



**AEGIS LABS INC.**



## Test Report And Application for Grant of Equipment Authorization

Pertaining To:

EUT	FCC ID:
<b>Hewlett Packard Notebook Computer Series PP2190</b>	<b>CNTPP2190</b>

Configuration
<b>Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module, MN: WM3B2100</b>

### *MEASUREMENTS PERFORMED IN ACCORDANCE WITH*

Regulatory Standard(s)
<b>47 CFR Part 15, Subpart C Section 15.247</b>
Test Method: ANSI C63.4: 1992 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

#### **APPLICANT:**

Hewlett Packard Company  
20555 SH 249  
Houston, TX 77070

Contact(s): Mr. David Wissel

#### **PREPARED BY:**

Aegis Labs, Inc.  
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Agent(s): Mr. Steve Kuiper  
Mr. Rick Candelas

	REPORT BODY	APPENDICES	TOTAL PAGES
		<i>A</i>	
PAGES	15	31	46

Test Report #: INTEL-030806F  
Test Report Revision: Rev. B, 09-22-03

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A	Test Data
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## 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 C of Part 15 of the FCC rules.

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.

**Prepared By:**

**08/11/03**

**Rick Candelas  
Staff Engineer  
Aegis Labs, Inc.**

**Date:**

**Report Approved By:**

**08/11/03**

**Steve J. Kuiper  
Quality Assurance Manager  
Aegis Labs, Inc.**

**Date:**

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## 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
15.247(a)(2)	The minimum 6dB bandwidth shall be at least 500 kHz.	PASSED	2.412 GHz = 12.75 MHz 2.437 GHz = 12.67 MHz 2.462 GHz = 12.58 MHz
15.247(b)(1)	The maximum peak output power of the intentional radiator shall not exceed 1 watt.	PASSED	2.412 GHz = 16.75 dBm (0.0473 W) 2.437 GHz = 16.65 dBm (0.0462 W) 2.462 GHz = 16.82 dBm (0.0481 W)
15.247(b)(4)	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 MPE Calculations
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	Conducted spurious emissions < -20dBc (Refer to 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	-1.24 dB @ 2483.5 MHz (Horizontal Polarization)
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	2.412 GHz = -8.00 dBm 2.437 GHz = -6.67 dBm 2.462 GHz = -8.33 dBm
15.207	AC Conducted Emissions	PASSED	-2.70 dB @ 0.5280 MHz
CISPR22	Radiated Emissions (30-1000 MHz)	PASSED	-1.75 dB @ 396.05 MHz (Vertical Polarization)

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### 3.0 ADMINISTRATIVE DATA AND TEST DESCRIPTION

<b>DEVICE TESTED:</b>	ITE Type: Hewlett Packard Notebook Computer Series PP2190 Model Number(s): Series PP2190 Serial Number: N/A FCC ID: CNTPP2190
<b>TEST DATE(S):</b>	August 6-7, 2003
<b>DATE EUT RECEIVED:</b>	August 2, 2003
<b>ORIGIN OF TEST SAMPLE(S):</b>	Production Unit
<b>RESPONSIBLE PARTY:</b>	Hewlett Packard Company 20555 SH 249 Houston, TX 77070
<b>CLIENT CONTACT:</b>	Mr. David Wissel
<b>MANUFACTURER:</b>	Hewlett Packard Company
<b>TEST LOCATION:</b>	Aegis Labs, Inc. 32231 Trabuco Creek Road Trabuco Canyon, CA 92678 Conducted Site #2 Radiated Site #2
<b>A2LA CERTIFICATE:</b>	1111.01, Valid through February 28, 2004
<b>PURPOSE OF TEST:</b>	To demonstrate compliance with the relevant standards described in Section 2.0 of this report.
<b>TEST(S) PERFORMED:</b>	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.

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## 4.0 DESCRIPTION OF EUT

### 4.1 EUT Description

Equipment Under Test (EUT)	
<b>Trade Name:</b>	Hewlett Packard Notebook Computer Series PP2190
<b>Model Number:</b>	Series PP2190 tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module, MN: WM3B2100
<b>Frequency Range:</b>	2.412 – 2.462 GHz
<b>Type of Transmission:</b>	Direct Sequence Spread Spectrum
<b>Transfer Rate:</b>	1/2/5.5/11 Mbps
<b>Number of Channels:</b>	11
<b>Modulation Type:</b>	DBPSK, DQPSK, CCK
<b>Antenna Type:</b>	PIFA Triple Band Antenna
<b>Antenna Gain (See Note 2):</b>	Main = 2.8dBi Aux = 2.7dBi
<b>Transmit Output Power:</b>	16 dBm (Typical) Please see Appendix I (Data Sheets) for actual output power.
<b>Power Supply:</b>	3.3VDC from computer MPCPI slot.
<b>Number of External Test Ports Exercised:</b>	2 Antenna Ports (1 Main & 1 Auxiliary)

The Hewlett Packard Notebook Computer Series PP2190 was tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module is an embedded 2.4 GHz Wireless Local Area Network Mini-PCI adapter. The Mini-PCI Type 3B form factor is designed for notebook computer systems where overall thickness must be kept to an absolute minimum and connect to antennas internal to the notebook computer. It is capable of a data rate of up to 11 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.

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#### 4.1.1 Channel Number and Frequencies

Eleven channels are provided for the EUT.

Channel	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462



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## 4.2 EUT Configuration

The EUT was set-up according to the ANSI C63.4: 1992 guidelines for emissions testing. All the appropriate test ports were exercised during both the pre-qualification and final evaluation scans.

The EUT was tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot and was connected to a set of Wistron NeWeb corp. triple band antennas via its main and auxiliary Ipex/Hirose antenna ports. Data can be found in Appendix A.

The Hewlett Packard Company notebook computer series PP2190 was connected to a Hewlett Packard printer, Logitech mouse, Dell LCD monitor, and Hayes modem via its parallel, USB, video, and serial ports respectively.

The EUT was transmitting on the channel stated in each test description at the maximum power.





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

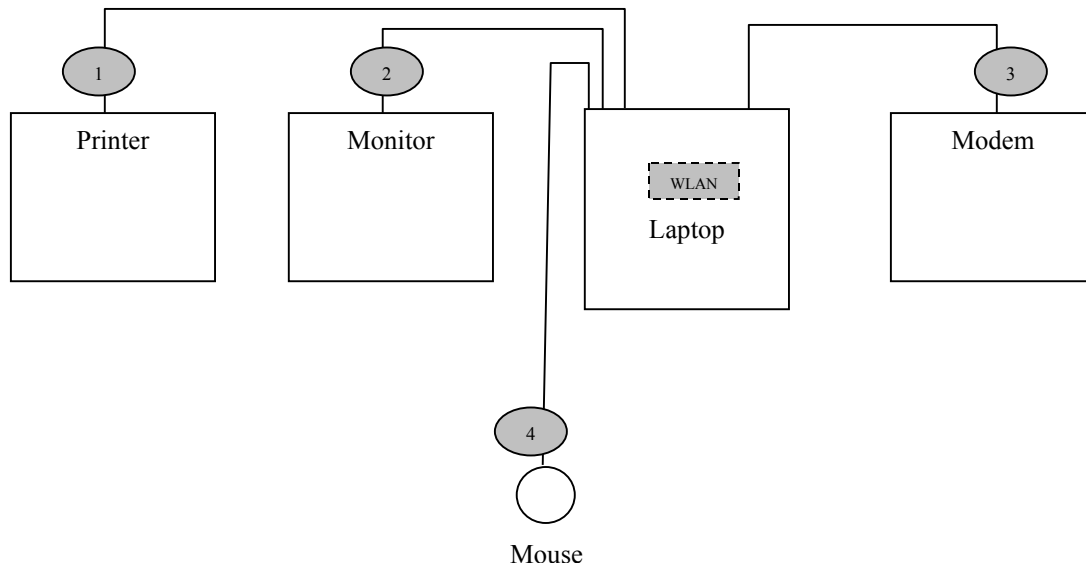
LIST OF EUT AND SUB-ASSEMBLIES			
Equipment Name	Manufacturer	Model Number	Serial Number
Notebook Computer	Hewlett-Packard	Series PP2190	N/A
EUT Sub-Assemblies			
802.11b MiniPCI Type IIIB Wireless Module	Intel Corporation	WM3B2100	00042351595D
Auxiliary Triple Band Antenna	Winstron NeWeb Corp.	PN: 6036A0005601	N/A
Main Triple Band Antenna	Winstron NeWeb Corp.	PN: 6036A0005501	N/A

HOST EQUIPMENT LIST			
Equipment Name	Manufacturer	Model Number	Serial Number
LCD Monitor	Dell	E151FPp	CN-06R644-47804-34R-LATL
Printer	Hewlett Packard	C8952A	CN29A1F0W0
Modem	Hayes	5362US	A02153623145
Mouse	Logitech	M-BJ58	LNA22802012

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



#### 4.4 I/O Cabling Diagram and Description



- Cable 1: This is a 6-foot braid and foil shielded round cable connecting the Hewlett Packard Company notebook computer to the Hewlett Packard Printer. It has a metallic DB-25 type connector at the computer end and a metallic centronics type connector at the printer end. 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 Hewlett Packard Company notebook computer with the Dell LCD 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 3: This is a 6-foot braid and foil shielded round cable connecting the Hewlett Packard Company notebook computer with the Hayes modem. It has metallic DB-9 type connector at the computer end and a metallic DB-25 type connector at the modem end. 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 4: This is a 6-foot braid and foil shielded round cable connecting the Hewlett Packard Company notebook computer to the Logitech mouse. It has a metallic USB-B 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.



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## 5.0 TEST EQUIPMENT AND TEST SETUPS

The test equipment settings and functions are selected using the guidance of ANSI C63.4-1992. 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: 1992. 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.



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## 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: 1992 and ANSI C63.7: 1992 guidelines. The Measurements were conducted in accordance with ANSI C63.4: 1992 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.



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## 5.4 Test and Measurement Equipment Used

TEST EQUIPMENT USED					
Equipment Name	Manufacturer	Model Number	Serial Number	Calibration Due Date	Calibration Cycle
EMI Receiver - RF Section	Hewlett Packard	85462A	3325A00137	12/16/03	1 Year
EMI Receiver - RF Filter Section	Hewlett Packard	85460A	3330A00138	12/16/03	1 Year
Attenuator - 5W-10dB	Pasternack	PE7014-10	N/A	11/03/03	1 Year
LISN (EUT)	FCC	FCC-LISN-50-25-2	9931	02/20/04	1 Year
LISN (Access)	Com-Power	LI-200	12019	01/25/04	1 Year
LISN (Access)	Com-Power	LI-200	12018	01/25/04	1 Year
Spectrum Analyzer	Agilent	8564EC	4046A00387	02/28/04	2 Years
Preamplifier	Agilent	8449B	3008A01573	04/29/04	2 Years
High Pass Filter	Microwave Circuits, Inc.	H3G020G2	0301DC0132	04/29/04	2 Years
Antenna - Biconical	EMCO	3110	9108-1421	02/11/04	1 Year
Antenna - Log Periodic	EMCO	3148	4947	02/11/04	1 Year
1-18 GHz Antenna - Horn	EMCO	3115	2230	09/14/03	1 Year
18-26.5 GHz Antenna – Horn	Custom Microwave	H042	001	05/09/04	1 Year
Power Meter	Rohde & Schwarz	NRVS	DE30863	07/21/05	2 Years
Power Sensor	Leistungsmesskoph	NRV-Z5	844855/012	07/21/05	2 Years
Temperature/Humidity Monitor	Dickson	TH550	7255185	01/18/04	1 Year

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## 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:

$$\text{Corrected Meter Reading} = \text{Meter Reading} + F + C - G - D$$

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:

$$\text{CML} = \text{Specification Limit} - F - C + G + D$$

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.



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## **7.0 MODIFICATIONS AND RECOMMENDATIONS**

No modifications were made to the EUT.



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## **APPENDIX A**

### ***TEST DATA***

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## AC POWER LINE CONDUCTED EMISSIONS TEST RESULTS

<b>CLIENT:</b>	Hewlett Packard Company	<b>DATE:</b>	08/06/03
<b>EUT:</b>	Notebook Computer	<b>PROJECT NUMBER:</b>	INTEL-030806-06
<b>MODEL NUMBER:</b>	Series PP2190	<b>TEST ENGINEER:</b>	Rick Candelas
<b>SERIAL NUMBER:</b>	N/A	<b>SITE #:</b>	2
<b>CONFIGURATION:</b>	Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot.	<b>TEMPERATURE:</b>	26 C
		<b>HUMIDITY:</b>	60% RH
		<b>TIME:</b>	8:00 AM

<b>Standard:</b>	FCC CFR 47, Part 15.207
<b>Description:</b>	AC Power Line Conducted Emissions
<b>Results:</b>	Passes the conducted limits by -2.70@ 0.5280 MHz

Conducted Limits		
Frequency (MHz)	Quasi-Peak Limit (dBuV)	Average Limit (dBuV)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

NOTE: During preliminary scans, there wasn't any difference which channel or data rate was used with the EUT; therefore only Channel 1 at a data rate of 1 Mbps was used for final testing.

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## AC Power Line Conducted Emissions Test Results (Continued)

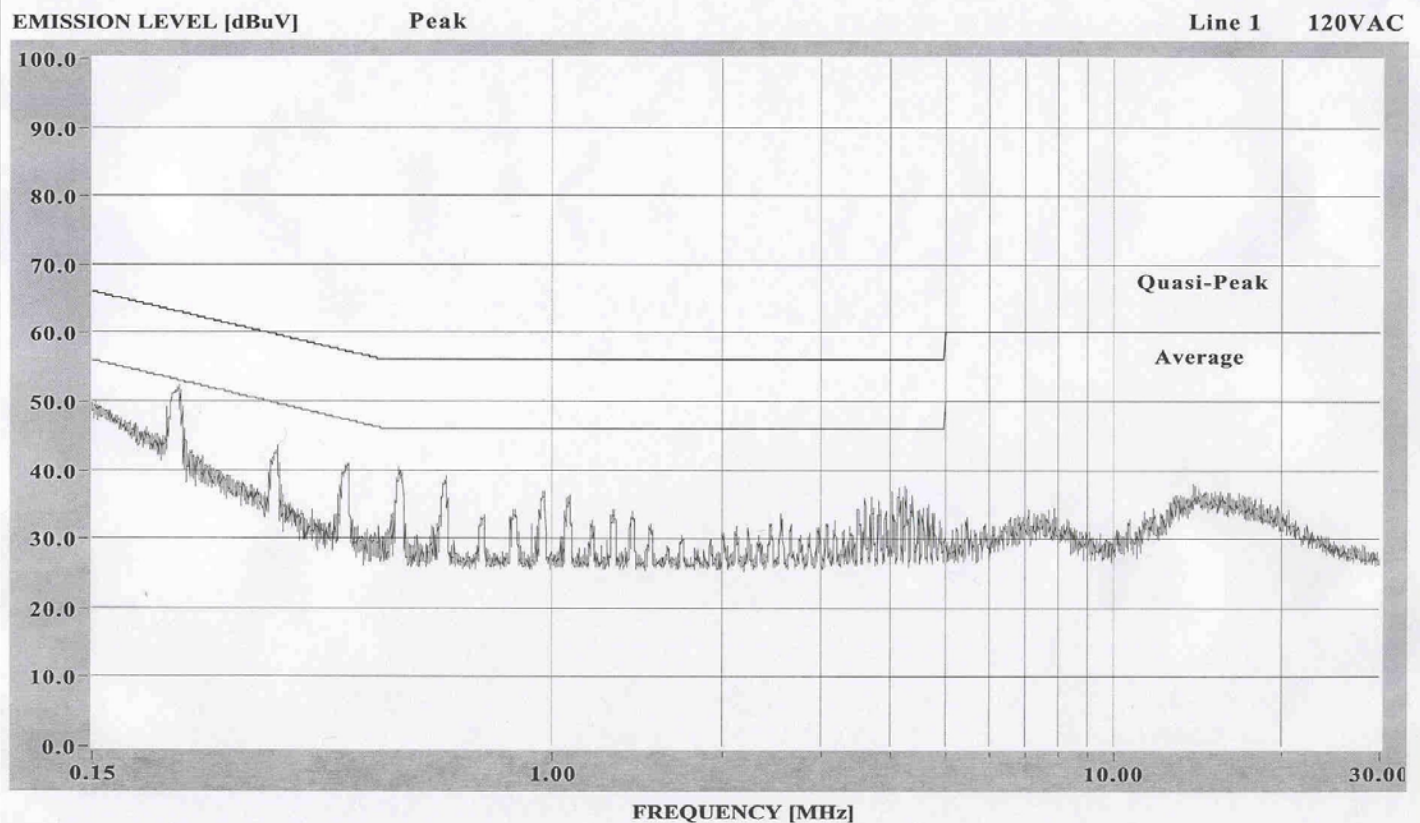
CONDUCTED EMISSIONS – LINE 1						
Freq. (MHz)	Meter Reading (dBuV)	Detector (PK/QP/AV)	Average Limit (dBuV)	Average Delta(dB)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta(dB)
0.2160	54.00	PK	54.11	-0.11	64.11	-10.11
0.2160	33.90	AV	54.11	-20.21	64.11	-30.21
0.3174	44.60	PK	51.22	-6.62	61.22	-16.62
0.4269	42.10	PK	48.09	-5.99	58.09	-15.99
0.5280	43.30	PK	46.00	-2.70	56.00	-12.70
4.5300	39.60	PK	46.00	-6.40	56.00	-16.40
6.3600	38.90	PK	50.00	-11.10	60.00	-21.10

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Date: 8/6/2003 Time: 2:23 PM

Usage for graphical purposes only.  
Refer to conducted measurement table for  
Peak, QP, and Avg. measurements, where applicable.

802.11b MiniPCI Type IIIB Wireless Module



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## AC Power Line Conducted Emissions Test Results (Continued)

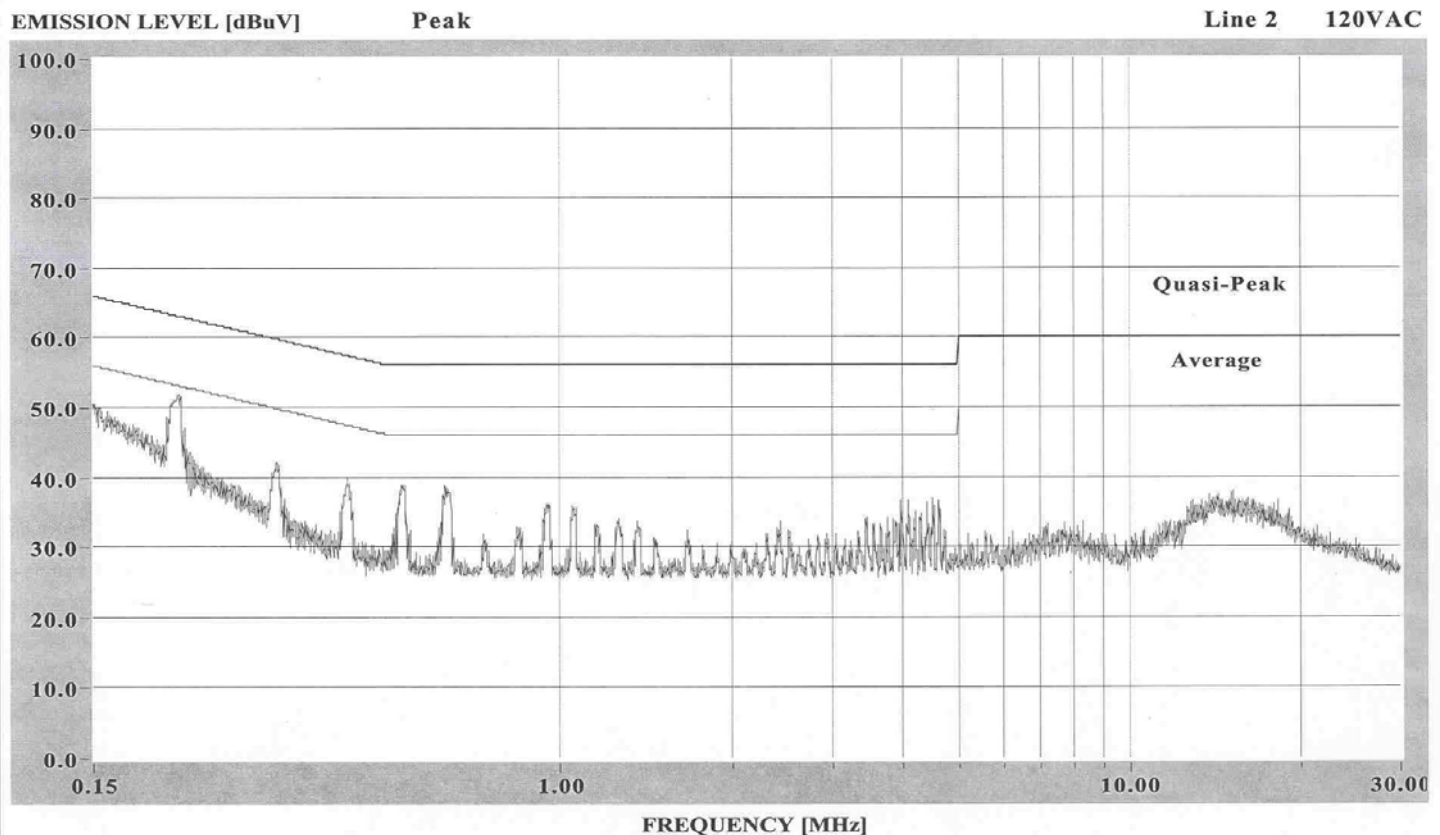
CONDUCTED EMISSIONS - LINE 2						
Freq. (MHz)	Meter Reading (dBuV)	Detector (PK/QP/AV)	Average Limit (dBuV)	Average Delta(dB)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta(dB)
0.2163	50.90	PK	54.11	-3.21	64.11	-13.21
0.3183	44.10	PK	51.19	-7.09	61.19	-17.09
0.4221	41.40	PK	48.22	-6.82	58.22	-16.82
0.5307	42.60	PK	46.00	-3.40	56.00	-13.40
3.7650	38.00	PK	46.00	-8.00	56.00	-18.00
14.7000	39.80	PK	50.00	-10.20	60.00	-20.20

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Usage for graphical purposes only.  
Refer to conducted measurement table for  
Peak, QP, and Avg. measurements, where applicable.

Date: 8/6/2003 Time: 2:31 PM

#### 802.11b MiniPCI Type IIIB Wireless Module



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## SPURIOUS RADIATED EMISSIONS TEST RESULTS

<b>CLIENT:</b>	Hewlett Packard Company	<b>DATE:</b>	08/06/03
<b>EUT:</b>	Notebook Computer	<b>PROJECT NUMBER:</b>	INTEL-030806-05
<b>MODEL NUMBER:</b>	Series PP2190	<b>TEST ENGINEER:</b>	Rick Candelas
<b>SERIAL NUMBER:</b>	N/A	<b>SITE #:</b>	2
<b>CONFIGURATION:</b>	Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot.	<b>TEMPERATURE:</b>	31 C
		<b>HUMIDITY:</b>	40% RH
		<b>TIME:</b>	1:00 PM

<b>Standard:</b>	CISPR22
<b>Description:</b>	Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Sec. 15.209. (Using CISPR22 Class B Limits)
<b>Results:</b>	Passes the radiated limits by -1.75@ 396.05 MHz (Vertical antenna polarization)

Radiated Limits	
Frequency (MHz)	Quasi-Peak Limit (dBuV) @ 10m
30-230	30
230-1000	37

NOTE: During preliminary scans, there wasn't any difference which channel or data rate was used with the EUT; therefore only Channel 1 at a data rate of 1 Mbps was used for final testing.

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## Spurious Radiated Emissions Test Results (Continued)

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
96.06	44.30	400	180			34.41	1.66	9.39	20.94	30.00	-9.06
144.07	46.50	400	135	45.12	Q	34.33	2.00	14.90	27.70	30.00	-2.30
198.04	40.90	400	90			34.32	2.39	16.94	25.92	30.00	-4.08
242.06	35.50	400	135			34.23	2.67	17.60	21.54	37.00	-15.46
264.03	40.00	350	135			34.21	2.81	18.43	27.03	37.00	-9.97
286.02	35.90	300	135			34.17	2.94	19.31	23.98	37.00	-13.02
308.05	40.50	300	135			34.13	3.05	13.90	23.31	37.00	-13.69
330.06	39.60	300	135			34.11	3.18	15.00	23.67	37.00	-13.33
333.07	41.20	300	135			34.10	3.20	15.03	25.33	37.00	-11.67
352.05	39.20	250	180			34.09	3.31	15.19	23.61	37.00	-13.39
374.05	40.90	250	180			34.05	3.40	15.06	25.31	37.00	-11.69
396.03	49.00	250	90			34.03	3.48	15.18	33.63	37.00	-3.37
418.03	41.90	250	315			33.98	3.57	15.85	27.34	37.00	-9.66
500.45	41.60	200	45			33.86	4.00	18.80	30.54	37.00	-6.46
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
56.33	47.70	100	225			34.40	1.16	9.54	24.01	30.00	-5.99
70.85	47.70	100	135			34.40	1.41	6.73	21.44	30.00	-8.56
96.00	50.00	100	180			34.42	1.66	9.10	26.35	30.00	-3.65
143.98	46.30	100	90	45.46	Q	34.33	2.00	14.40	27.53	30.00	-2.47
198.04	39.90	100	180			34.32	2.39	17.02	25.00	30.00	-5.00
242.01	35.98	100	180			34.23	2.67	18.68	23.10	37.00	-13.90
264.00	39.50	100	180			34.21	2.81	19.21	27.32	37.00	-9.68
286.05	38.30	100	180			34.17	2.94	19.87	26.94	37.00	-10.06
308.05	43.70	100	180			34.13	3.05	14.40	27.01	37.00	-9.99
330.04	40.80	100	225			34.11	3.18	15.60	25.47	37.00	-11.53
333.13	42.80	100	270			34.10	3.20	15.57	27.46	37.00	-9.54
352.02	40.80	100	180			34.09	3.31	15.39	25.41	37.00	-11.59
374.05	42.20	100	225			34.05	3.40	15.30	26.85	37.00	-10.15
396.05	50.50	100	180	49.65	Q	34.03	3.48	16.14	35.25	37.00	-1.75
418.04	45.50	100	180			33.98	3.57	16.55	31.64	37.00	-5.36

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AEGIS LABS INC.

## Spurious Radiated Emissions Test Results (Continued)

<b>CLIENT:</b>	Hewlett Packard Company	<b>DATE:</b>	08/07/03
<b>EUT:</b>	Notebook Computer	<b>PROJECT NUMBER:</b>	INTEL-030806
<b>MODEL NUMBER:</b>	Series PP2190	<b>TEST ENGINEER:</b>	Rick Candelas
<b>SERIAL NUMBER:</b>	N/A	<b>SITE #:</b>	2
<b>CONFIGURATION:</b>	Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot.	<b>TEMPERATURE:</b>	15 C
		<b>HUMIDITY:</b>	93% RH
		<b>TIME:</b>	8:00 AM

<b>Standard:</b>	FCC CFR 47, Part 15.247(c)
<b>Description:</b>	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.
<b>Results:</b>	Passes the radiated limits by -1.24@ 2483.5 MHz (Horizontal antenna polarization)

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

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AEGIS LABS INC.

## Spurious Radiated Emissions Test Results (Continued)

*Fundamental Measurements at Channels 1, 6, & 11*  
*Aegis Labs, Inc. File #: INTEL-030806-03*

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
2412.00	72.00	100	315				2.99	29.22	104.21		
2412.00				68.67	A		2.99	29.22	100.88		
2437.00	73.83	125	315				3.05	29.27	106.15		
2462.00	77.67	100	225				3.11	29.32	110.10		
2462.00				74.17	A		3.11	29.32	106.60		

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
2412.00	73.67	125	270				2.99	29.42	106.08		
2412.00				70.00	A		2.99	29.42	102.41		
2437.00	74.50	150	270				3.05	29.47	107.02		
2462.00	75.00	200	270				3.11	29.52	107.63		
2462.00				71.50	A		3.11	29.52	104.13		

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



AEGIS LABS INC.

## Spurious Radiated Emissions Test Results (Continued)

*Band Edge Field Strength Calculations at Channels 1 & 11*  
*Aegis Labs, Inc. File #: INTEL-030806-03*

RADIATED EMISSIONS - Horizontal Antenna Polarization											
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)		Preamplifier Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL
2390.00									52.05	74.00	-21.95
2390.00					A				43.21	54.00	-10.79
2483.50									59.43	74.00	-14.57
2483.50					A				52.76	54.00	-1.24

RADIATED EMISSIONS - Vertical Antenna Polarization											
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)		Preamplifier Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL
2390.00									53.92	74.00	-20.08
2390.00					A				44.74	54.00	-9.26
2483.50									56.96	74.00	-17.04
2483.50					A				50.29	54.00	-3.71

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:

$$BE = F_m - \Delta_m$$

Where

BE = Band Edge Field Strength

F<sub>m</sub> = Measured Fundamental (Peak or Average)

Δ<sub>m</sub> = Measured Conducted Band Edge Delta (Peak or Average)

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AEGIS LABS INC.

## Spurious Radiated Emissions Test Results (Continued)

*Spurious Emissions Measurements*  
*“Continuous Transmit Mode”*  
*Aegis Labs, Inc. File #: INTEL-030806-04*

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
EUT in Continuous Transmit Mode on Channel 1 (2.412 GHz)											
4823.98	43.50	100	180			36.16	4.06	34.10	45.50	74.00	-28.50
4823.98				33.83	A	36.16	4.06	34.10	35.83	54.00	-18.17
1154.00	65.50	125	225			36.75	1.71	25.45	55.91	74.00	-18.09
1154.00				38.83	A	36.75	1.71	25.45	29.24	54.00	-24.76
1566.00	57.83	100	135			36.93	2.20	26.92	50.03	74.00	-23.97
1566.00				36.67	A	36.93	2.20	26.92	28.87	54.00	-25.13
EUT in Continuous Transmit Mode on Channel 6 (2.437 GHz)											
4873.96	42.50	100	180			36.20	4.10	34.27	44.67	74.00	-29.33
4873.96				31.00	A	36.20	4.10	34.27	33.17	54.00	-20.83
1154.00	66.67	150	225			36.75	1.71	25.45	57.08	74.00	-16.92
1153.75				39.50	A	36.75	1.71	25.45	29.91	54.00	-24.09
1567.50	58.17	100	135			36.94	2.20	26.93	50.36	74.00	-23.64
1567.50				34.83	A	36.94	2.20	26.93	27.02	54.00	-26.98
EUT in Continuous Transmit Mode on Channel 11 (2.462 GHz)											
4923.71	41.33	100	180			36.24	4.14	34.44	43.67	74.00	-30.33
4923.71				28.83	A	36.24	4.14	34.44	31.17	54.00	-22.83
1154.10	64.83	125	180			36.75	1.71	25.45	55.24	74.00	-18.76
1154.10				37.00	A	36.75	1.71	25.45	27.41	54.00	-26.59
1567.60	57.00	100	135			36.94	2.20	26.93	49.19	74.00	-24.81
1567.60				35.83	A	36.94	2.20	26.93	28.02	54.00	-25.98



AEGIS LABS INC.

## Spurious Radiated Emissions Test Results (Continued)

*Spurious Emissions Measurements*  
*“Continuous Transmit Mode”*  
*Aegis Labs, Inc. File #: INTEL-030806-04*

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
<b>EUT in Continuous Transmit Mode on Channel 1 (2.412 GHz)</b>											
4824.05	43.00	100	135			36.16	4.06	34.07	44.97	74.00	-29.03
4824.05				30.17	A	36.16	4.06	34.07	32.14	54.00	-21.86
1153.50	71.00	100	135			36.75	1.71	25.52	61.48	74.00	-12.52
1153.50				44.00	A	36.75	1.71	25.52	34.48	54.00	-19.52
1563.20	58.67	125	135			36.91	2.20	26.94	50.90	74.00	-23.10
1563.20				36.86	A	36.91	2.20	26.94	29.09	54.00	-24.91
<b>EUT in Continuous Transmit Mode on Channel 6 (2.437 GHz)</b>											
4873.99	41.83	100	135			36.20	4.10	34.22	43.95	74.00	-30.05
4873.99				29.83	A	36.20	4.10	34.22	31.95	54.00	-22.05
1153.60	71.67	100	180			36.75	1.71	25.52	62.15	74.00	-11.85
1153.60				44.17	A	36.75	1.71	25.52	34.65	54.00	-19.35
1569.37	60.67	100	135			36.95	2.20	26.96	52.88	74.00	-21.12
1569.37				37.17	A	36.95	2.20	26.96	29.38	54.00	-24.62
<b>EUT in Continuous Transmit Mode on Channel 11 (2.462 GHz)</b>											
4924.07	41.67	100	135			36.24	4.14	34.37	43.94	74.00	-30.06
4924.07				28.50	A	36.24	4.14	34.37	30.77	54.00	-23.23
1154.30	71.83	100	180			36.75	1.71	25.52	62.31	74.00	-11.69
1154.30				44.67	A	36.75	1.71	25.52	35.15	54.00	-18.85
1594.16	59.83	150	270			37.15	2.20	27.06	51.93	74.00	-22.07
1594.16				37.50	A	37.15	2.20	27.06	29.60	54.00	-24.40



AEGIS LABS INC.

## Spurious Radiated Emissions Test Results (Continued)

*Spurious Emissions Measurements*  
*“Continuous Receive Mode”*  
*Aegis Labs, Inc. File #: INTEL-030806-04*

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
<b>EUT in Continuous Receive Mode on Channel 1 (2.412 GHz)</b>											
1154.00	64.50	100	225			36.75	1.71	25.45	54.91	74.00	-19.09
1154.00				36.17	A	36.75	1.71	25.45	26.58	54.00	-27.42
1566.30	56.83	100	135			36.93	2.20	26.93	49.03	74.00	-24.97
1566.30				34.50	A	36.93	2.20	26.93	26.70	54.00	-27.30
<b>EUT in Continuous Receive Mode on Channel 6 (2.437 GHz)</b>											
1154.01	65.00	100	225			36.75	1.71	25.45	55.41	74.00	-18.59
1154.01				30.10	A	36.75	1.71	25.45	20.51	54.00	-33.49
1566.00	57.10	100	135			36.93	2.20	26.92	49.30	74.00	-24.70
1566.00				35.33	A	36.93	2.20	26.92	27.53	54.00	-26.47
<b>EUT in Continuous Receive Mode on Channel 11 (2.462 GHz)</b>											
1154.50	64.80	100	225			36.75	1.71	25.46	55.21	74.00	-18.79
1154.50				34.00	A	36.75	1.71	25.46	24.41	54.00	-29.59
1565.90	56.98	100	135			36.93	2.20	26.92	49.18	74.00	-24.82
1565.90				36.40	A	36.93	2.20	26.92	28.60	54.00	-25.40

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AEGIS LABS INC.

## Spurious Radiated Emissions Test Results (Continued)

*Spurious Emissions Measurements*  
*"Continuous Receive Mode"*  
*Aegis Labs, Inc. File #: INTEL-030806-04*

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
<b>EUT in Continuous Receive Mode on Channel 1 (2.412 GHz)</b>											
1175.90	70.33	100	180			36.82	1.75	25.60	60.86	74.00	-13.14
1175.90				44.00	A	36.82	1.75	25.60	34.53	54.00	-19.47
1537.70	58.33	125	180			36.79	2.18	26.84	50.56	74.00	-23.44
1537.70				36.33	A	36.79	2.18	26.84	28.56	54.00	-25.44
<b>EUT in Continuous Receive Mode on Channel 6 (2.437 GHz)</b>											
1175.80	72.00	100	180			36.82	1.75	25.60	62.53	74.00	-11.47
1175.80				43.90	A	36.82	1.75	25.60	34.43	54.00	-19.57
1594.00	57.90	125	180			37.15	2.20	27.06	50.01	74.00	-23.99
1594.00				36.67	A	37.15	2.20	27.06	28.78	54.00	-25.22
<b>EUT in Continuous Receive Mode on Channel 11 (2.462 GHz)</b>											
1160.00	71.80	100	180			36.77	1.72	25.54	62.29	74.00	-11.71
1160.00				44.67	A	36.77	1.72	25.54	35.16	54.00	-18.84
1590.00	58.40	125	180			37.12	2.20	27.04	50.52	74.00	-23.48
1590.00				35.80	A	37.12	2.20	27.04	27.92	54.00	-26.08

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AEGIS LABS INC.

## CONDUCTED BAND EDGE MEASUREMENTS

<b>CLIENT:</b>	Hewlett Packard Company	<b>DATE:</b>	08/06/03
<b>EUT:</b>	Notebook Computer	<b>PROJECT NUMBER:</b>	INTEL-030806-02a
<b>MODEL NUMBER:</b>	Series PP2190	<b>TEST ENGINEER:</b>	Rick Candelas
<b>SERIAL NUMBER:</b>	N/A	<b>SITE #:</b>	2
<b>CONFIGURATION:</b>	Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot.	<b>TEMPERATURE:</b>	21 C
		<b>HUMIDITY:</b>	68% RH
		<b>TIME:</b>	5:00 AM

<b>Standard:</b>	FCC CFR 47, Part 15.247C
<b>Description:</b>	Conducted band edge plots for use in calculating the emissions within a restricted band near the operating band using the "Marker Delta Method".
<b>Results:</b>	For signals in the restricted bands immediately above and below the 2.412 to 2.462 GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was then applied to the average and peak field strength of the intentional signal to calculate the field strength of the unintentional signals.

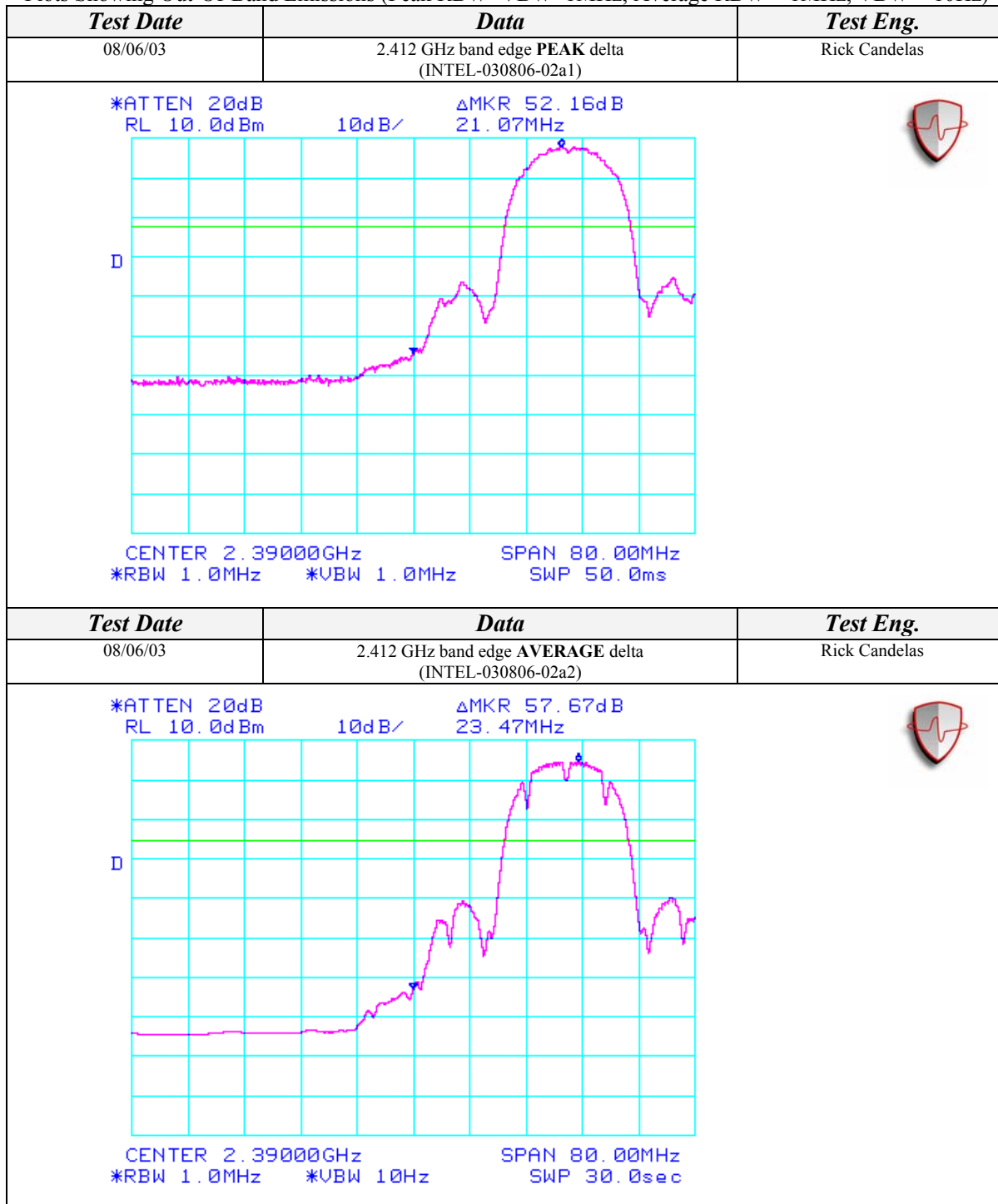
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AEGIS LABS INC.

## Conducted Band Edge Measurements (Continued)

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



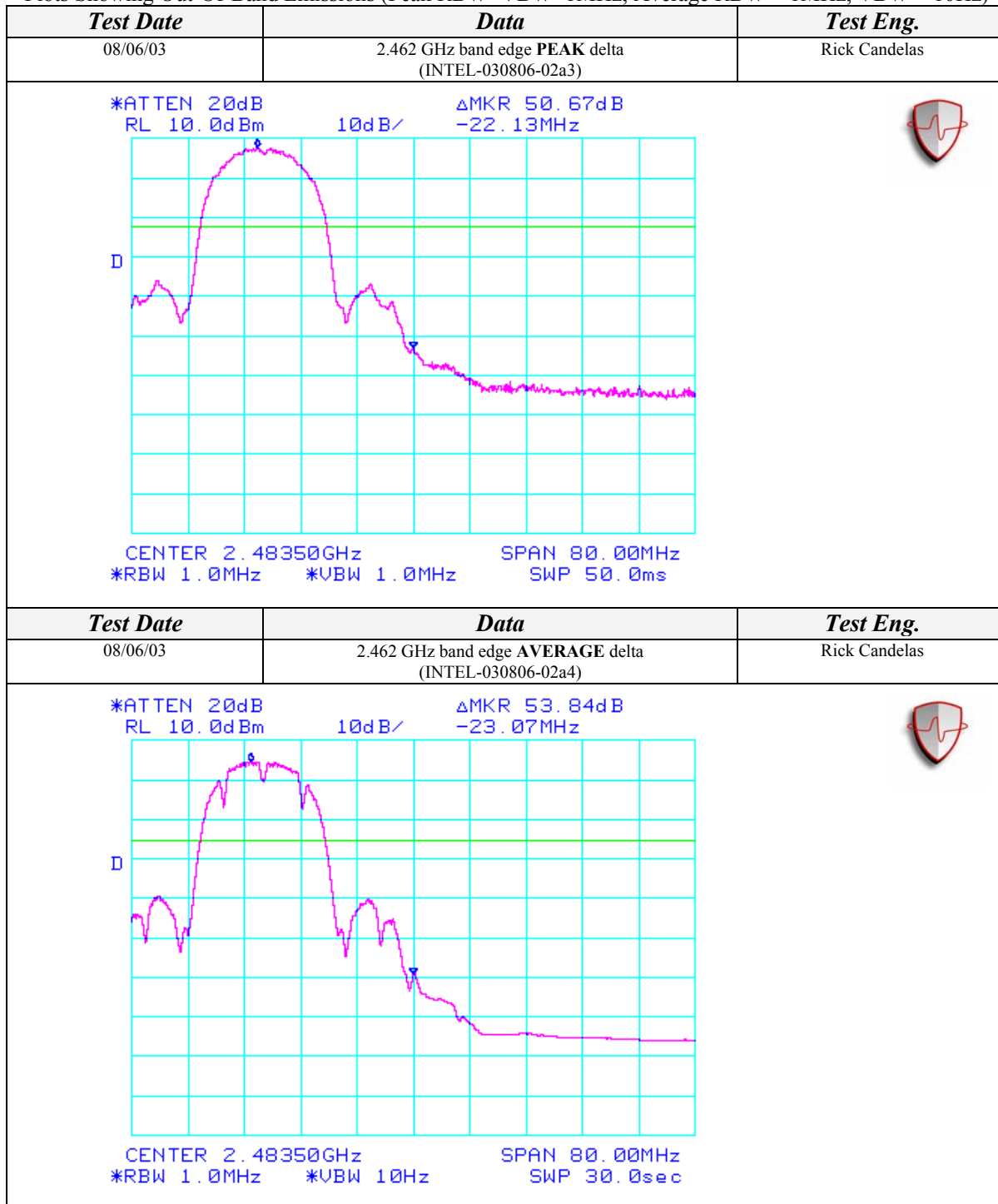
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AEGIS LABS INC.

## Conducted Band Edge Measurements (Continued)

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



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AEGIS LABS INC.

## PEAK TRANSMIT POWER

<b>CLIENT:</b>	Hewlett Packard Company	<b>DATE:</b>	08/06/03
<b>EUT:</b>	Notebook Computer	<b>PROJECT NUMBER:</b>	INTEL-030806-01
<b>MODEL NUMBER:</b>	Series PP2190	<b>TEST ENGINEER:</b>	Rick Candelas
<b>SERIAL NUMBER:</b>	N/A	<b>SITE #:</b>	2
<b>CONFIGURATION:</b>	Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot.	<b>TEMPERATURE:</b>	18 C
		<b>HUMIDITY:</b>	80% RH
		<b>TIME:</b>	4:00 AM

<b>Standard:</b>	FCC CFR 47, Part 15.247(b)(1)
<b>Description:</b>	The maximum peak output power of the intentional radiator shall not exceed 1 watt.
<b>Results:</b>	0.0473 W @ 2.412 GHz 0.0462 W @ 2.437 GHz 0.0481 W @ 2.462 GHz

Peak Transmit Power Limits	
Frequency (MHz)	Output Power (W)
2412-2462	1

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## Peak Transmit Power (Continued)

Frequency (MHz)	Rate (Mbps)	Power (dBm)	Cable Factor (dB)	Power Corrected (dBm)	Power (mW)
2412.00	1	16.60	0.15	16.75	47.32
2412.00	5.5	16.30	0.15	16.45	44.16
2412.00	11	16.17	0.15	16.32	42.85
2437.00	1	16.50	0.15	16.65	46.24
2437.00	5.5	16.16	0.15	16.31	42.76
2437.00	11	16.12	0.15	16.27	42.36
2462.00	1	16.67	0.15	16.82	48.08
2462.00	5.5	16.34	0.15	16.49	44.57
2462.00	11	16.27	0.15	16.42	43.85



AEGIS LABS INC.

## 6 dB EMISSIONS BANDWIDTH

<b>CLIENT:</b>	Hewlett Packard Company	<b>DATE:</b>	08/06/03
<b>EUT:</b>	Notebook Computer	<b>PROJECT NUMBER:</b>	INTEL-030806-02b
<b>MODEL NUMBER:</b>	Series PP2190	<b>TEST ENGINEER:</b>	Rick Candelas
<b>SERIAL NUMBER:</b>	N/A	<b>SITE #:</b>	2
<b>CONFIGURATION:</b>	Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot.	<b>TEMPERATURE:</b>	21 C
		<b>HUMIDITY:</b>	68% RH
		<b>TIME:</b>	5:00 AM

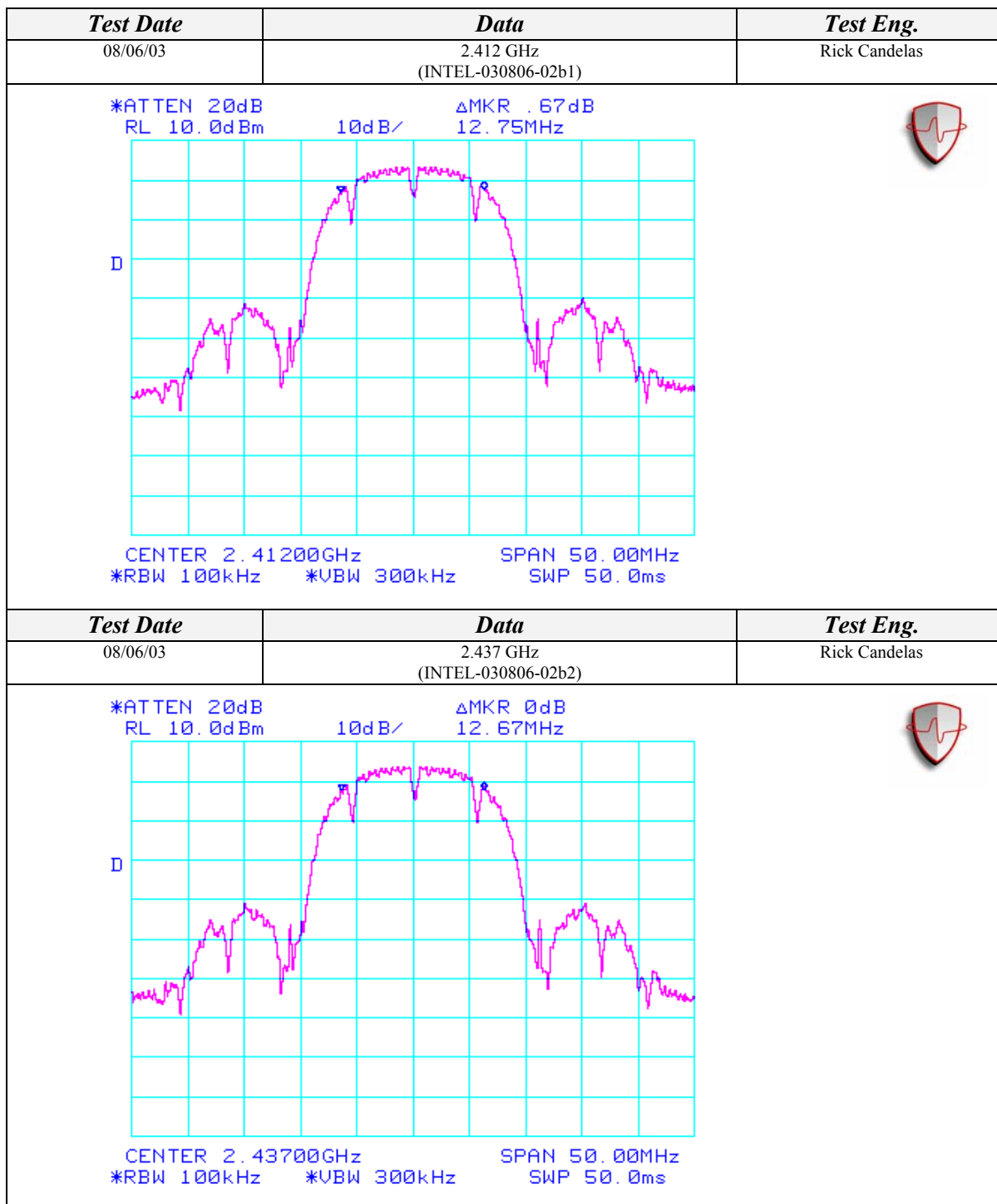
<b>Standard:</b>	FCC CFR 47, Part 15.247(a)(2)
<b>Description:</b>	The minimum 6 dB bandwidth shall be at least 500 kHz.
<b>Results:</b>	12.75 MHz @ 2.412 GHz 12.67 MHz @ 2.437 GHz 12.58 MHz @ 2.462 GHz

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## 6 dB Emissions Bandwidth (Continued)

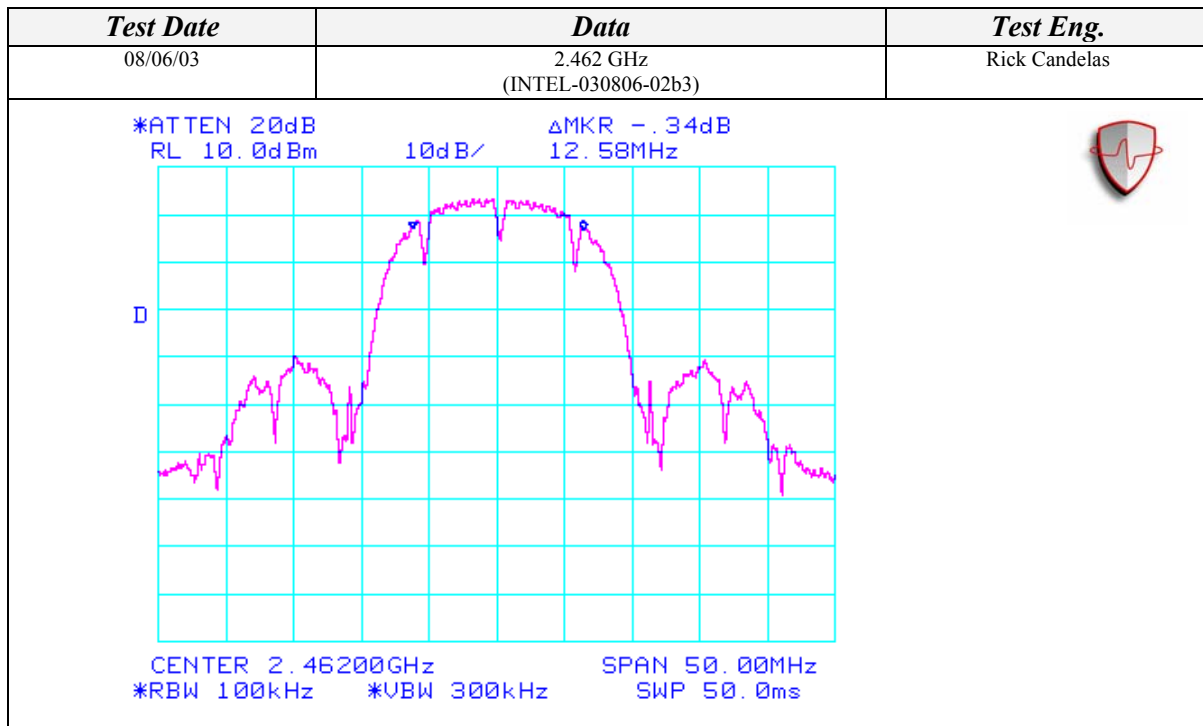


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## 6 dB Emissions Bandwidth (Continued)



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AEGIS LABS INC.

## PEAK POWER SPECTRAL DENSITY

<b>CLIENT:</b>	Hewlett Packard Company	<b>DATE:</b>	08/06/03
<b>EUT:</b>	Notebook Computer	<b>PROJECT NUMBER:</b>	INTEL-030806-02c
<b>MODEL NUMBER:</b>	Series PP2190	<b>TEST ENGINEER:</b>	Rick Candelas
<b>SERIAL NUMBER:</b>	N/A	<b>SITE #:</b>	2
<b>CONFIGURATION:</b>	Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot.	<b>TEMPERATURE:</b>	21 C
		<b>HUMIDITY:</b>	68% RH
		<b>TIME:</b>	5:00 AM

<b>Standard:</b>	FCC CFR 47, Part 15.247(d)
<b>Description:</b>	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.
<b>Results:</b>	-8.00 dBm @ 2.412 GHz -6.67 dBm @ 2.437 GHz -8.33 dBm @ 2.462 GHz

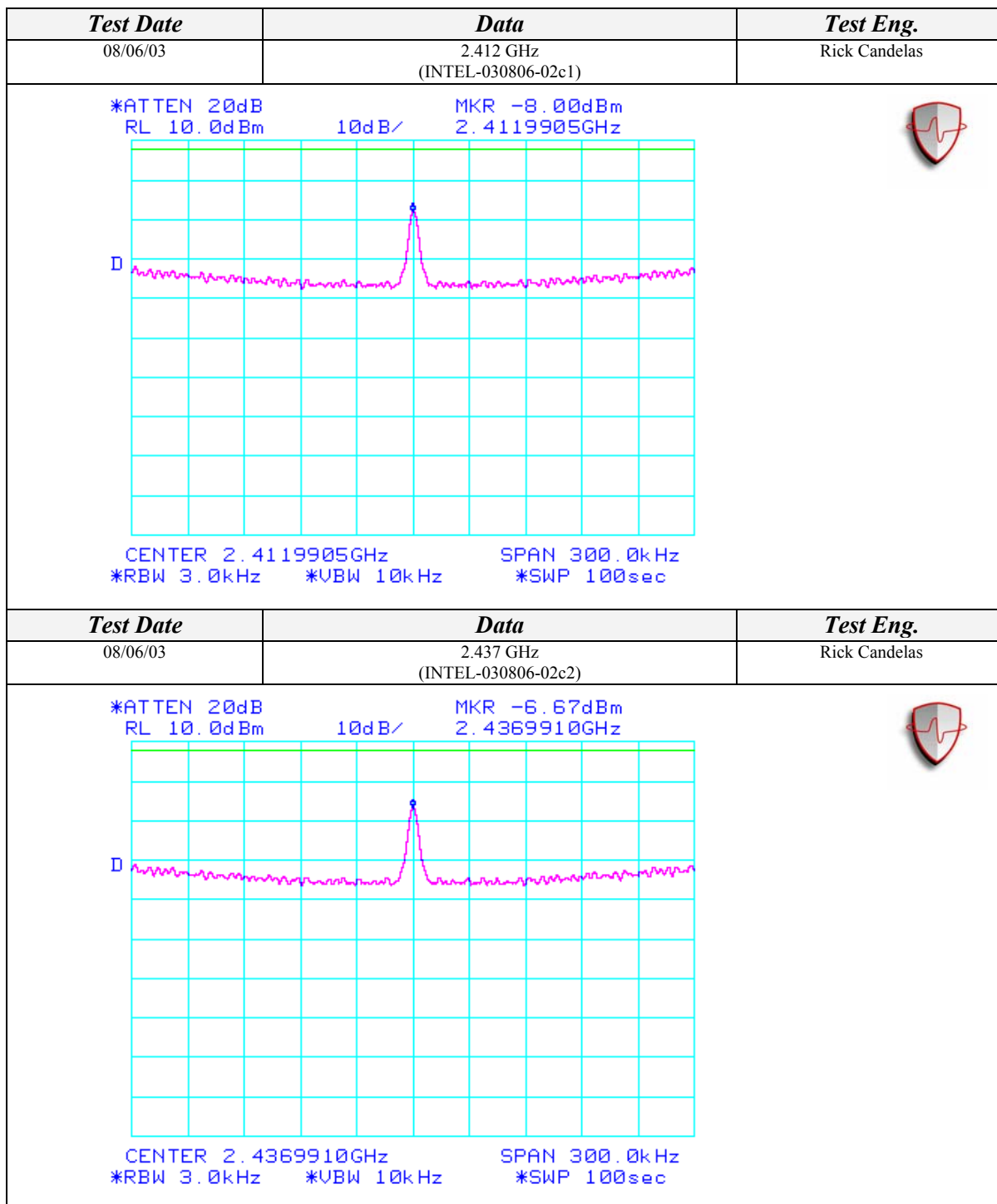
Peak Power Spectral Density Limits	
Frequency (MHz)	Limit (dBm)
2412-2462	8

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## Peak Power Spectral Density (Continued)

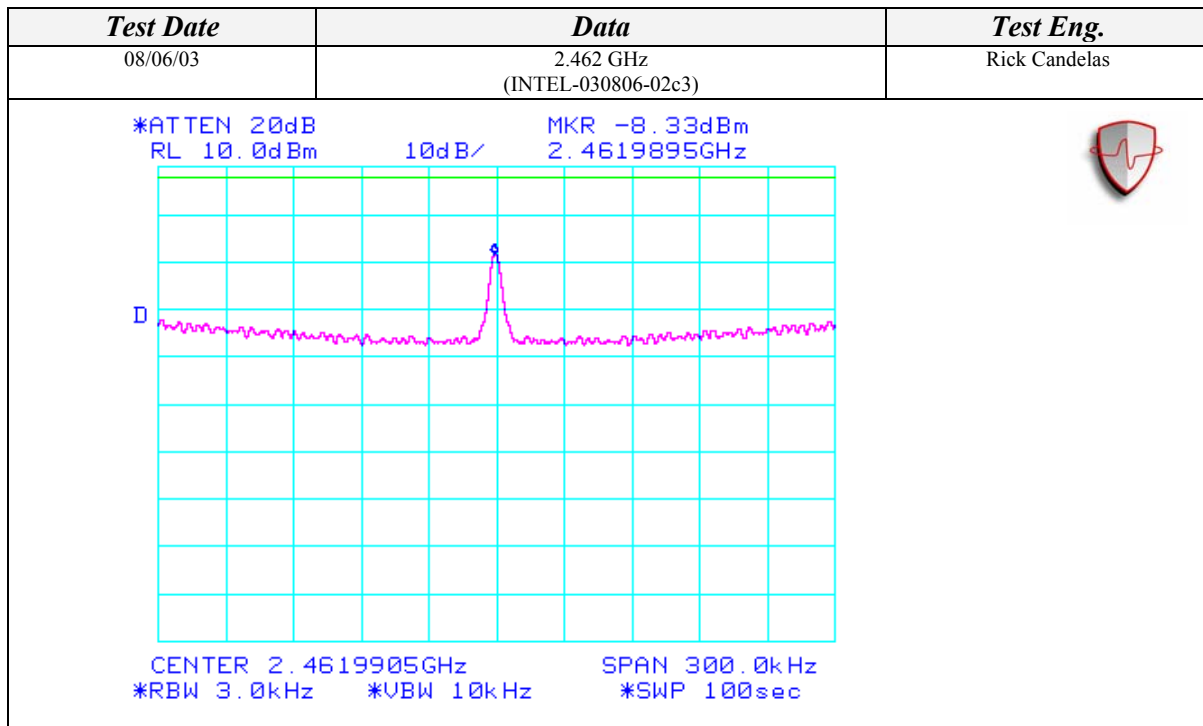


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## Peak Power Spectral Density (Continued)





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## CONDUCTED OUT OF BAND EMISSIONS

<b>CLIENT:</b>	Hewlett Packard Company	<b>DATE:</b>	08/06/03
<b>EUT:</b>	Notebook Computer	<b>PROJECT NUMBER:</b>	INTEL-030806-02d
<b>MODEL NUMBER:</b>	Series PP2190	<b>TEST ENGINEER:</b>	Rick Candelas
<b>SERIAL NUMBER:</b>	N/A	<b>SITE #:</b>	2
<b>CONFIGURATION:</b>	Tested with an Intel 802.11b MiniPCI Type IIIB Wireless Module installed in its mini PCI slot.	<b>TEMPERATURE:</b>	21 C
		<b>HUMIDITY:</b>	68% RH
		<b>TIME:</b>	5:00 AM

<b>Standard:</b>	FCC CFR 47, Part 15.407(b)(1) and 15.407(b)(2)
<b>Description:</b>	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.

Test Results Summary			
Plot	Channel Frequency (MHz)	Data	Results
INTEL-030806-07d01	2412	30MHz – 2GHz	-46.17 dBm @ 457.00 MHz
INTEL-030806-07d02		2GHz – 10GHz	-58.67 dBm @ 7.24 GHz
INTEL-030806-07d03		10GHz – 20GHz	-70.17 dBm @ 14.08 GHz
INTEL-030806-07d04		20GHz – 26.5GHz	-66.83 dBm @ 24.57 GHz
INTEL-030806-07d05	2437	30MHz – 2GHz	-48.83 dBm @ 483.00 MHz
INTEL-030806-07d06		2GHz – 10GHz	-60.83 dBm @ 7.31 GHz
INTEL-030806-07d07		10GHz – 20GHz	-70.00 dBm @ 14.17 GHz
INTEL-030806-07d08		20GHz – 26.5GHz	-67.00 dBm @ 24.65 GHz
INTEL-030806-07d09	2462	30MHz – 2GHz	-44.17 dBm @ 506.00 MHz
INTEL-030806-07d10		2GHz – 10GHz	-59.33 dBm @ 7.37 GHz
INTEL-030806-07d11		10GHz – 20GHz	-70.00 dBm @ 13.47 GHz
INTEL-030806-07d12		20GHz – 26.5GHz	-66.50 dBm @ 25.34 GHz

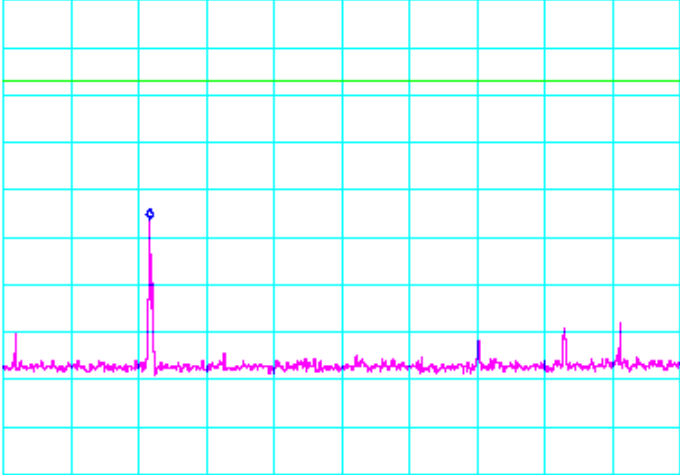

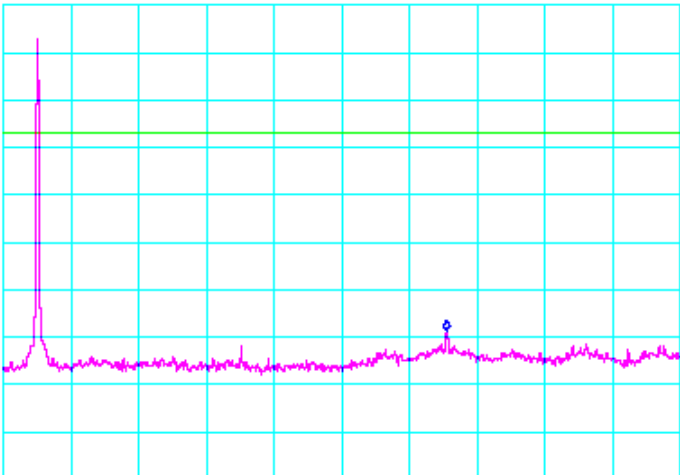

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## Conducted Out Of Band Emissions (Continued)

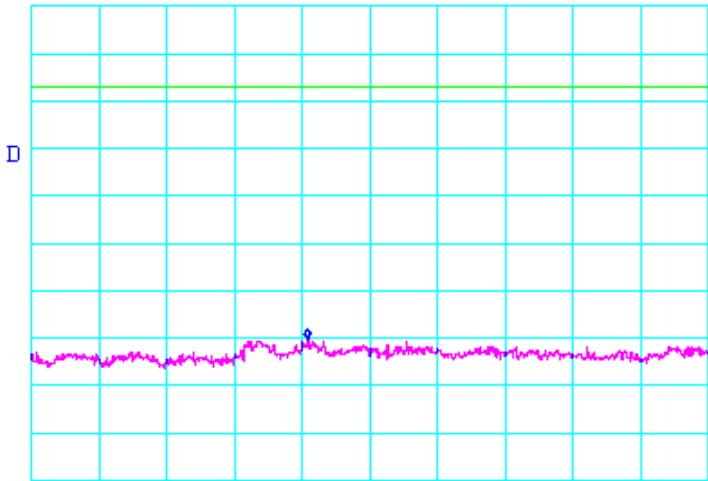
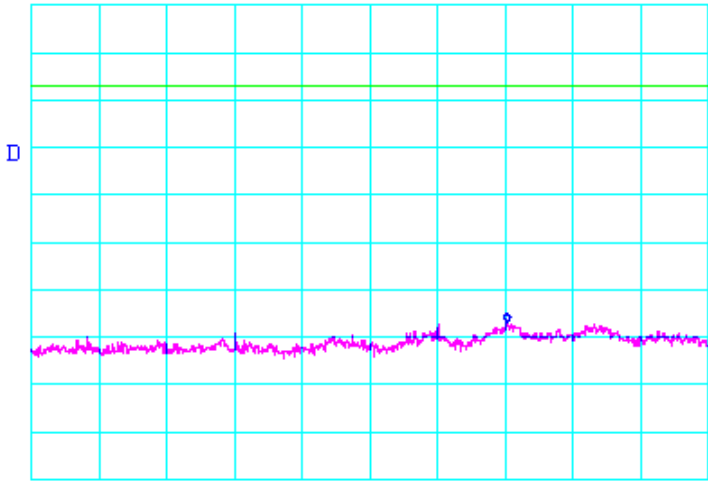
Test Date	Data	Test Eng.
08/06/03	2.412 GHz (INTEL-030806-02d01)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -46.17dBm 457MHz</div></div><div>START 30MHz      STOP 2.000GHz *RBW 100kHz    *VBW 300kHz    SWP 1.10sec</div></div> <div></div>		
Test Date	Data	Test Eng.
08/06/03	2.412 GHz (INTEL-030806-02d02)	Rick Candelas
<div><div><div>*ATTEN 20dB RL 10.0dBm</div><div>10dB/</div><div>MKR -58.67dBm 7.240GHz</div></div><div>START 2.000GHz      STOP 10.000GHz *RBW 100kHz    *VBW 300kHz    SWP 4.40sec</div></div> <div></div>		

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## Conducted Out Of Band Emissions (Continued)

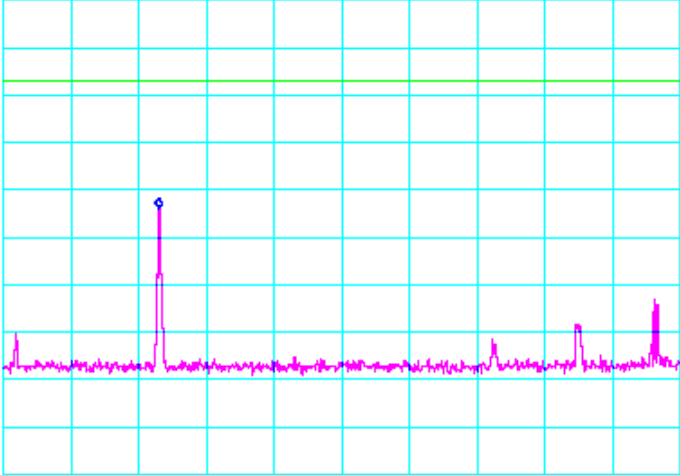

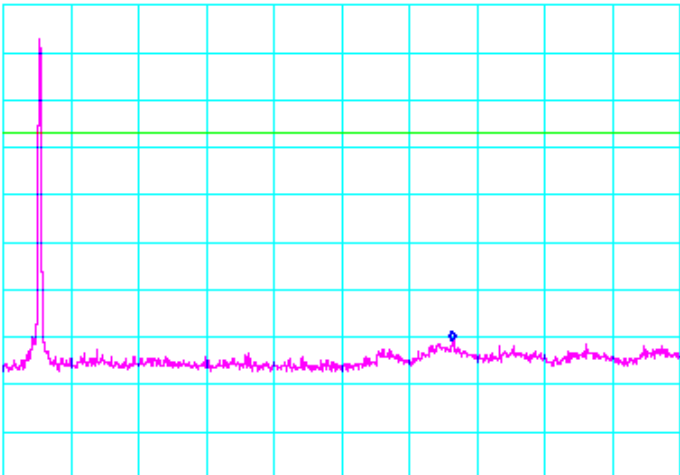

Test Date	Data	Test Eng.
08/06/03	2.412 GHz (INTEL-030806-02d03)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -70.17dBm 14.08GHz</div></div><div></div><div>START 10.00GHz STOP 20.00GHz *RBW 100kHz *VBW 300kHz SWP 5.50sec</div></div>		
Test Date	Data	Test Eng.
08/06/03	2.412 GHz (INTEL-030806-02d04)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -66.83dBm 24.572GHz</div></div><div></div><div>START 20.000GHz STOP 26.500GHz *RBW 100kHz *VBW 300kHz SWP 3.60sec</div></div>		

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## Conducted Out Of Band Emissions (Continued)

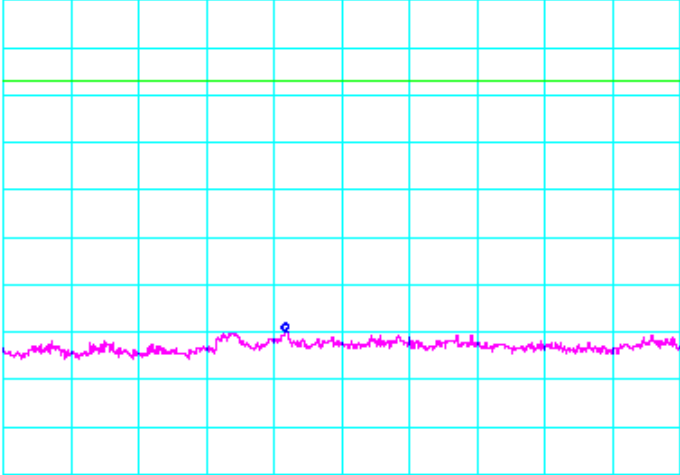
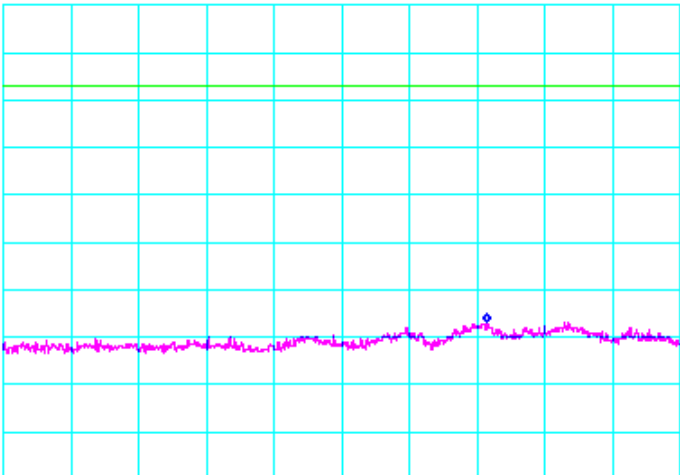
Test Date	Data	Test Eng.
08/06/03	2.437 GHz (INTEL-030806-02d05)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -43.83dBm 483MHz</div></div><div>START 30MHz      STOP 2.000GHz *RBW 100kHz    *VBW 300kHz    SWP 1.10sec</div></div> <div></div>		
Test Date	Data	Test Eng.
08/06/03	2.437 GHz (INTEL-030806-02d06)	Rick Candelas
<div><div><div>*ATTEN 20dB RL 10.0dBm</div><div>10dB/</div><div>MKR -60.83dBm 7.307GHz</div></div><div>START 2.000GHz      STOP 10.000GHz *RBW 100kHz    *VBW 300kHz    SWP 4.40sec</div></div> <div></div>		

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## Conducted Out Of Band Emissions (Continued)

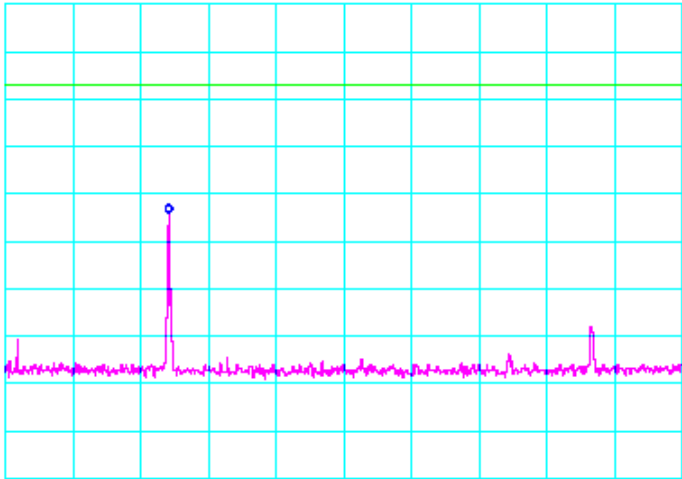
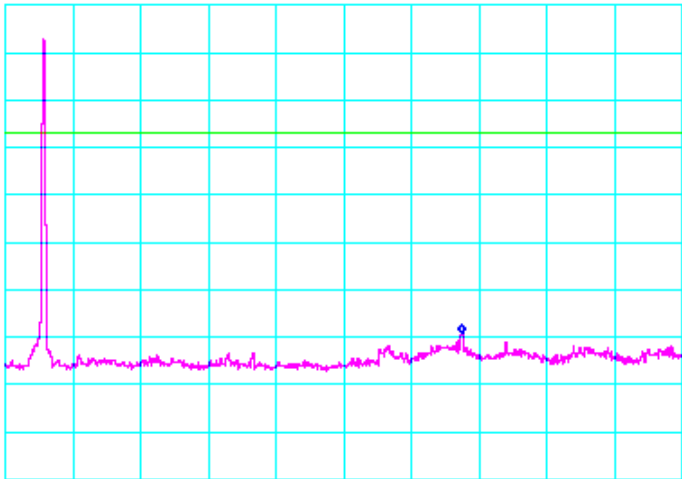
Test Date	Data	Test Eng.
08/06/03	2.437 GHz (INTEL-030806-02d07)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -70.00dBm 14.17GHz</div></div><div></div><div>START 10.00GHz STOP 20.00GHz *RBW 100kHz *VBW 300kHz SWP 5.50sec</div></div>		
Test Date	Data	Test Eng.
08/06/03	2.437 GHz (INTEL-030806-02d08)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -67.00dBm 24.648GHz</div></div><div></div><div>START 20.000GHz STOP 26.500GHz *RBW 100kHz *VBW 300kHz SWP 3.60sec</div></div>		

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## Conducted Out Of Band Emissions (Continued)

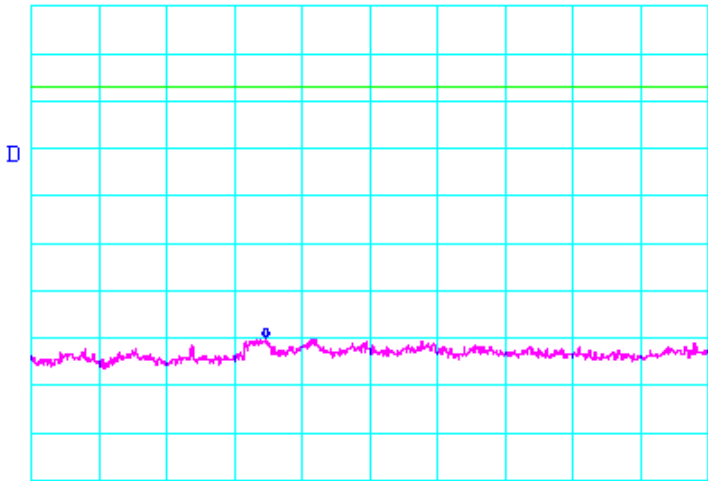
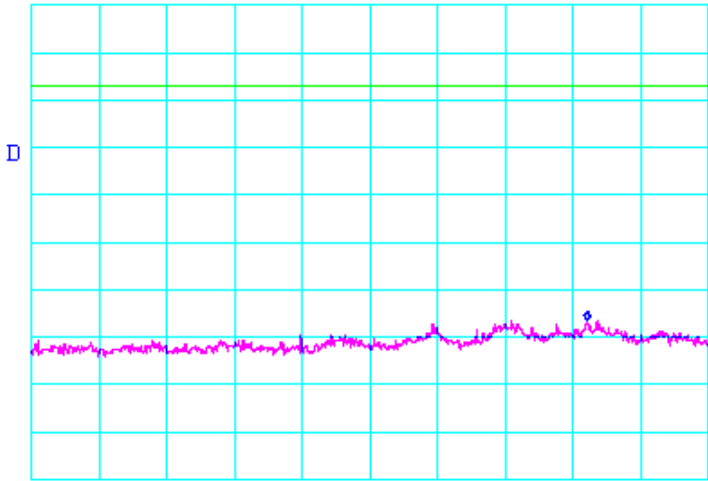
Test Date	Data	Test Eng.
08/06/03	2.462 GHz (INTEL-030806-02d09)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -44.17dBm 506MHz</div></div><div></div><div>START 30MHz      STOP 2.000GHz *RBW 100kHz    *VBW 300kHz    SWP 1.10sec</div></div>		
Test Date	Data	Test Eng.
08/06/03	2.462 GHz (INTEL-030806-02d10)	Rick Candelas
<div><div><div>*ATTEN 20dB RL 10.0dBm</div><div>10dB/</div><div>MKR -59.33dBm 7.373GHz</div></div><div></div><div>START 2.000GHz      STOP 9.960GHz *RBW 100kHz    *VBW 300kHz    SWP 4.40sec</div></div>		

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## Conducted Out Of Band Emissions (Continued)

Test Date	Data	Test Eng.
08/06/03	2.462 GHz (INTEL-030806-02d11)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -70.00dBm 13.47GHz</div></div><div></div><div>START 10.00GHz STOP 20.00GHz *RBW 100kHz *VBW 300kHz SWP 5.50sec</div></div>		
Test Date	Data	Test Eng.
08/06/03	2.462 GHz (INTEL-030806-02d12)	Rick Candelas
<div><div><div>*ATTEN 10dB RL 0dBm</div><div>10dB/</div><div>MKR -66.50dBm 25.341GHz</div></div><div></div><div>START 20.000GHz STOP 26.500GHz *RBW 100kHz *VBW 300kHz SWP 3.60sec</div></div>		

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