Elliott Laboratories Inc.
www.elliottlabs.com
684 West Maude Avenue
Sunnyvale, CA 94086-3518
408-245-7800 Phone
408-245-3499 Fax

February 8, 2002

Jim Baer
Intel Corporation
2300 Corporate Center Drive
Thousand Oaks, CA. 91320

Subject: FCC Emissions Report, WPCI5000

Dear Mr. Baer:

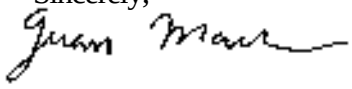
A report has been created detailing the results of the FCC electromagnetic emissions testing performed on the WPCI5000 for authorization under a FCC Declaration of Conformity. Please find this report enclosed.

Per Federal Communication Commission regulations, the signature of an official of the company responsible for marketing the WPCI5000 is required for this report to be acceptable for determining compliance. After this report has been signed, we recommend filing it in a safe place for future reference.

Once an official has signed page 3 of this report, you may begin shipping the WPCI5000, making sure each unit is manufactured with any modifications described in the report, the proper FCC label is attached and the appropriate FCC statement is included in the operator's manual.

If you have any questions, please don't hesitate to call us at 408-245-7800.

Sincerely,



Juan Martinez
Senior EMC Engineer

JM/dmg
Enclosure: Emissions Report

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Electromagnetic Emissions Test Report for a Declaration of Conformity per FCC Part 15, Subpart B Specifications for a Class B Digital Device on the Intel Corporation Model: WPCI5000

MANUFACTURER:	Intel Corporation 2300 Corporate Center Drive Thousand Oaks, CA. 91320
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	February 8, 2002
FINAL TEST DATE (S):	January 25 and January 26, 2002
AUTHORIZED SIGNATURE:	Juan Martinez Senior EMC Engineer

NVLAP LAB CODE 200069-0

TABLE OF CONTENTS

SCOPE

The Federal Communications Commission (FCC) establishes rules and regulations regarding the electromagnetic emissions of all electronic devices. An electromagnetic emissions test has been performed on the Intel Corporation model WPCI5000 pursuant to Subpart B of Part 15 of FCC Rules for digital devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures. The test data has been provided as an exhibit to this report for reference.

The digital device above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

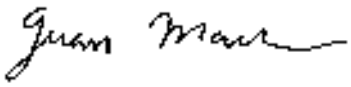
Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Intel Corporation model WPCI5000 and therefore apply only to the tested sample. The sample was selected and prepared by Jim Baer of Intel Corporation.

VALIDATING SIGNATURES

The tested sample of the Class B digital device submitted to and tested by Elliott Laboratories complied with the requirements of subpart B of Part 15 of the Federal Communications Commissions Rules as specified in this report.



Juan Martinez
Senior EMC Engineer
Elliott Laboratories, Inc.

The official of the company responsible for marketing the device tested.

Signature

Printed Name
Intel Corporation

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart B of Part 15 of FCC Rules for the radiated and conducted emissions of digital devices. Since the subject device is intended for operation in a residential environment and is either a personal computer or a peripheral for a personal computer, a Declaration of Conformity to Class B emissions limits is required.

A Declaration of Conformity is a procedure where the manufacturer or a contracted laboratory makes measurements and takes necessary steps to ensure that the equipment complies with the appropriate technical standards. Submittal of a sample unit or test data to the FCC is not required unless specifically requested by the Commission. Once the product has been found to comply with the FCC Rules, a label indicating compliance must be attached to all identical units subsequently manufactured. Specific compliance information and cautionary information must also be included in the operator's manual.

Maintenance of FCC compliance is the responsibility of the manufacturer. Any modification of the product that may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing and/or I/O cable changes, etc.).

EMISSION TEST RESULTS

The following emissions tests were performed on the Intel Corporation model WPCI5000. The actual test results are contained in an appendix of this report.

LIMITS OF CONDUCTED INTERFERENCE VOLTAGE

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.107(e).

The following measurement was extracted from the data recorded during the conducted emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an appendix of this report.

0.15 – 30.00 MHz, 120V/ 60Hz

Frequency MHz	Level dBuV	Power Lead	Class B Limit	Class B Margin	Detector QP/Ave	Comments
0.219	49.8	Neutral	52.9	-3.1	Average	

Note: For frequencies below 1 GHz, the limits of CISPR 22 were used.

LIMITS OF RADIATED INTERFERENCE FIELD STRENGTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.109(g).

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an appendix of this report.

30 – 1000 MHz

Frequency MHz	Level dBuV/m	Pol v/h	Class B Limit	Class B Margin	Detector Pk/QP/Avg	Azimuth Degrees	Height Meters	Comments
797.250	33.9	h	37.0	-3.1	QP	125	1.0	

Note: For frequencies below 1 GHz, the limits of CISPR 22 were used.

MEASUREMENT UNCERTAINTIES

ISO Guide 25 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.2

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Intel Corporation model WPCI5000 is a UNII PCI card, which is designed to be used in PC computer to provide wireless network access. Normally, the EUT would be table-top during operation. The EUT was treated as tabletop equipment during testing to simulate the end user environment. EUT received its voltage from the PC host.

The sample was received on January 7, 2002 and tested on January 25 and January 26, 2002. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
Intel WPCI5000 PCI Card	N/A

ENCLOSURE

The EUT does not contain an enclosure. It relies on the host system shield. It measures approximately 1 cm wide by 20 cm deep by 5 cm high.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for testing:

Manufacturer	Model	Description	Serial Number	FCC ID
Compaq	3563V5	Desktop PC	N/A	CNT75MDEBV5
Logitech	M-C34	Mouse	LZB83058088	DZL211146
Dell	SK-1000RE	Keyboard	GYUR105K	M950529070
GEM	DD-556AA	Monitor	H79DD-556	BDK008B0023
HP	2225C+	Printer	3028S76892	DS16XU2225
Robotics	Pilot 1000	PDA	604819965702	MQ90001

No remote support equipment was used during testing.

EUT INTERFACE PORTS

The I/O cabling configuration during emissions testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length (m)
Mouse	Desktop	PS/2	Shielded	1.4
Keyboard	Desktop	PS/2	Shielded	1.3
VGA	Desktop	D-Sub 15	Shielded	1.5
Printer	Desktop	Parallel	Shielded	2
Palm Pilot	Desktop	Com 1	Shielded	1.5

EUT OPERATION

Radio was set to transmit continuously. H-pattern software used to exercise the printer, serial, and display ports.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on January 25 and January 26, 2002 at the Elliott Laboratories Open Area Test Site 3 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-1992. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer runs automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNA

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors that are programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An appendix of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth that results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions that have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted and radiated emissions below 1000 MHz given below are taken from the first edition of CISPR Pub. 22 (1997), "Limits and Methods of Measurements of Radio Interference Characteristics of Information Technology Equipment." as specified in sections 15.107(e) and 15.109(g) of the FCC Rules. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The limits are based on the use of an average or quasi-peak detector as indicated.

CONDUCTED EMISSIONS SPECIFICATION LIMITS

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

RADIATED EMISSIONS SPECIFICATION LIMITS

Frequency (MHz)	Quasi Peak Limit (dBuV/m @ 10m)
30 to 230	30.0
230 to 1000	37.0

RADIATED EMISSIONS SPECIFICATION LIMITS

The limits for radiated emissions above 1000 MHz given below are as specified in section 15.109(a) of Part 15 of FCC Rules. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). The limits are based on the use of an average detector. In addition, limits based on the use of a peak detector are specified as 20 dB above the limits based on the use of an average detector.

Frequency (MHz)	Peak Limit (dBuV/m @ 3m)	Average Limit (dBuV/m @ 3m)
above 1000	74.0	54.0

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements. A distance factor, when used for electric field measurements, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

APPENDIX A: Test Equipment Calibration Data

Radiated Emissions, 30 - 1000 MHz, 25-Jan-02
Engineer: volivas

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Biconical Antenna, 30-300 MHz	3110B	1320	12	5/23/2001	5/23/2002
EMCO	Log Periodic Antenna, 0.2-1 GHz	3146	1294	12	3/27/2001	3/27/2002
Rohde & Schwarz	Test Receiver, 20-1300 MHz	ESVP	1317	12	5/9/2001	5/9/2002

Conducted Emissions, 25-Jan-02
Engineer: Rafael

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Elliott Laboratories	LISN 2 x (Solar 8028 LISN + 6512 Caps)	LISN-5, Support	379	12	8/10/2001	8/10/2002
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	372	12	7/27/2001	7/27/2002
Rohde & Schwarz	Test Receiver, 0.009-2000 MHz	ESN	1332(775)	12	10/12/2001	10/12/2002
Solar Electronics Co	LISN	8028-50-TS-24-BNC	904	12	5/18/2001	5/18/2002

Radiated Emissions, Fundamental - 40,000 MHz, 08-Feb-02
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	868	12	11/13/2001	11/13/2002
Hewlett Packard	Microwave EMI test system (SA40, 30Hz - 40GHz)	84125C	1149	12	2/5/2001	2/5/2002
Hewlett Packard	Preamplifier, 1-26.5 GHz	8449B	TY,84299	12	4/1/2001	4/1/2002
Hewlett Packard	Spectrum Analyzer, 9KHz - 22GHz	8593EM	1319	12	5/31/2001	5/31/2002

APPENDIX B: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T45876 9 Pages

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Emissions Spec:	FCC Part 15 B and E, RSS-210	Class:	B
Immunity Spec:	N/A	Environment:	-

EMC Test Data

For The

Intel Corporation

Model

WPCI5000

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Emissions Spec:	FCC Part 15 B and E, RSS-210	Class:	B
Immunity Spec:	N/A	Environment:	-

EUT INFORMATION

General Description

The EUT is a UNII PCI card which is designed to be used in PC computer to provide wireless network access. Normally, the EUT would be table-top. The EUT was treated as table-top equipment during testing to simulate the end user environment. EUT received it's voltage from the PC host.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Intel	WPCI5000	PCI Card	N/A	DoC
Intel	WM3A5000	Mini PCI card	N/A	J30WM3A5000

Antenna

The EUT uses the following external antennas:

Manufacturer	Model	Description	Serial Number	Antenna Gain (dBi)
FoxxCon	FX01A88-00	Omnidirectional antenna	-	2

The antenna connector used is non-standard antenna reverse threat connector to meet the requirements of FCC Part 15.203 and RSS-210.

EUT Enclosure

The EUT does not contain an enclosure. It relies on the host system shield. It measures approximately 1 cm wide by 20 cm deep by 5 cm high.

Modification History

Mod. #	Test	Date	Modification
1			

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Emissions Spec:	FCC Part 15 B and E, RSS-210	Class:	B
Immunity Spec:	N/A	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Compaq	3563V5	Desktop PC	N/A	CNT75MDEBV5
Logitech	M-C34	Mouse	LZB83058088	DZL211146
Dell	SK-1000RE	Keyboard	GYUR105K	M950529070
GEM	DD-556AA	Monitor	H79DD-556	BDK008B0023
HP	2225C+	Printer	3028S76892	DS16XU2225
Robotics	Pilot 1000	PDA	604819965702	MQ90001

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

EUT Interface Ports

		Cable(s)		
EUT Port	Connected To	Description	Shielded or Unshielded	Length(m)
Reverse SMA	Antenna	N/A	N/A	N/A

HOST Interface Ports

		Cable(s)		
HOST Port	Connected To	Description	Shielded or Unshielded	Length(m)
Mouse	Desktop	PS/2	Shielded	1.4
Keyboard	Desktop	PS/2	Shielded	1.3
VGA	Desktop	D-Sub 15	Shielded	1.5
Printer	Desktop	Parallel	Shielded	2
Palm Pilot	Desktop	Com1	Shielded	1.5

EUT Operation During Emissions Testing (Digital Testing)

Radio was set to transmitt continously. H-pattern software used to exercise the printer, serial, and display ports.

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210	Class:	B

Conducted Emissions - Power Ports

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 1/25/02
Test Engineer: Rafael
Test Location: SVOATS #3

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the host system was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment. Remote support equipment was located approximately 30 meters away from the test area, with all I/O connections routed overhead.

Ambient Conditions:

Temperature: 10°C
Rel. Humidity: 74%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power 120V/60Hz	EN55022 B	Pass	-3.06dB @ .219MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.219	49.8	Neutral	52.9	-3.1	Average	
0.219	49.2	Line	52.9	-3.7	Average	
0.343	42.4	Neutral	49.1	-6.7	Average	
0.343	42.3	Line	49.1	-6.8	Average	
0.219	49.8	Neutral	62.9	-13.1	QP	
0.219	49.2	Line	62.9	-13.7	QP	
22.860	35.3	Line	50.0	-14.7	Average	
22.860	34.8	Neutral	50.0	-15.2	Average	
0.343	42.4	Neutral	59.1	-16.7	QP	
0.343	42.3	Line	59.1	-16.8	QP	
22.860	35.3	Line	60.0	-24.7	QP	
22.860	34.8	Neutral	60.0	-25.2	QP	

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210	Class:	B

Radiated Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 1/26/02
Test Engineer: Rafael
Test Location: SVOATS #3

Config. Used: 1
Config Change:
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

On the OATS, the measurement antenna was located 10 meters from the EUT for the measurement range 30 - 1000 MHz.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 10°C
Rel. Humidity: 74%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	RE, 30 - 1000MHz - Maximized Emissions	EN55022 B	Pass	-3.1dB @ 797.25MHz

Modifications Made During Testing:

Modifications Made are mention on each run.

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210	Class:	B

Run #1: Pre-liminary scan, 30-1000 MHz
With antenna on tower Vertical

Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
730.770		h	37.0	-37.0	QP			
730.770	37.2	v	37.0	0.2	QP			Signal Sub.
597.905	33.1	h	37.0	-3.9	QP	35	1.3	Chassis very sensitive
797.250	33.9	h	37.0	-3.1	QP	125	1.0	
631.160	30.1	h	37.0	-6.9	QP	180	1.0	
797.250	32.3	v	37.0	-4.7	QP	140	1.4	
applied gasket to ffront side both left and right								
730.770	31.5	v	37.0	-5.5	QP	300	1.4	Signal Sub.
730.770	29.1	v	37.0	-7.9	QP	125	1.0	Signal Sub.

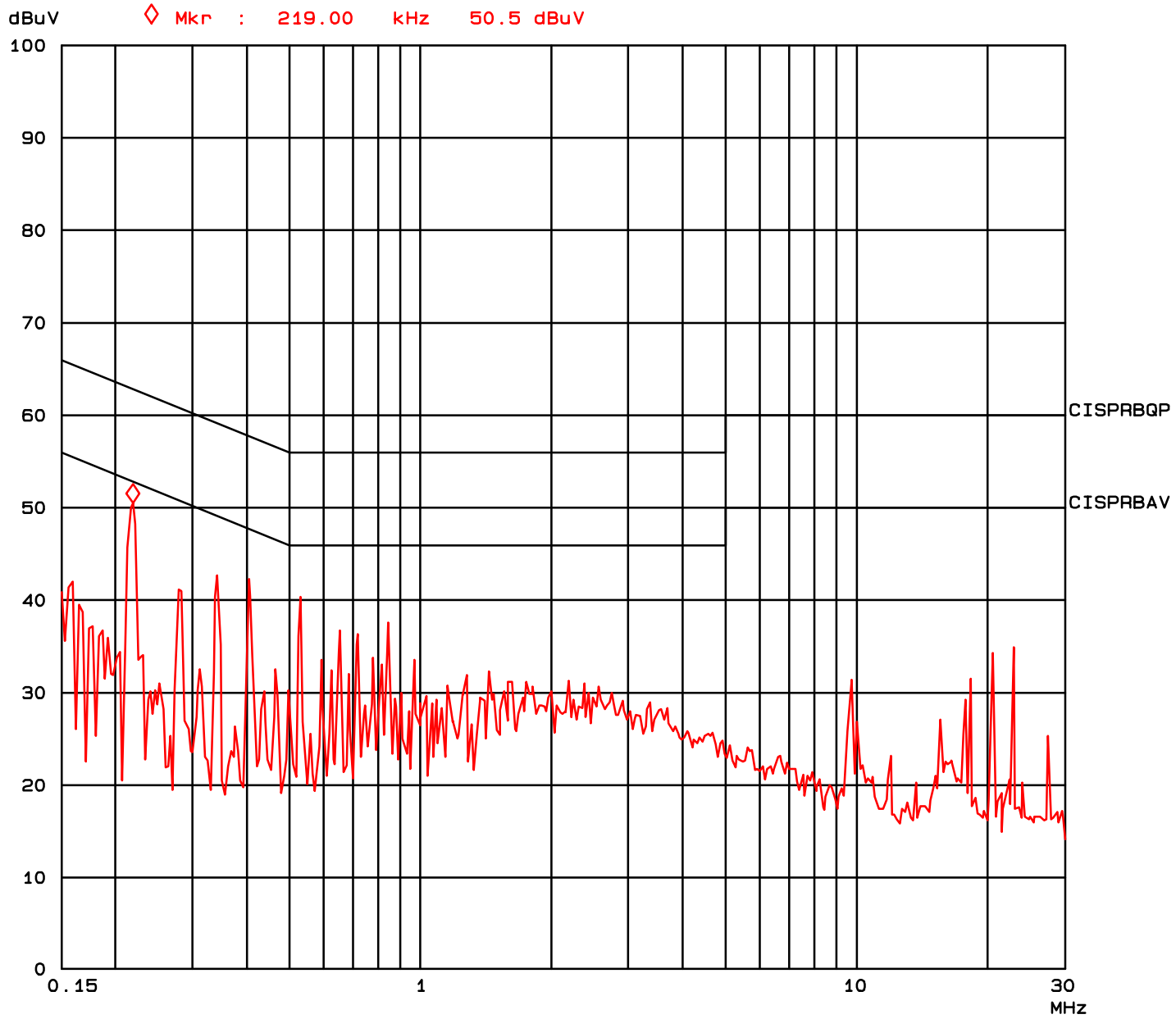
Run #2: Maximized Readings From Run #1

Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
797.250	33.9	h	37.0	-3.1	QP	125	1.0	
597.905	33.1	h	37.0	-3.9	QP	35	1.3	Chassis very sensitive
797.250	32.3	v	37.0	-4.7	QP	140	1.4	
730.770	31.5	v	37.0	-5.5	QP	300	1.4	Signal Sub.
631.160	30.1	h	37.0	-6.9	QP	180	1.0	
730.770	29.1	v	37.0	-7.9	QP	125	1.0	Signal Sub.
Note 1:	Add note here							
Note 2:								

Elliott Laboratories
Conducted Emissions

25. Jan 02 21:32

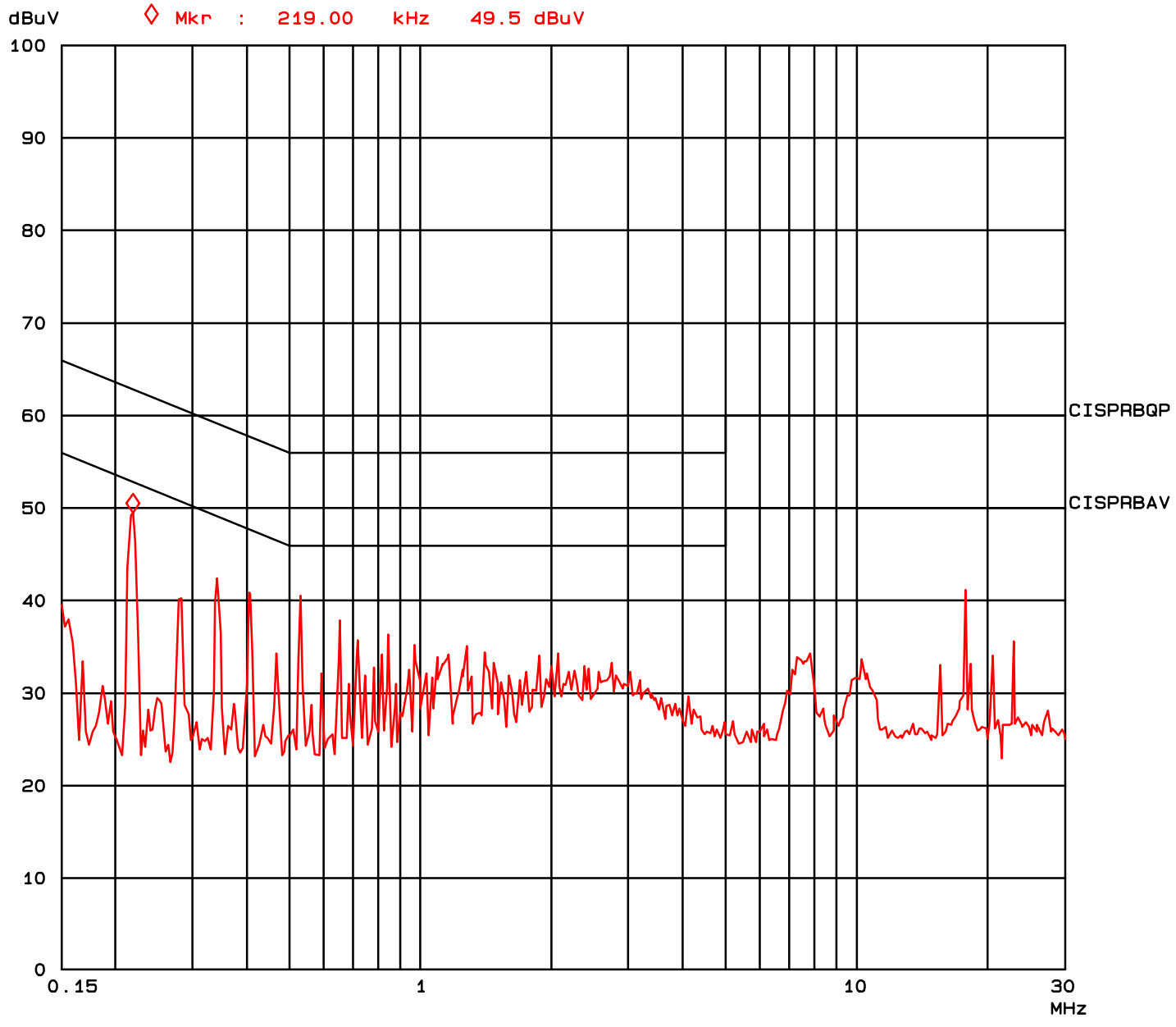
Operator: Rafael varelas
Comment: Intel Corporation
WM3A5000 w/ PCI cardin Desktop
T45876, J45836
[X] Line [ ] Neutral
E=EUT, A=Ambient
120V/60Hz



Elliott Laboratories
Conducted Emissions

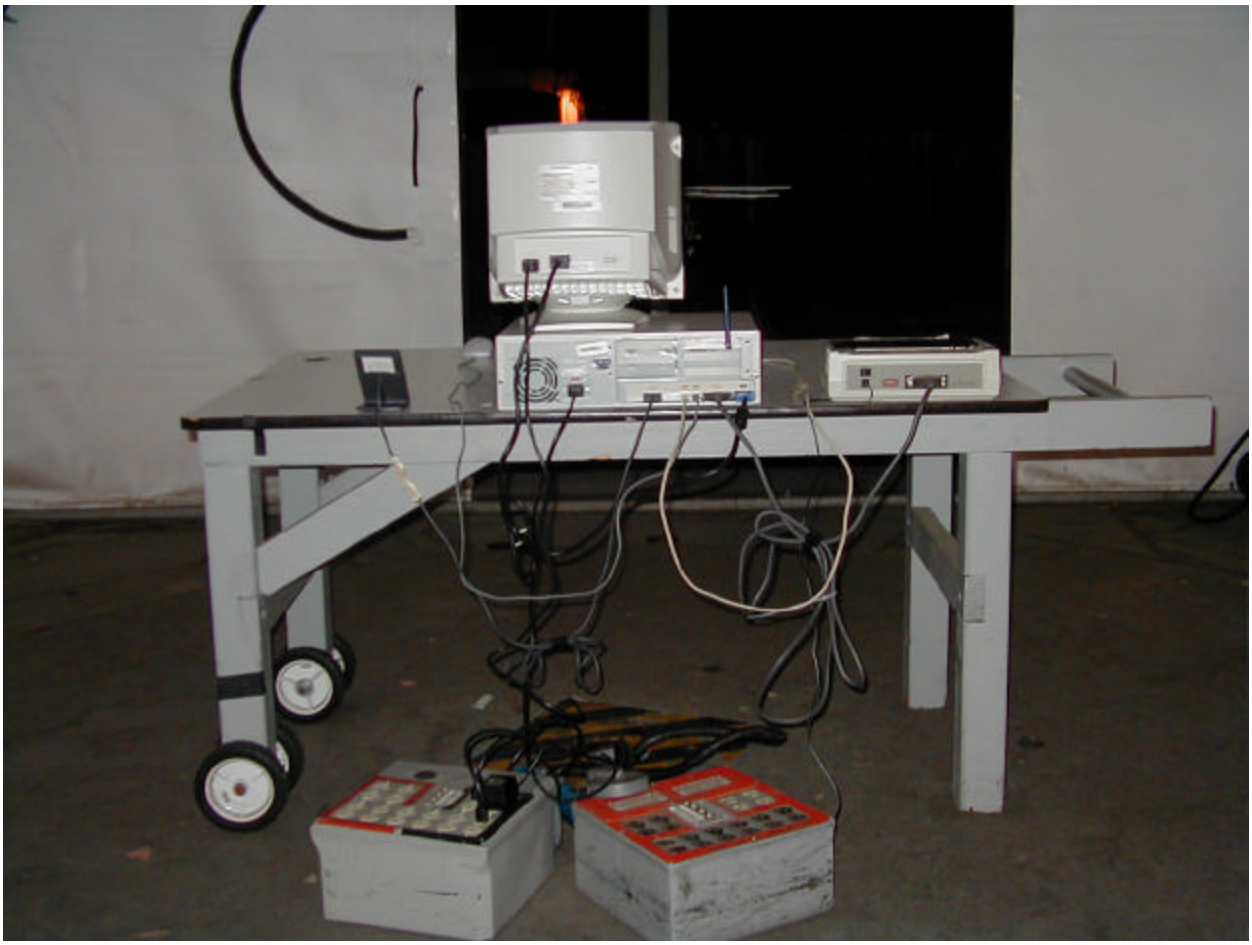
25. Jan 02 21:11

Operator: Rafael varelas
Comment: Intel Corporation
WM3A5000 w/ PCI cardin Desktop
T45876, J45836
[ ] Line [X] Neutral
E=EUT, A=Ambient
120V/60Hz



APPENDIX C: Radiated Emissions Test Configuration Photographs

APPENDIX C: Radiated Emissions Test Configuration Photographs



APPENDIX D: Conducted Emissions Test Configuration Photographs

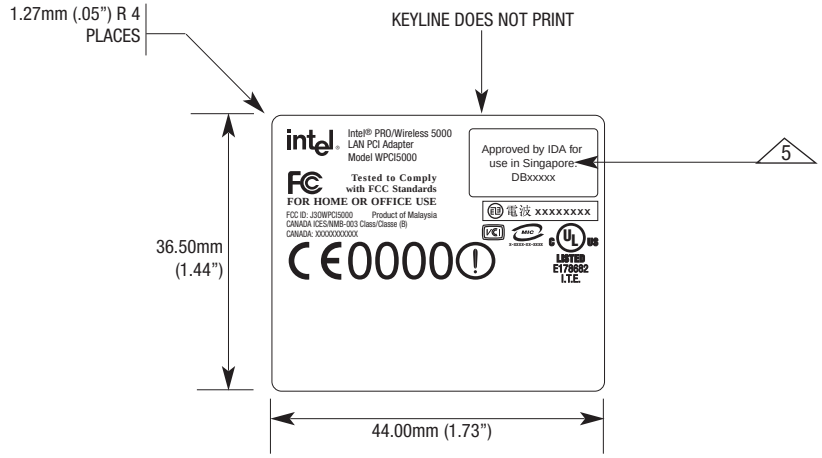
APPENDIX D: Conducted Emissions Test Configuration Photographs

APPENDIX E: Label and Label Location

Each unit shall have the label on the following page permanently attached in the location specified.

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
A	Per ECN 24376		M. Klutch



10 • ELECTRONIC ART: REF. ARTWORK #832-2494-001A (ADOBE ILLUSTRATOR 9.0 FORMAT)

△9 • LABEL MATERIAL AND SUPPLIER MUST BE UL APPROVED

8 • A/W PART NUMBERS TO PRINT ON ALL FILM LAYERS (CMYK OR PMS) IF FILM IS REQD

7 • CLEANING TEST: PERFORM LABEL CLEANING TEST PER XIRCOM QA LABEL CLEANING TEST #XQI-0002-001

6 • GAP BETWEEN LABELS ON ROLL TO BE BETWEEN 3.175MM (.125")

△5 • ALL TEXT/GRAPHICS TO BE BLACK UNLESS OTHERWISE SPECIFIED IN ART FILE

4 • FOR LABEL ORIENTATION ON ROLL, REF: DWG #802-0016-001, PAGEMAKER 5.0 FILE

3 • MARK PART NUMBER AND REVISION IN CONSPICUOUS AREA ON OUTSIDE OF BULK PACKAGING

△2 FINISH
• MATTE

△1 MATERIAL
• MYLAR, WHITE, 2.3 MIL FACESTOCK, 3M#7815; ACRYLIC PERM ADHESIVE, 3M#310, 0.8 MIL (PENANG REQMT); OR XIRCOM APPROVED EQUIVALENT

NOTES: (UNLESS OTHERWISE SPECIFIED)

PRELIMINARY LABEL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
± .008
MATERIAL △8 △1
FINISH △2
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN K. Hovsepian	02-22-02
CHECKED N. Guetschoff	
APPROVED R. San Jose, C. Claybaugh, B. Winters, L. Thum	

Xircom an Intel company

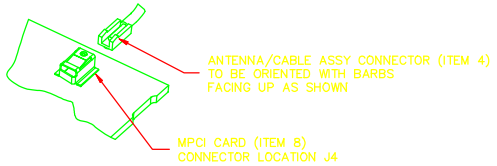
LABELS, APPRVLS, WPCI5000

SIZE	FSCM NO.	DRAWING NO.	REV.
A		830-1649-001	A

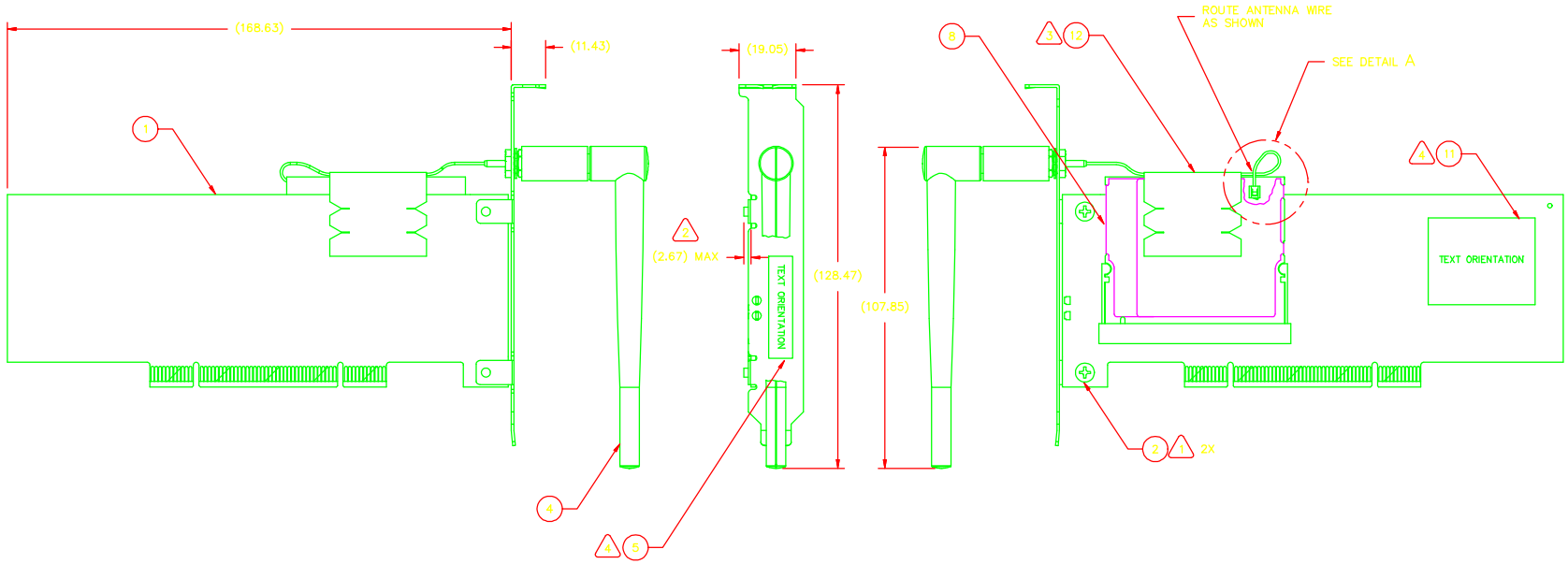
SCALE = 1" = 1" SHEET 1 OF 1

REVISIONS

ZONE	REV	DESCRIPTION	DATE	INC BY
	2	PROTOTYPE REL PER PCN 24398	02/14/02	VN



DETAIL A
ATTACH ANTENNA/CABLE ASSY (ITEM 4)
TO MPCI CARD (ITEM 8)



5. FINISHED ASSEMBLY SHALL MEET OR EXCEED XIRCOM QUALITY REQUIREMENT SPECIFICATION 170-SPEC-001, CURRENT REVISION.

4. APPLY APPROVAL LABELS PER PRODUCT BOM REQUIREMENTS. LOCATE LABELS APPROXIMATELY WHERE SHOWN. ORIENT LABELS AS SHOWN.

3. APPLY SECURITY SEAL (ITEM 12) OVER MPCI CARD (ITEM 8) AND ANTENNA/CABLE ASSY (ITEM 4) AS SHOWN.

2. MAX PROTRUSION FOR SCREWS (ITEM 2) TO BE 2.67 BEYOND BOTTOM SIDE OF PCBA (ITEM 1).

1. ATTACH ANTENNA/CABLE ASSY MOUNTING BRACKET (ITEM 4) TO PCBA (ITEM 1) WITH TWO SCREWS (ITEM 2). TORQUE EACH SCREW TO 5.0 – 7.0 IBF-IN.

NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED	APPROVALS		DATE	
DIMENSIONS ARE MILLIMETER [INCH REF]	DWN	V.NORMAN	02/07/02	Xircom
TOLERANCES ARE: DECIMALS .X ± .25 [.010] .XX ± .13 [.005] ANGLES ± 1/2°	CHK	V.NORMAN	02/14/02	
	ENG SER	.	.	TLA, WPCI5000
MATERIAL	ENG	D.EYRE	02/14/02	
	COMPL ENG	.	.	
FINISH	MFG	C.CLAYBAUGH	02/14/02	SIZE B · DRAWING NO. 175-1487-001 · REV 2
	QA	C.WELLS	02/14/02	
DO NOT SCALE DRAWING	MKTG	.	.	SCALE – · AUTOCAD · SHEET 1 OF 1

APPENDIX F: User's Manual Statements and Declaration of Conformity

The following pages were extracted from the user's manual or documentation provided with the equipment. They include all the required information that is to be provided to the user in accordance with FCC Rules.

Intel® PRO/Wireless 5000 LAN Products
Safety and Regulatory Notices

This section provides the following safety and regulatory notices covering the following products: Intel® PRO/Wireless 5000 LAN Access Point, Intel® PRO/Wireless 5000 LAN CardBus Adapter and the Intel® PRO/Wireless 5000 LAN PCI Adapter model WPCI5000

Safety Notices

The FCC with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. The Intel PRO/Wireless 5000 LAN products the Intel® PRO/Wireless 5000 LAN Access Point model WSAP5000, the Intel PRO/Wireless CardBus Adapter model WCP5000, and the Intel PRO/Wireless PCI Adapter model WPCI5000 meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio according to the instructions found in this manual will result in exposure substantially below the FCC's recommended limits.

- Do not touch or move antenna while the unit is transmitting or receiving.
- Do not hold any component containing the radio such that the antenna is very close or
- touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not operate the radio or attempt to transmit data unless the antenna is connected; if
- not, the radio may be damaged.
- Use in specific environments:
    - The use of wireless devices in hazardous locations is limited to the constraints posed by the safety directors of such environments.
    - The use of wireless devices on airplanes is governed by the Federal Aviation Administration (FAA).
    - The use of wireless devices in hospitals is restricted to the limits set forth by each hospital.
- Antenna use:
    - High-gain, wall-mount, or mast-mount antennas are designed to be professionally installed and should be located at a minimum distance of 12 inches (30 cm) or more from the body of all persons. Please contact your professional installer, VAR, or antenna manufacturer for proper installation requirements.
- Explosive Device Proximity Warning (see below)
- Warning for Laptop Users (see below)
- Use on Aircraft Caution (see below)
- Other Wireless Devices (see below)

Explosive Device Proximity Warning

Warning: Do not operate a portable transmitter (such as a wireless network device) near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.

Use On Aircraft Caution

Caution: Regulations of the FCC and FAA prohibit airborne operation of radio-frequency wireless devices because their signals could interfere with critical aircraft instruments.

Other Wireless Devices

Safety Notices for Other Devices in the Wireless Network: Refer to the documentation supplied with wireless Ethernet adapters or other devices in the wireless network.

FCC Regulations

FCC Regulations Part 15 Declaration of Conformity (DoC)

Intel Corporation declares that the equipment described in this document is within the requirements of the Code of Federal Regulations listed below:

Title 47 Part 15, Subpart B, Class B for a digital device.

This declaration is based upon the compliance of the Intel PRO/Wireless CardBus Adapter model WCP5000, and the Intel PRO/Wireless PCI Adapter model WPCI5000 to the above standards. Intel has determined that the models listed have been shown to comply with the applicable technical standards if no unauthorized change is made in the equipment and if the equipment is properly maintained and operated.

These units are identical to the units tested and found acceptable with the applicable standards. Records maintained by Intel continue to reflect that units being produced under this Declaration of Conformity, within the variation that can be expected due to quantity production and tested on a statistical basis, continue to comply with the applicable technical standards.

Responsible Party:

R.W. Bass, Vice President and General Manager, Xircom Inc, an Intel company, 2300 Corporate Center Drive, Thousand Oaks, California 91320 U.S.A.

FCC Rules and Regulations - Part 15

The Intel® PRO/Wireless 5000 LAN Access and Intel PRO/Wireless CardBus Adapter model WCP5000 device complies with Part 15 of the FCC rules. Operation is subject to the conditions:

1. This device may not cause harmful interference and,
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the

following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: The Part 15 radio device operates on a non-interference basis with other devices operating at this frequency. Any changes or modification to said product not expressly approved by Intel could void the user's authority to operate this device.

Canadian Department of Communications Industry Canada (IC) Notice

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.
This device complies with Class B Limits of Industry Canada. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

The device is certified to the requirements of the RSS-210 for LELAN devices. The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information, contact your local Industry Canada office.

Japan Regulatory Notices

TELEC

This equipment has been certified to confirm with the technical regulations of the specified radio equipment under the radio law of Japan. If you open the case to modify the circuit, you may be punished by law.

In the frequency bandwidth of this equipment, industrial device, scientific device, medical device like microwave oven, licensed premises radio station and non-licensed specified low power radio station for mobile object identification system (RF-ID) that is used in product line of factories are used.

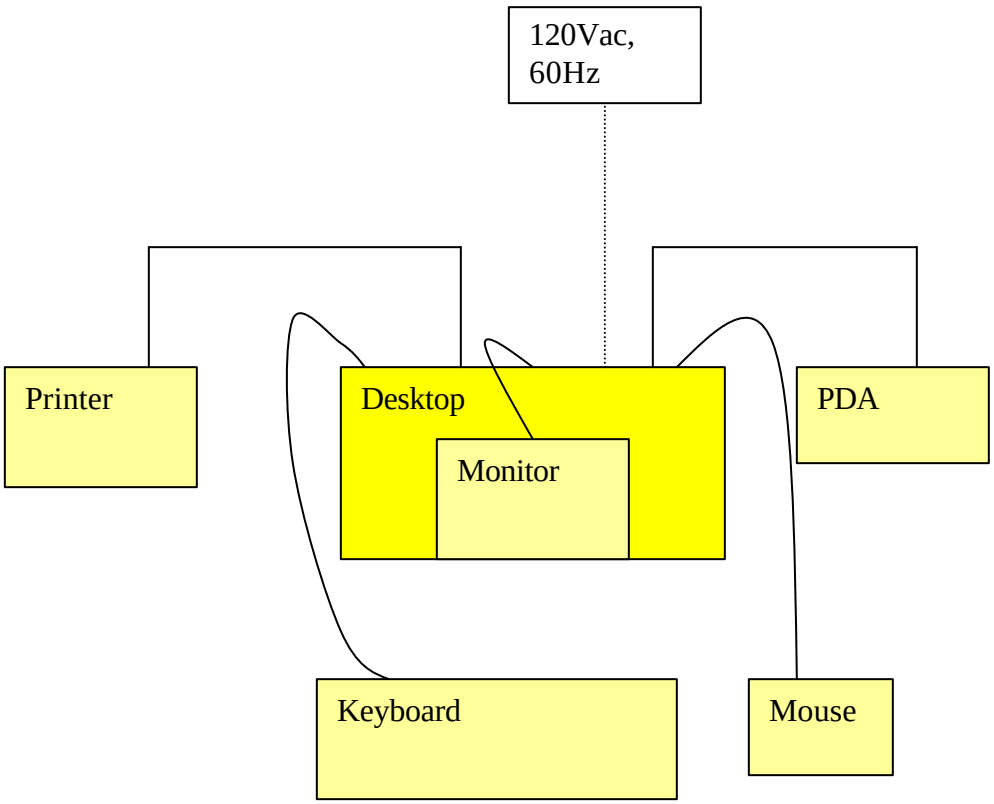
1. Please make sure before using this equipment that no premises radio station and no specified low-power radio station of RF-ID are used in the neighborhood.
2. In case that RF interference occurs to licensed premises radio station of RF-ID from this equipment, please change promptly the frequency for use or stop emitting radio, and contact the number below and ask how to deal with it to avoid radio interference, such as setting of partitions.
3. Please contact the number below if you have a problem, such as interference from this equipment to specified low-power radio station of RF-ID. Contact: Intel Technical
4. Support.

JATE

Refer to the JATE approval number on the equipment.

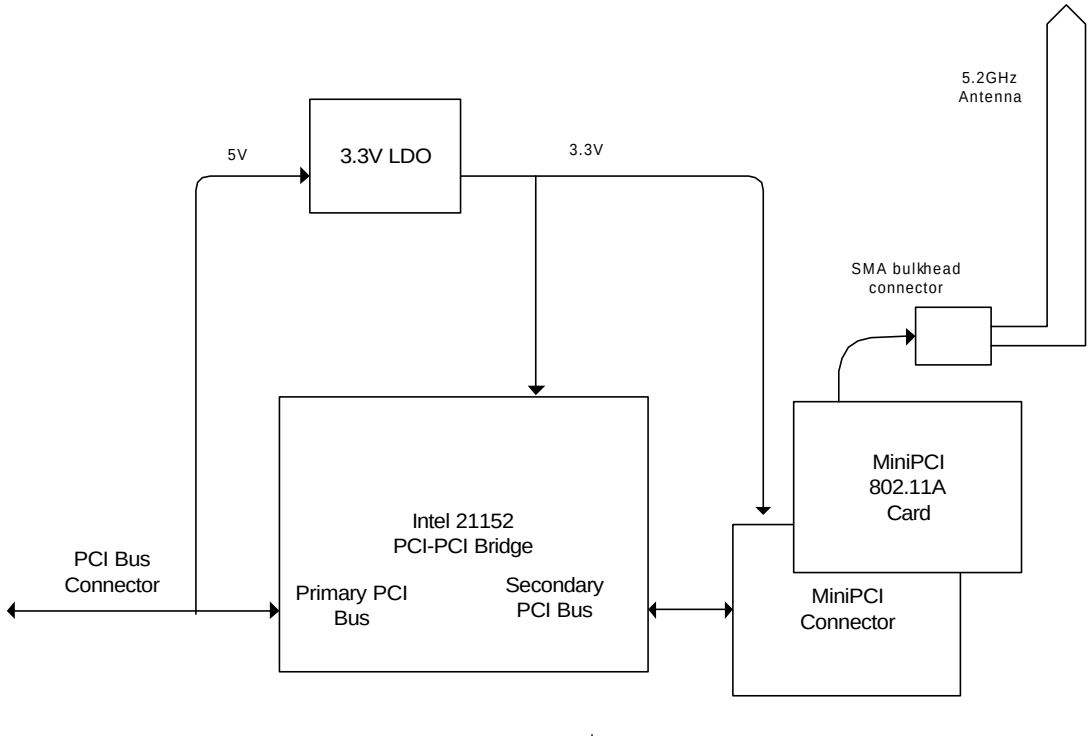
APPENDIX G: Block Diagram of Intel Corporation Model WPCI5000 Test Configuration

TEST CONFIGURATION BLOCK DIAGARAM



APPENDIX H: Block Diagram of Intel Corporation Model WPCI5000

Intel PRO/Wireless WPCI5000 LAN PCI Adapter



Function

The Intel PRO/Wireless WPCI5000 LAN PCI Adapter is intended to allow use of a MiniPCI 802.11A Radio Card in the PCI bus of a desktop PC.

PCI Bridge

The Adapter uses a PCI-PCI bridge to connect the host PCI bus to the MiniPCI card without violating the requirements of the PCI Bus specification. This allows access of the MiniPCI card from the host and allows the MiniPCI card to access host memory. The PCI bridge complies with Rev 2.2 of the PCI specification, providing a 32-bit bus at up to 33MHz.

Power

Both the PCI-PCI bridge use a 3.3VDC supply. This is derived from the host PCI 5V supply using a 3.3V regulator.

Antenna

The Adapter uses a 5.2GHz Dipole antenna, attached to the Adapter's rear panel at a reverse-thread, reverse polarity SMA bulkhead-type connector. The SMA connector connects to the 802.11A MiniPCI card through a cable terminated with a Radial UMP connector.

APPENDIX I: Reference Documents

Title 47 CFR, Part 2, Subpart I	"Marketing of Radiofrequency Devices"
Title 47 CFR, Part 2, Subpart J	"Equipment Authorization Procedures"
Title 47 CFR, Part 2, Subpart K	"Importation of Devices Capable of Causing Harmful Interference"
Title 47 CFR, Part 15, Subpart B	"Unintentional Radiators"
ANSI C63.4-1992	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
FCC/OST Bulletin # 61 (1993)	"The FCC Equipment Authorization Program for Radio Frequency Devices"
FCC/OST Bulletin # 62 (1993)	"Understanding the FCC Regulations Concerning Computing Devices"
Title 47 USC, Sections 501-504	Penalties for Non-compliance with FCC Rules
CISPR Pub. 22 (1985)	"Limits and Methods of Measurements of Radio Interference Characteristics of Information Technology Equipment"