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February 8, 2002

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

Subject: FCC and IC Emissions Report, WPCI5000

Dear Mr. Baer:

A report has been created detailing the results of the FCC and IC electromagnetic emissions testing performed on the WPCI5000. This has been submitted to the American TCB for a Grant of Equipment Authorization pursuant to Subpart E of Part 15 of FCC Rules (CFR 47) regarding intentional radiators and to Industry Canada as a Low Power, Licence Exempt Radio Communications Device. Please find this report enclosed. This report has been sent to American TCB and Industry Canada.

We will periodically check the status of the applications and immediately communicate any problems, should they arise.

To check on the status of the Industry Canada application yourself, you can go to the following URL:
http://spectrum.ic.gc.ca/~cert/index2_e.html

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

Sincerely,

A handwritten signature in black ink that reads "Juan Martinez".

Juan Martinez
Senior EMC Engineer

JM/dmg
Enclosure: R46202



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February 8, 2002

American TCB
6731 Whittier Ave.
Suite C110
McLean, VA. 22101

Gentlemen:

The enclosed documents constitute a formal submittal and application for a Grant of Equipment Authorization pursuant to Subpart E of Part 15 of FCC Rules (CFR 47) regarding intentional radiators. Data within this report demonstrates that the equipment tested complies with the FCC limits for intentional radiators.

Elliott Laboratories, as duly authorized agent prepared this submittal. A copy of the letter of our appointment as agent is enclosed.

If there are any questions or if further information is needed, please contact Elliott Laboratories for assistance.

Sincerely,

A handwritten signature in black ink that reads "Juan Martinez".

Juan Martinez
Senior EMC Engineer

JM/dmg

Enclosures: Agent Authorization Letter
 Emissions Test Report with Exhibits



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February 8, 2002

Industry Canada,
Certification Section
Certification and Engineering Bureau
1241 Clyde Avenue
Ottawa, Canada
K2C 1Y3

Gentlemen:

The enclosed documents constitute a formal submittal and application for Certification pursuant to RSS-210 and RSP-100 regarding low power, licence-exempt radiocommunications devices. Data within this report demonstrates that the equipment tested complies with the RSS-210, Issue 4 limits for such devices. Please note that a summary of results is provided on page 5 of this report and the test data is provided in EXHIBIT 2.

The device in question is a PCI Card w/ WM3A5000 Mini PCI card. The PCI card is used inside PC computers, which provides wireless networking capability. Model Number: WPCI5000.

Elliott Laboratories, as duly authorized agent prepared this submittal. A copy of the letter of our appointment as agent is enclosed. Please also find enclosed a credit card authorization form.

If there are any questions or if further information is needed, please contact Elliott Laboratories for assistance at doc@elliottlabs.com.

Sincerely,

Juan Martinez
Senior EMC Engineer

JM/dmg

Enclosures: Application Form
 Application Fee
 Agent Authorization Letter
 Emissions Test Report with Exhibits

***Electromagnetic Emissions Test Report
and
Application for Grant of Equipment Authorization
pursuant to
FCC Part 15, Subpart E (UNII Devices) and
Industry Canada RSS 210 Issue 4 (LELEAN Devices)
on the Intel Corporation
Model: WPCI5000***

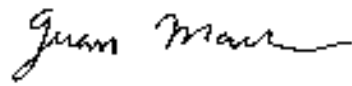
FCC ID: J3OWPCI5000

GRANTEE: 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: January 18 and January 19, 2002

AUTHORIZED SIGNATORY: 

Juan Martinez
Senior EMC Engineer

This report shall not be reproduced, except in its entirety, without the written approval of Elliott Laboratories, Inc.

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:
WPCI5000

Manufacturer:
Intel Corporation
2300 Corporate Center Drive
Thousand Oaks, CA. 91320

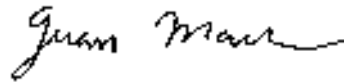
Tested to applicable standards:
RSS-210, Issue 4, December 2000 (Low Power License-Exempt Radiocommunication Devices)
FCC Part 15 Subpart E (UNII Devices)

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 SV3 Dated July 30, 2001
Departmental Acknowledgement Number: IC2845 SV4 Dated July 19, 2001

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4 as detailed in section 5.3 of RSS-210, Issue 4); and that the equipment performed in accordance with the data submitted in this report.

Signature
Name
Title
Company
Address



Juan Martinez
Senior EMC Engineer
Elliott Laboratories Inc.
684 W. Maude Ave
Sunnyvale, CA 94086
USA

Date: February 8, 2002

Maintenance of compliance with the above standards is the responsibility of the manufacturer. Any modification of the product which 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 or I/O cable changes, etc.).

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SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation model WPCI5000 pursuant to Subpart E of Part 15 of FCC Rules for Unlicensed National Information Infrastructure (UNII) devices and RSS-210 Issue 4 for licence-exempt local area network (LELAN) 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 intentional radiator 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

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart E of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

SUMMARY OF RESULTS

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
Operation in the 5.15 – 5.25 GHz Band				
15.407 (d)		As the device operates in the 5.15 – 5.25 GHz band the antenna must be integral to the device.	Antenna Gain = 2 dBi The antenna detachable (REVERSED THREAD & POLARITY)	COMPLIES
15.407(e)		Indoor operation only	Refer to user's manual in Exhibit 6	COMPLIES
15.407(a) (1)	6.2.2 q1 (i)	Bandwidth	26-dB (27.33 MHz), 20-dB (17.33 MHz)	N/A
15.407(a) (1)	6.2.2 q1 (i)	Output Power	16.9 dBm	COMPLIES
15.407(a) (1)	6.2.2 q1 (i)	Power Spectral Density	-2.30 dBm/MHz	COMPLIES
15.407(b) (5) / 15.209	6.2.2 q1 (ii)	Spurious Emissions below 1GHz	-7.4 dB @ 6216 MHz	COMPLIES
15.407(b) (2)	6.2.2 q1 (ii)	Spurious Emissions above 1GHz	-3.1dB @ 797.25MHz	COMPLIES
Operation in the 5.25 – 5.35 GHz Band Note: The device is not restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the power spectral limit of -27dBm/MHz as detailed in FCC 15.407(b)(2) and RSS 210 6.2.2 q1 (ii)				
		Maximum Antenna Gain /detachable Antenna	Antenna Gain = 2 dBi The antenna detachable (REVERSED THREAD & POLARITY)	COMPLIES
15.407(a) (2)	6.2.2 q1 (ii)	Bandwidth	26-dB (33.0 – 38.1 MHz), 20-dB (18.38 – 22.50 MHz)	N/A
15.407(a) (2)	6.2.2 q1 (ii)	Output Power	21 dBm	COMPLIES
15.407(a) (2)	6.2.2 q1 (ii)	Power Spectral Density	1.7 dBm/MHz	COMPLIES
15.407(b) (5) / 15.209	6.2.2 q1 (ii)	Spurious Emissions below 1GHz	-4.0 dB @ 15,780 MHz	COMPLIES
15.407(b) (2)	6.2.2 q1 (ii)	Spurious Emissions above 1GHz	-3.1dB @ 797.25MHz	COMPLIES

General requirements for all bands				
	6.2.2 q(iv)(a)	Digital Modulation	Digital Modulation is used, refer to the "Theory of Operations" (Exhibit 9) for a detailed explanation.	COMPLIES
	6.2.2 q(iv)(b)	Peak Spectral Density	6.70 – 10.70 dBm/MHz	COMPLIES
15.407(a)(6)		Peak Excursion Ratio	7.42 - 7.75 dB	COMPLIES
	6.2.2 q(iv)(c)	Channel Selection	The device was tested on the following channels in normal mode: 6, 14, and 20.	N/A
15.407 (c)	6.2.2 q(iv)(d)	Automatic Discontinuation of Operation in the absence of information to transmit	Operation is discontinued in the absence of information to transmit, refer to the "Theory of Operations" in Exhibit 9 for a detailed explanation.	COMPLIES
15.407 (g)	6.2.2 q(iv)(e)	Frequency Stability	Frequency stability is +/- 20 ppm, refer to the "Theory of Operations" in Exhibit 9 for a detailed analysis.	COMPLIES
	6.2.2 q(iv)(g)	User Manual information	All relevant statements have been included in the user's manuals. Refer to Exhibit 6 for details	COMPLIES
15.407 (f)	6.2.2 q(iv)(g)	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11	COMPLIES
15.407(b) / 15.207	6.6	AC Conducted Emissions	-3.06dB @ .219MHz	COMPLIES

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 table-top equipment during testing to simulate the end user environment. EUT received it's voltage from the PC host.

The sample was received on January 7, 2002 and tested on January 18 to 19 and January 28 to 29, 2002. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number	Proposed FCC ID #
Intel /WPCI5000/ PCI Card	N/A	J30WMPCI5000
Intel /WM3A500/ Mini PCI Card	N/A	J30WM3A5000

OTHER EUT DETAILS**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 the emission specifications.

SUPPORT EQUIPMENT

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

Manufacturer/Model/Description	Serial Number	FCC ID Number
GEM/DD-556AA/Monitor	J79DD-556	BDK008B0023
Logitech/M-C34/Mouse	LZB83058088	DZL211146
Dell/SK-1000RE/Keyboard	GYUR105K	M950529070
Compaq/3563V5/Desktop PC	N/A	CNT75MDEBV5

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 DURING TESTING

The radio was transmitting at full power on the specified channel with a duty cycle of 99% (maximum allowed). The EUT was tested in normal mode (channel bandwidth of approximately 30 MHz).

"Normal Mode" allows data rates of up to 54 Mb/s. The device was, therefore, tested in normal mode at the data rate that produced the highest output power for normal mode (6 Mb/s)

ANTENNA REQUIREMENTS

As the device is intended to operate in the 5.15 – 5.25 GHz band an integral antenna as detailed in 15.407 (d) and RSS-210 6.2.2(q1) (i) is required. The antenna for the device is an external antenna. It uses an SMA jack connector (Reverse thread and Polarity 30 u" gold plated).

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on January 7, January 15, January 18, January 24, January 25 and January 26, 2002 at the Elliott Laboratories Open Area Test Site # 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 Federal Communications Commission. In accordance with Industry Canada rules detailed in RSS 210 Issue 4 and RSS-212, construction, calibration, and equipment data for the test sites have been filed with the Federal Communications 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 and 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 run 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.

POWER METER

Either a spectrum analyzer or a power meter and thermister mount are used for all direct output power measurements from transmitters.

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.

ANTENNAS

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 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 exhibit 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 which 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 which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements are performed with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.

Measurement bandwidths (video and resolution) are set in accordance with FCC procedures for the type of radio being tested.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions from the AC power port are given in units of microvolts, the limits for radiated electric field emissions are given in units of microvolts per meter at a specified test distance and the output power limits are given in terms of Watts, milliwatts or dBm. 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 results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp) the following formula is used to determine the field strength limit in terms of microvolts per meter at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

For reference, converting the voltage and electric field strength specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. Conversion of power specification limits from linear units (in milliwatts) to decibel form (in dBm) is accomplished by taking the base ten logarithm, then multiplying by 10.

FCC 15.407 (a) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 - 5250	50mW (17 dBm)	4 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi.

Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

RS-210 6.2.2(q1) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 - 5250	200mW (23 dBm)	10 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi.

Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

SPURIOUS RADIATED EMISSIONS LIMITS

The table below shows the limits for unwanted (spurious) emissions falling in the restricted bands detailed in Part 15.205 and Industry Canada RSS-210 Table 2.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

The table below shows the limits for unwanted (spurious) emissions outside of the restricted bands above 1GHz.

Operating Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength At 3m (dBuV/m)
5150 - 5250	-27 dBm	68.3 dBuV/m
5250 - 5350	-27 dBm (note 1)	68.3 dBuV/m
5725 - 5825	-27 dBm (note 2)	68.3 dBuV/m
	-17 dBm (note 3)	78.3 dBuV/m

Note 1: If operation is restricted to indoor use only then emissions in the band 5.15 – 5.25 GHz must meet the power spectral density limits for the intentional signals detailed in RSS 210 and FCC Subpart E for devices operating in the 5.15 – 5.25 GHz band.

Note 2: Applies to spurious signals separated by more than 10 MHz from the allocated band.

Note 3: Applies to spurious signals within 10 MHz of the allocated band.

AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in FCC Part 15.205 and Industry Canada RSS-210 section 6.6.

Frequency Range (MHz)	Limit (uV)	Limit (dBuV)
0.450 to 30.000	250	48

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - B = C$$

and

$$C - S = M$$

where:

R_r = Receiver Reading in dBuV

B = Broadband Correction Factor*

C = Corrected Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

* Broadband Level - Per ANSI C63.4, 13 dB may be subtracted from the quasi-peak level if it is determined that the emission is broadband in nature. If the signal level in the average mode is six dB or more below the signal level in the peak mode, the emission is classified as broadband.

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:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

$$F_d = \text{Distance Factor in dB}$$

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

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:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

EXHIBIT 1: Test Equipment Calibration Data

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

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
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**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
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**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Assett #</u>	<u>Cal interval</u>	<u>Last Calibrated</u>	<u>Cal Due</u>
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

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T 45876 37 Pages



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



EMC Test Data

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
Contact:	Robert Paxman	Proj Eng:	Mark Briggs
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 thread 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			



EMC Test Data

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
Contact:	Robert Paxman	Proj Eng:	Mark Briggs
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

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

HOST Interface Ports

HOST 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	Com1	Shielded	1.5

EUT Operation During Emissions Testing (Digital Testing)

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



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

FCC Part 15 Subpart E Tests: Normal Mode

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:	1/19/2001
Test Engineer:	Jmartinez
Test Location:	SVOATS# 4

Config. Used: 2
 Config Change: N/A
 Host Unit Voltage 120Vac, 60Hz

General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing.
 For radiated emissions testing the measurement antenna was located 3 meters from the EUT unless stated otherwise.
 When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions: Temperature: 8.9°C
 Rel. Humidity: 89%

Summary of Results: Turbo Mode

Run #	Test Performed	Limit	Result	Comments
1	Output Power (5.15 - 5.25GHz band)	15.407(a) (1)	Pass	16.9 dBm
1	Output Power (5.25 - 5.35GHz band)	15.407(a) (2)	Pass	21.0 dBm
2	Power Spectral Density (5.15 - 5.25GHz)	15.407(a) (1)	Pass	-2.3 dBm/MHz
2	Power Spectral Density (5.25- 5.35GHz)	15.407(a) (2)	Pass	1.70 dBm/MHz
3	26dB Bandwidth	15.407	Pass	27.33 - 38.1 MHz
3	20 dB Bandwidth	RSS 210	Pass	17.33 - 22.5 MHz
4	Peak Excursion Envelope	15.407(a) (6)	Pass	7.42 - 7.75 dB
5	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	> -27 dBm



EMC Test Data

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

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.

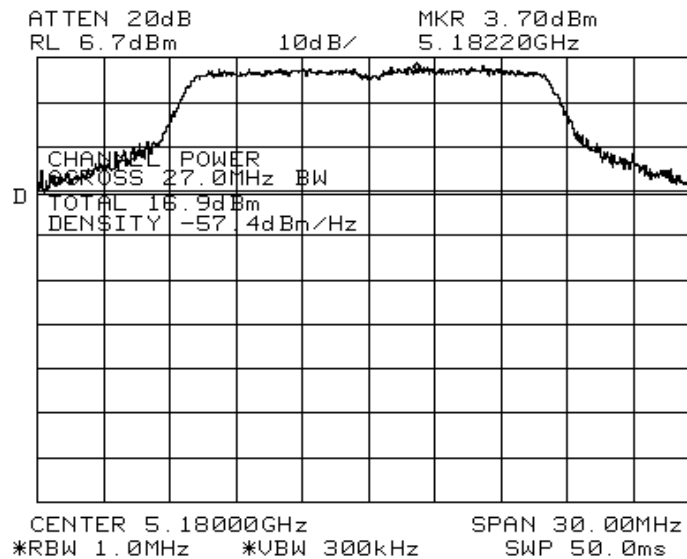
Run #1: Output Power

Antenna Gain: 2 dBi

Power (dBm)	Frequency (MHz)	VBW (kHz)	26-dB EBW	Measured Power (dBm)	FCC Limit (dBm) (note 3)
13	5180	145	27.33	16.9	17.0
15	5260	202	38.10	21.0	24.0
13	5320	175	33.00	19.2	24.0

Note 1: Measured using spectrum analyzer's power measurement function (RBW = 1MHz, VBW = (Note 2)) which summed the power over the occupied bandwidth (26dB bandwidth).

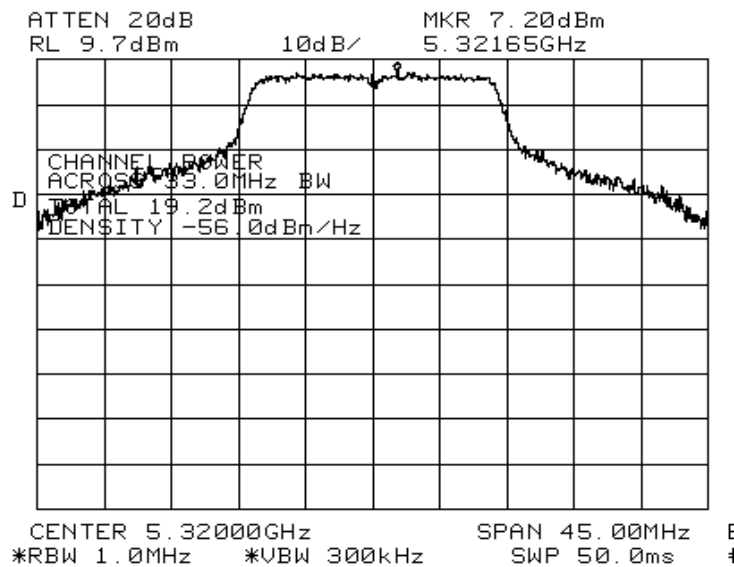
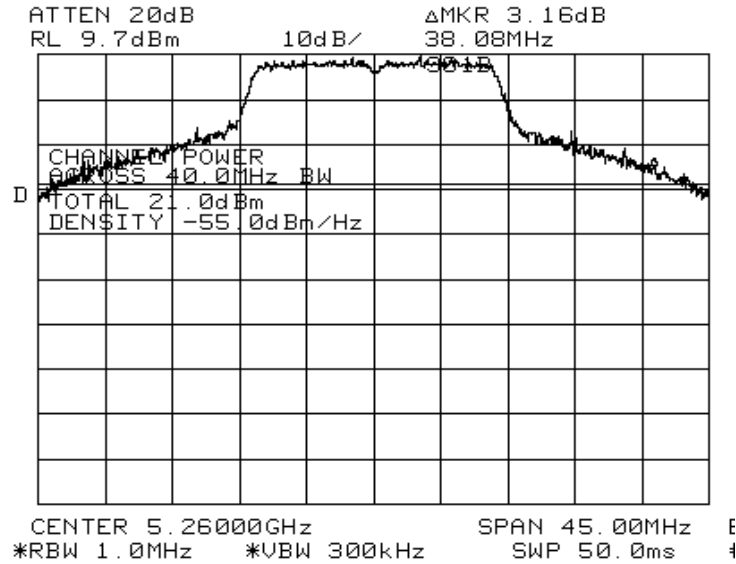
Note 2: VBW was determine by the following formulas: $EBW/2 \cdot \pi \cdot 30$ or $1/2 \cdot \pi \cdot T$, whichever gives the largest VBW.





EMC Test Data

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





EMC Test Data

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

Run #2: Power Spectral Density
 Antenna Gain: 2 dBi

Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)	FCC Limit (dBm) note 2	Peak Power Spectral Density (dBm)	
low	5180	-2.30	4.0	6.7	Note 1
mid	5260	1.70	11.0	10.70	Note 1
high	5320	0.20	11.0	8.87	Note 1

Note 1: The above measurements were made using RBW = 1MHz, VBW = 3MHz, video averaging on. To demonstrate compliance with RSS 210, the peak PSD was also measured using RBW= VBW=1MHz, video averaging off during the peak excursion measurements (run #4). The peak PSD (measured with RBW=VBW=1MHz) of 9.33 **dBm** did not exceed the maximum permitted average PSD of 10dBm (5.15 to 5.25 GHz band) or 11dBm (5.25-5.35GHz band) so no restriction is placed on the output power or average PSD with respect to RSS 210.

Note 2: RSS 210 limit is 10dBm/MHz in the 5.15 to 5.25 GHz band, 6dB higher than the FCC limit.

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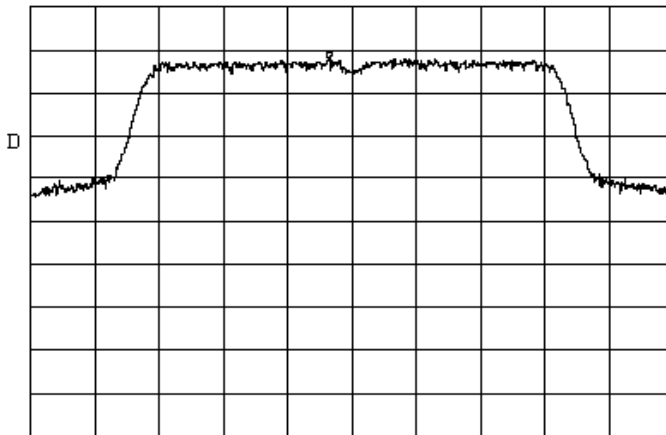
EMC Test Data

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

Plots Showing Power Spectral Density (RBW = 1MHz, VBW = 3 MHz, video averaging ON)

FCC Power Density

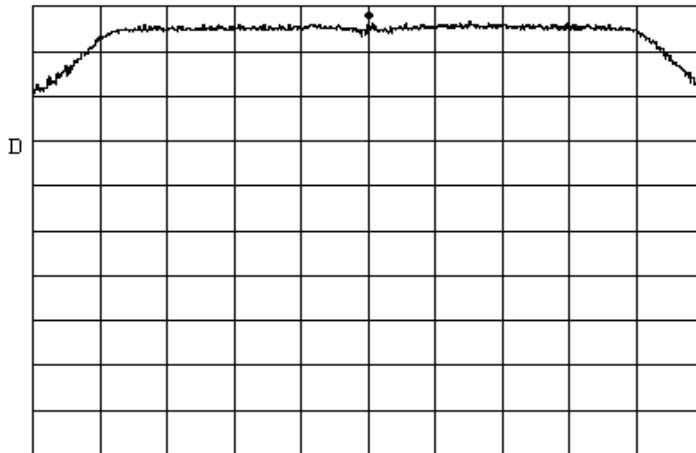
ATTEN 20dB VAVG 100 MKR -2.30dBm
RL 9.7dBm 10dB/ 5.17909GHz



CENTER 5.18000GHz SPAN 26.00MHz E
*RBW 1.0MHz *VBW 3.0MHz SWP 50.0ms S

Canada Power Density

ATTEN 20dB MKR 6.70dBm
RL 9.7dBm 10dB/ 5.18003GHz



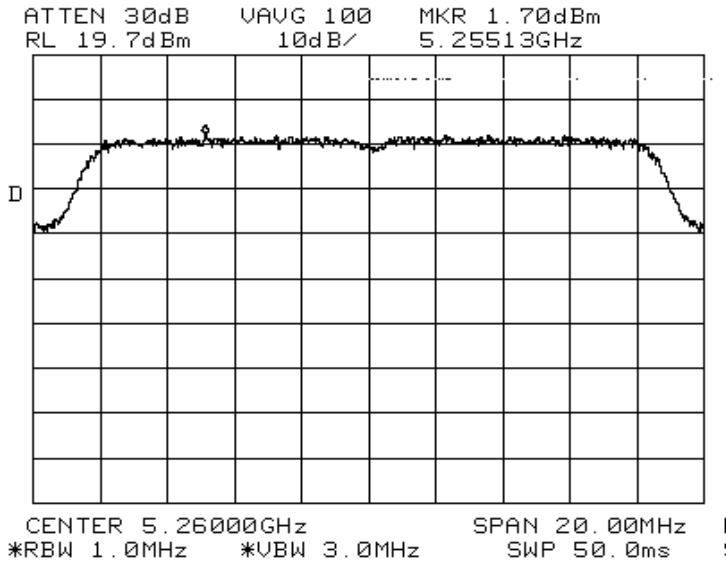
CENTER 5.18000GHz SPAN 20.00MHz E
*RBW 1.0MHz *VBW 1.0MHz SWP 50.0ms S



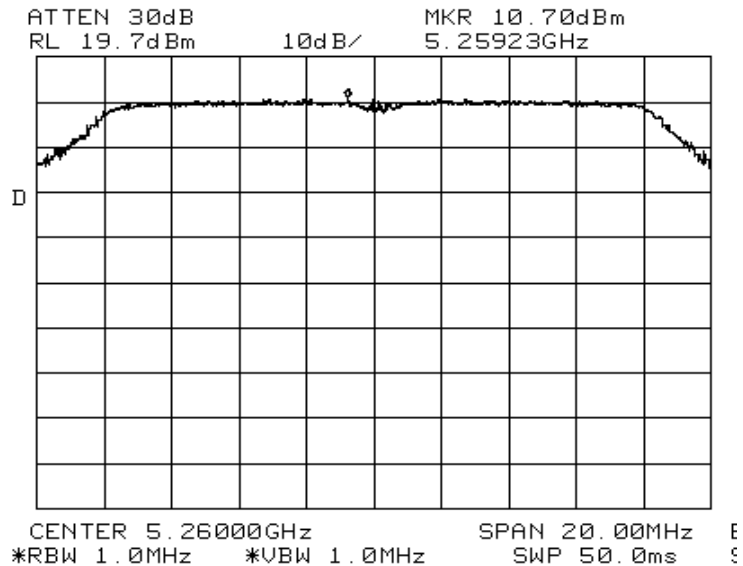
EMC Test Data

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

FCC Power Density



Canada Power Density



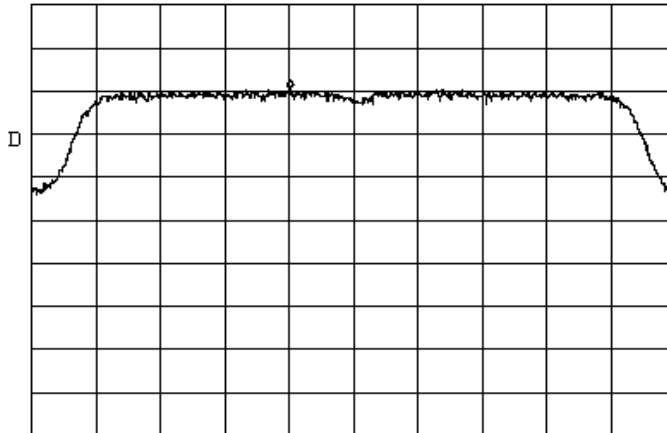


EMC Test Data

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

FCC Power Density

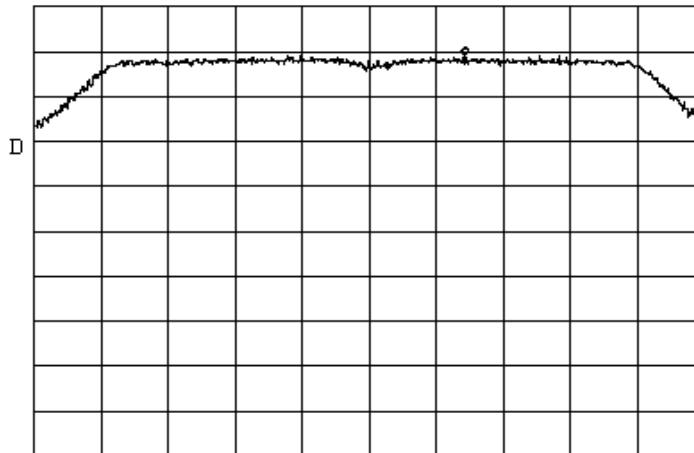
ATTEN 30dB VAUG 100 MKR .20dBm
RL 19.7dBm 10dB/ 5.31803GHz



CENTER 5.32000GHz SPAN 20.00MHz E
*RBW 1.0MHz *UBW 3.0MHz SWP 50.0ms S

Canada Power Density

ATTEN 30dB MKR 8.87dBm
RL 19.7dBm 10dB/ 5.32287GHz



CENTER 5.32000GHz SPAN 20.00MHz E
*RBW 1.0MHz *UBW 1.0MHz SWP 50.0ms S



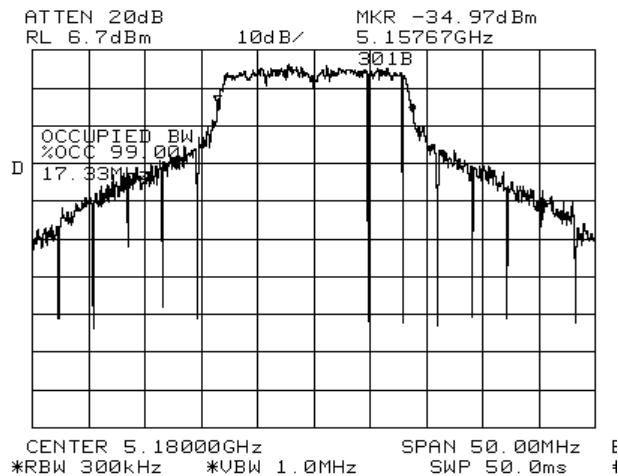
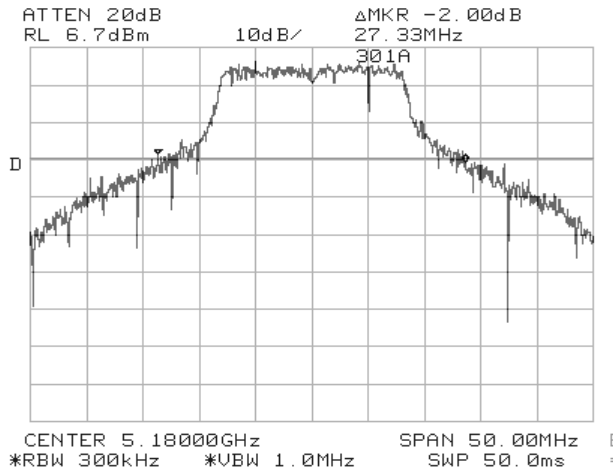
EMC Test Data

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 #3: Signal Bandwidth

Channel	Frequency (MHz)	Resolution Bandwidth	26 dB Signal Bandwidth (MHz)	20 dB Signal Bandwidth (MHz)	Graph reference #
low	5180	300 kHz	27.33	17.33	301A and 301B
mid	5260	300 kHz	38.10	22.50	302A and 302B
high	5320	300 kHz	33.00	18.38	303A and 303B

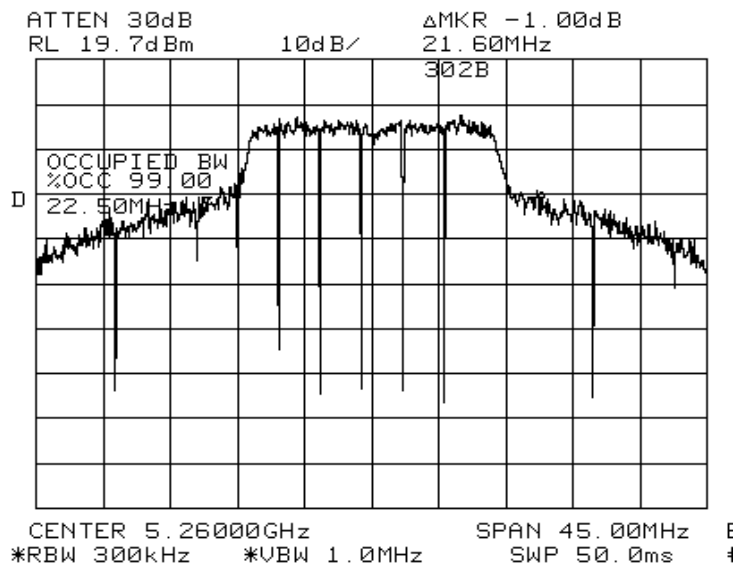
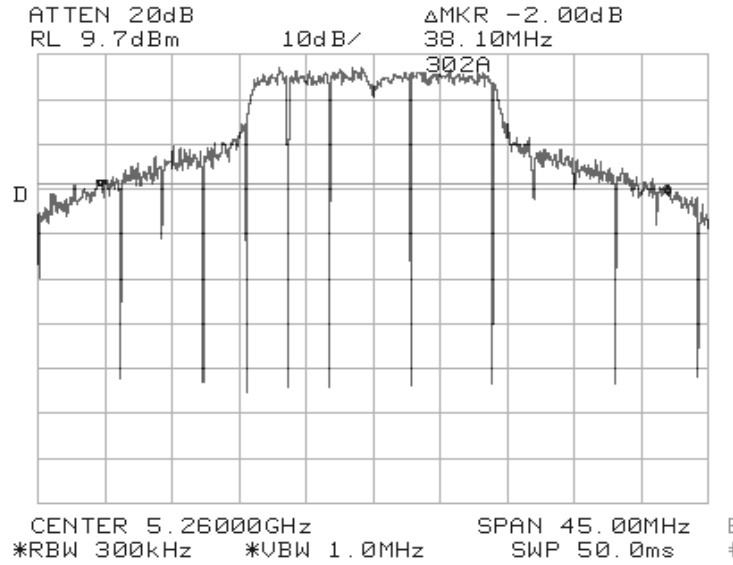
Plots Showing Signal Bandwidth





EMC Test Data

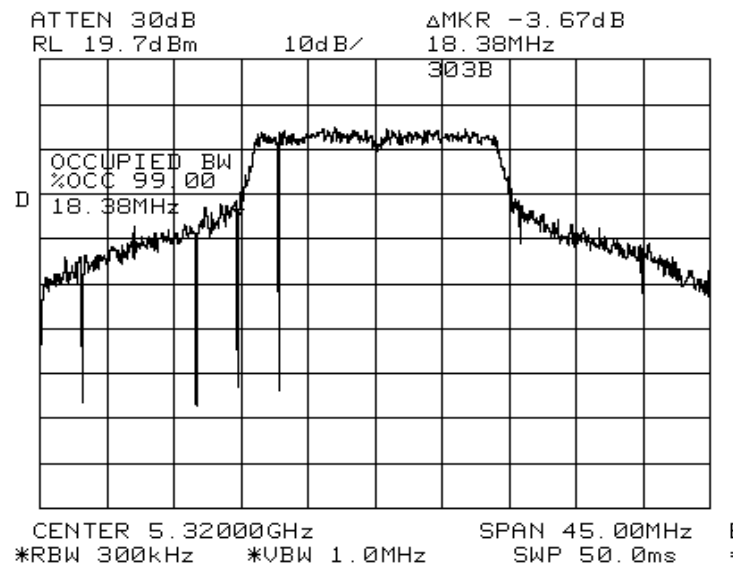
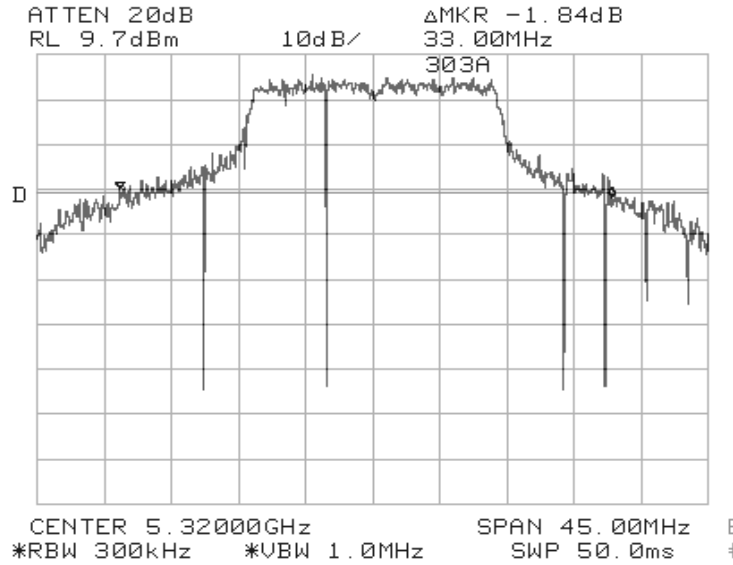
Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
Contact:	Robert Paxman	Proj Eng:	Mark Briggs
Spec:	FCC Part 15 B and E, RSS-210	Class:	B





EMC Test Data

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





EMC Test Data

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

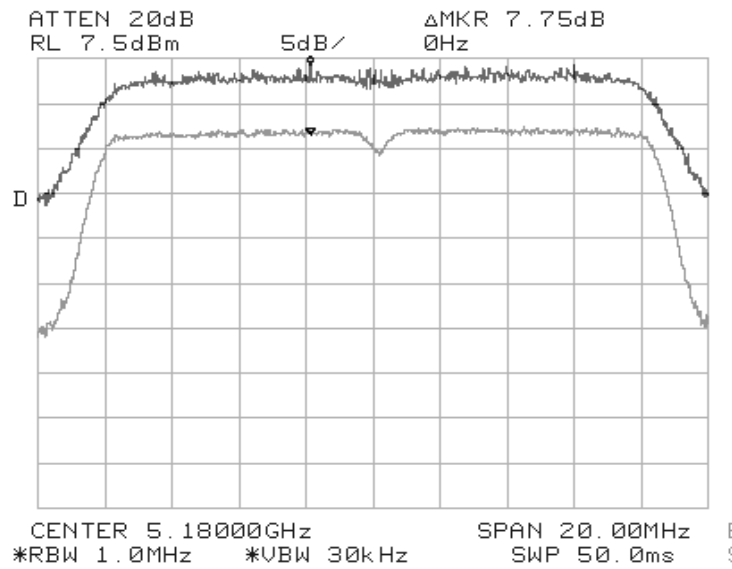
Run #4: Peak Excursion Measurement

Plots Showing Peak Excursion

Trace A: RBW = VBW = 1MHz

Trace B: RBW = 1 MHz, VBW = 30kHz

Low Channel; Peak Excursion = 7.75 dB

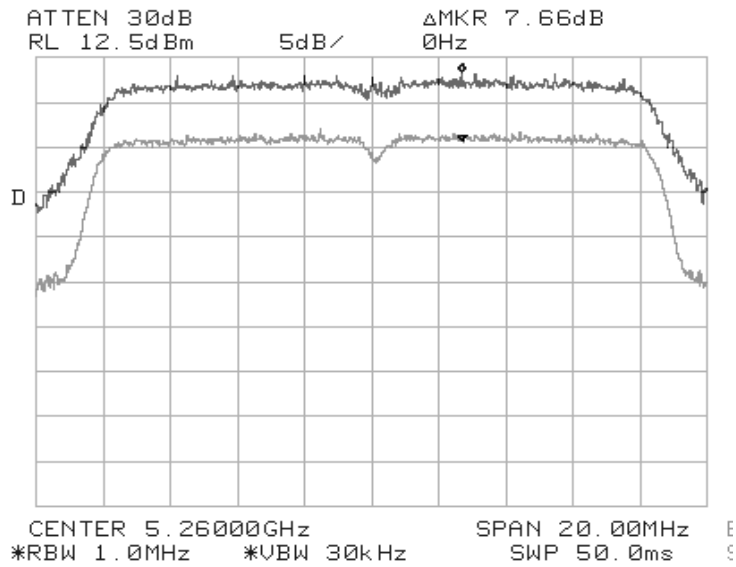




EMC Test Data

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

Middle Channel; Peak Excursion = 7.66 dB

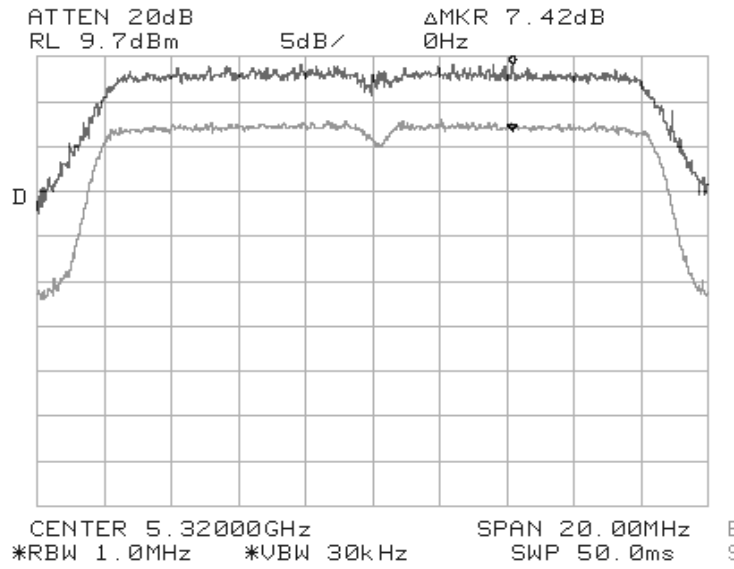




EMC Test Data

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

High Channel; Peak Excursion = 7.42 dB





EMC Test Data

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

Run #5: Out Of Band Spurious Emissions - Antenna Conducted

The EIRP limit is -27dBm/MHz for all out of band signals that do not fall in restricted bands. A limit of -27 dBm was, therefore, used for signals not in restricted bands and close to the intentional band within 100 MHz of the upper and lower band edges. For signals removed from the band edge by more than 100MHz, radiated measurements were made (refer to run #6) if the signal amplitude exceeded -37dBm.

Channel	Frequency (MHz)	Frequency Range	Highest Spurious Signal	Graph reference #
low	5180	30 - 1000 MHz	Note 4	501
		1 to 5.15 GHz	3103 (Note 2), 4140 (Note 1)	502
		5.25 to 10 GHz	6208 (Note 2)	503
		10 GHz to 20 GHz	10350 (Note 3), 15530 (Note 1)	504
		20 GHz to 40 GHz	None	505
mid	5260	30 - 1000 MHz	Note 4	506
		1 to 5.25 GHz	3160 (Note 2), 4209 (Note 1)	507
		5.35 to 10 GHz	6311 (Note2)	508
		10 GHz to 20 GHz	10520 (Note 1), 15780 (Note 3)	509
		20 GHz to 40 GHz	None	510
high	5320	30 - 1000 MHz	Note 4	511
		1 to 5.30 GHz	3193 (Note 2), 4254 (Note 1)	512
		5.34 to 10 GHz	6381 (Note 2)	513
		10 GHz to 20 GHz	10630 (Note 1), 15950 (Note 1)	514
		20 GHz to 40 GHz	None	515

Note 1:	Signal is in a restricted band. Refer to run #6 for field strength measurements.
Note 2:	Signal is not in restricted band. Limit is -27dBm eirp. As the signal strength is significantly lower than -27dBm no field strength measurements required.
Note 3:	Signal is not in restricted band. Limit is -27dBm eirp. Although the signal strength is significantly lower than -27dBm field strength measurements were made (refer to run #6)
Note 4:	All spurious signals in this frequency band measured during digital device radiated emissions test.

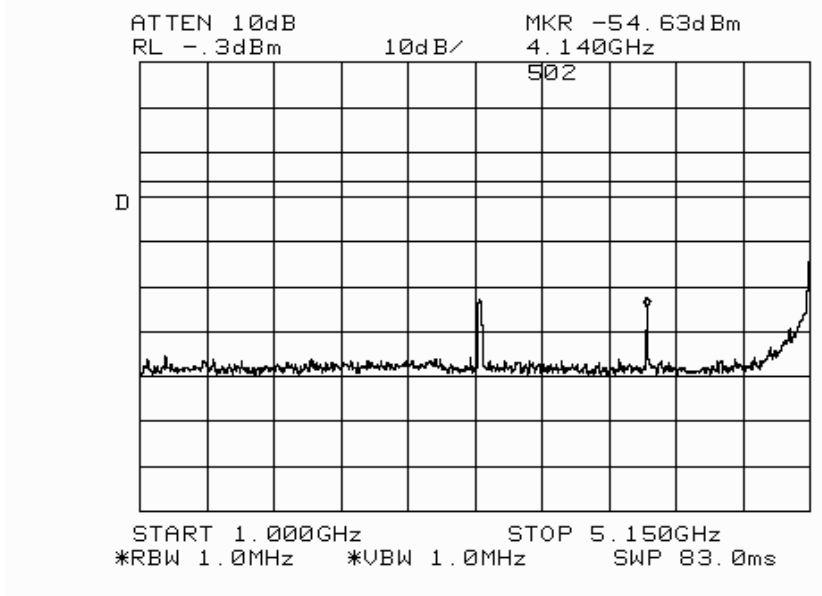
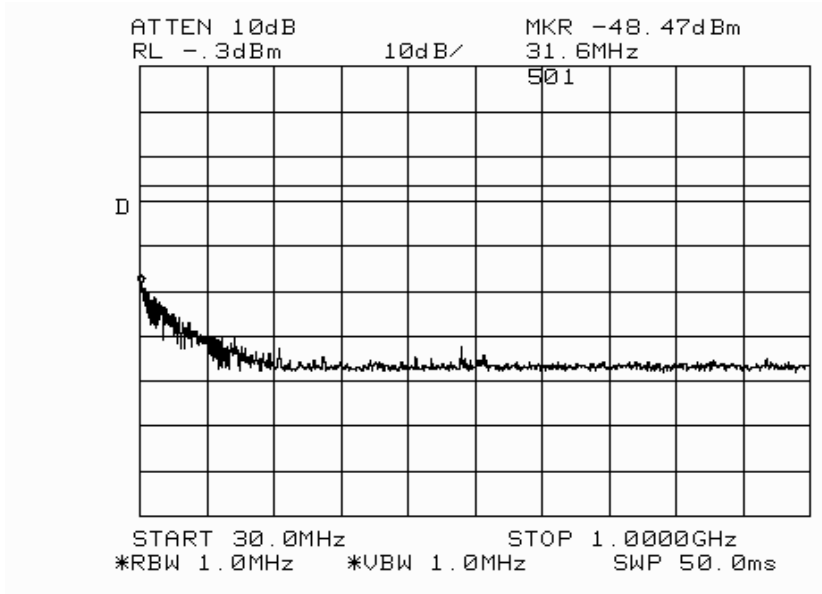


EMC Test Data

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

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

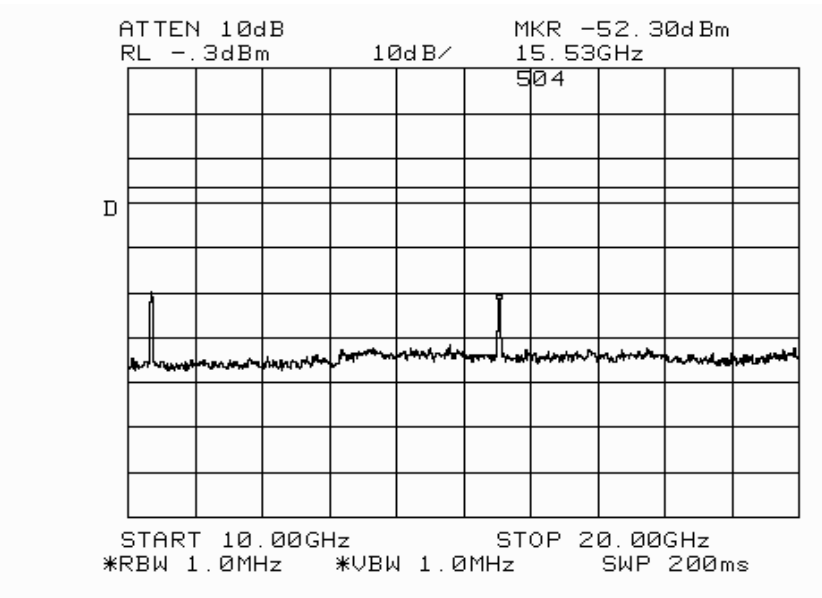
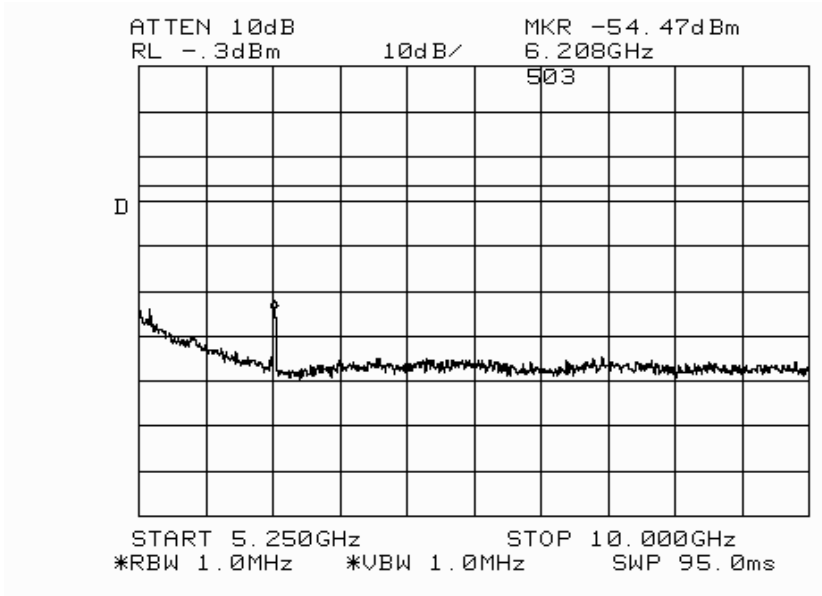
EUT operating at 5.18 GHz:





EMC Test Data

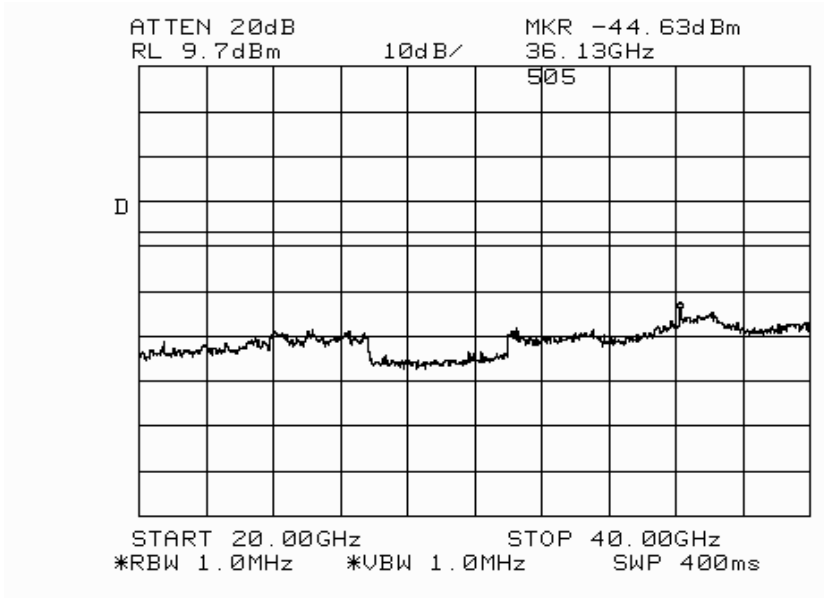
Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
Contact:	Robert Paxman	Proj Eng:	Mark Briggs
Spec:	FCC Part 15 B and E, RSS-210	Class:	B



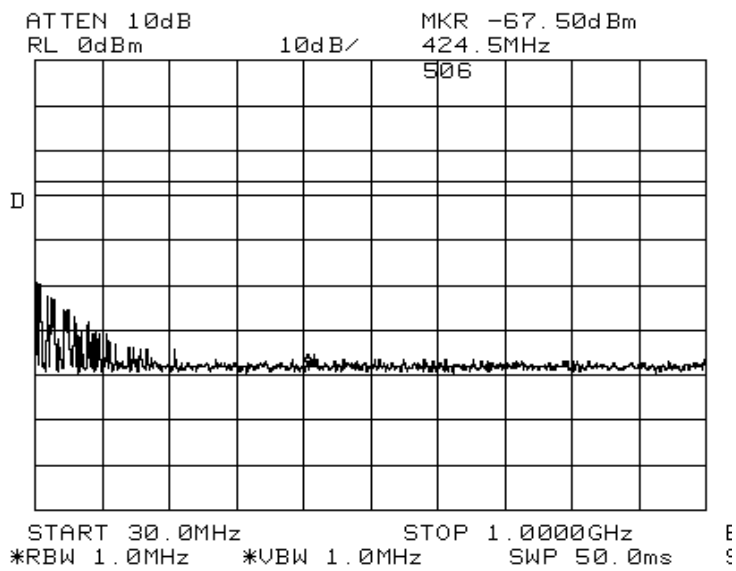


EMC Test Data

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



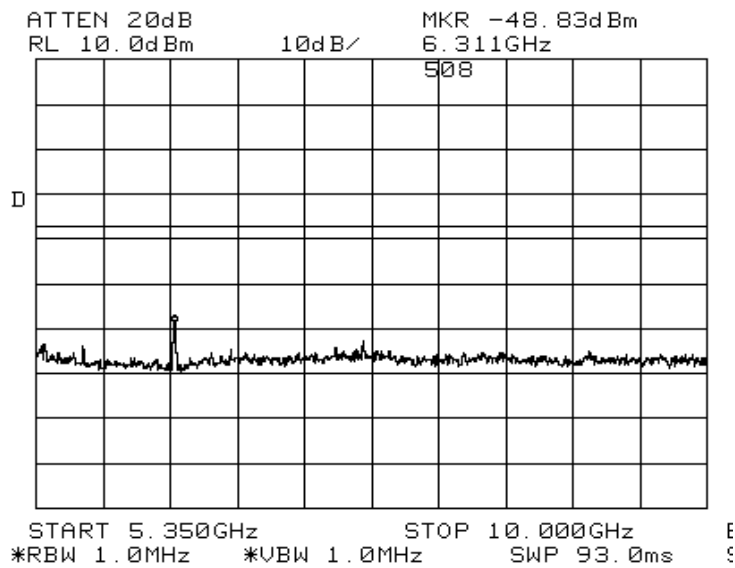
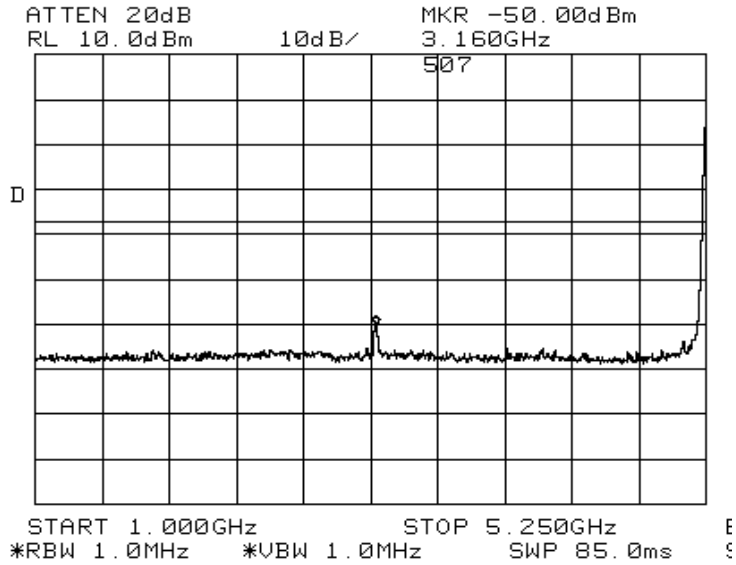
EUT operating at 5.26GHz:





EMC Test Data

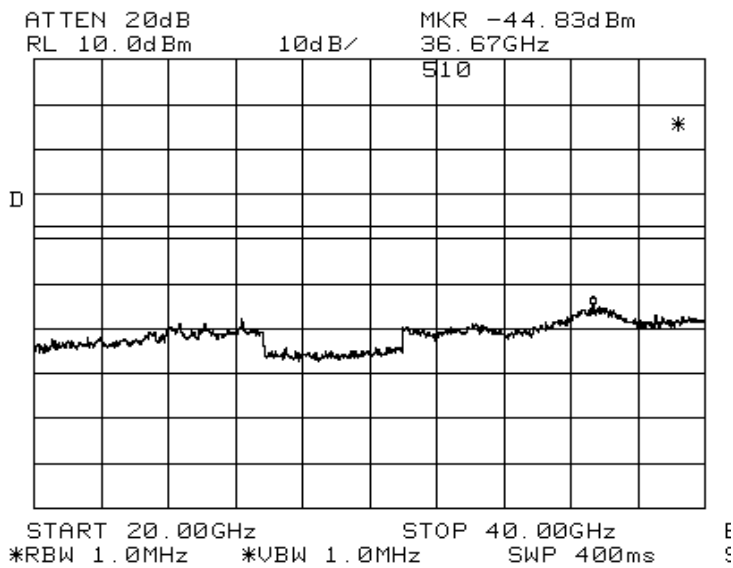
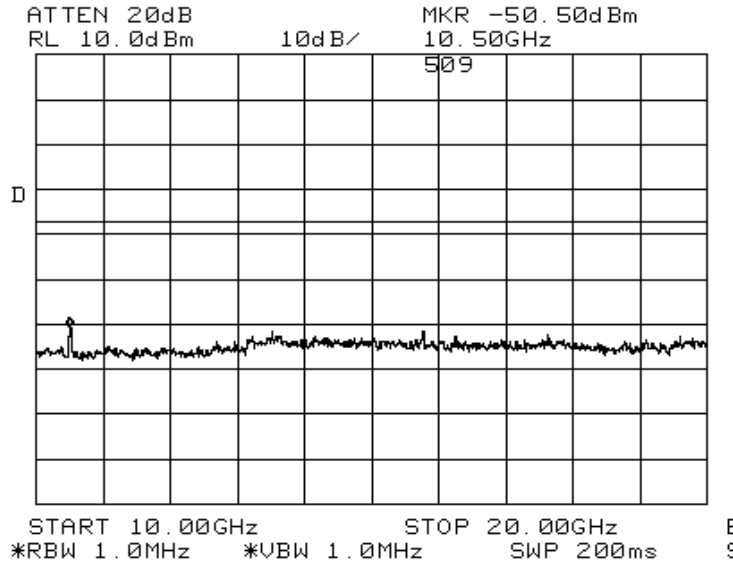
Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
Contact:	Robert Paxman	Proj Eng:	Mark Briggs
Spec:	FCC Part 15 B and E, RSS-210	Class:	B





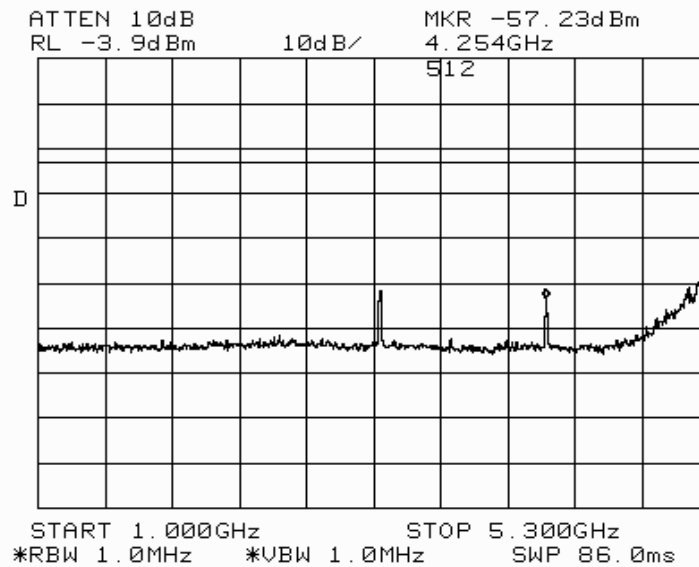
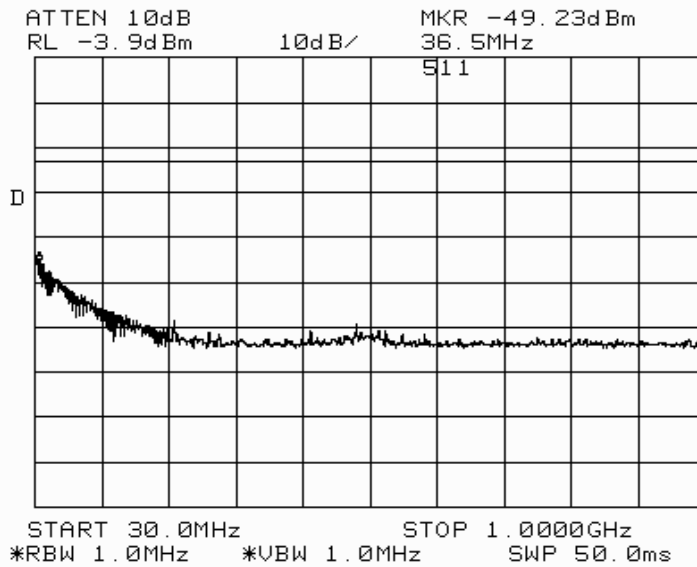
EMC Test Data

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



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

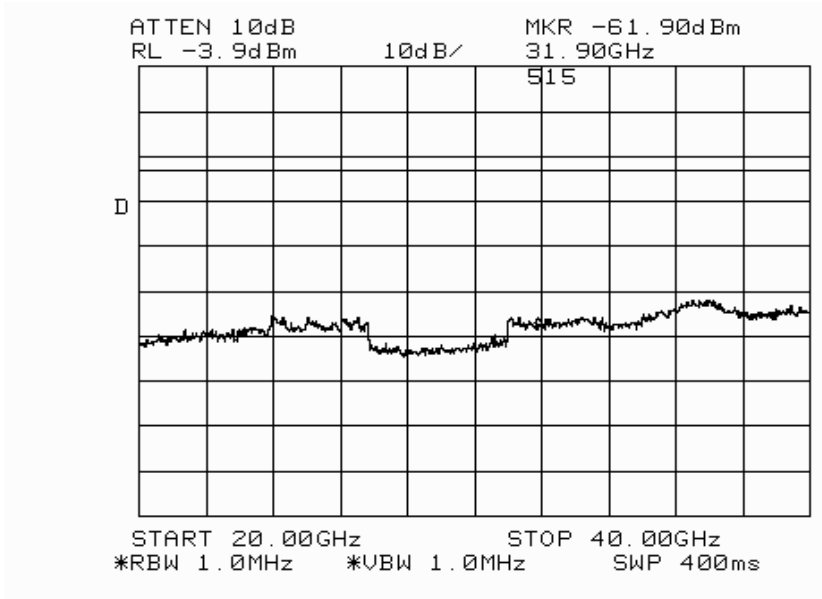
EUT operating at 5.32GHz:





EMC Test Data

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





EMC Test Data

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

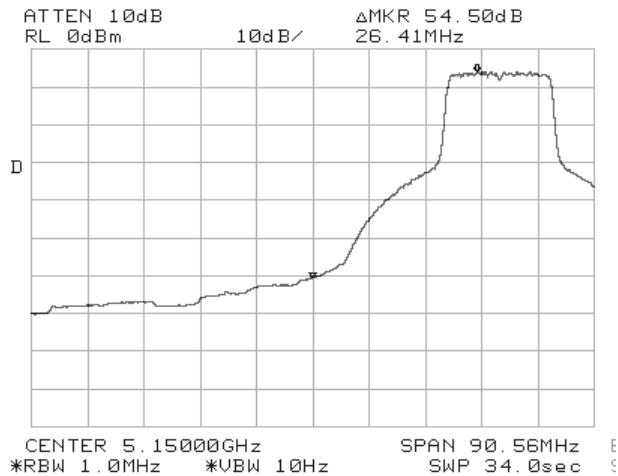
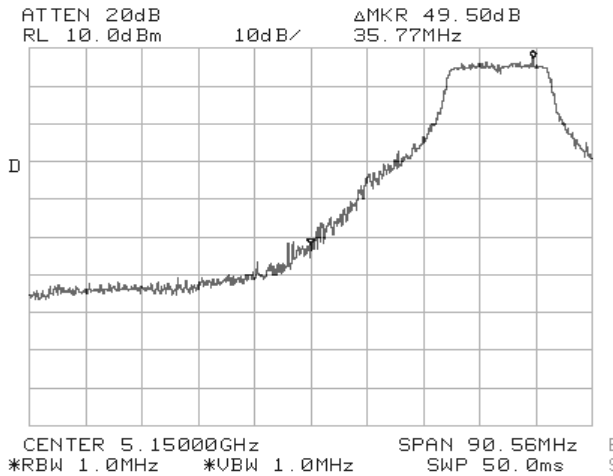
Band Edge Measurements:

For signals in the restricted bands immediately above and below the 5.15 to 5.35 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 made on the OATS to calculate the field strength of the unintentional signals.

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

5.15 GHz band edge, EUT operating on the lowest channel

The highest signal within 50 MHz of the 5.15 GHz band was -49.50 dBc (Peak) / -54.50 dBc (Average)



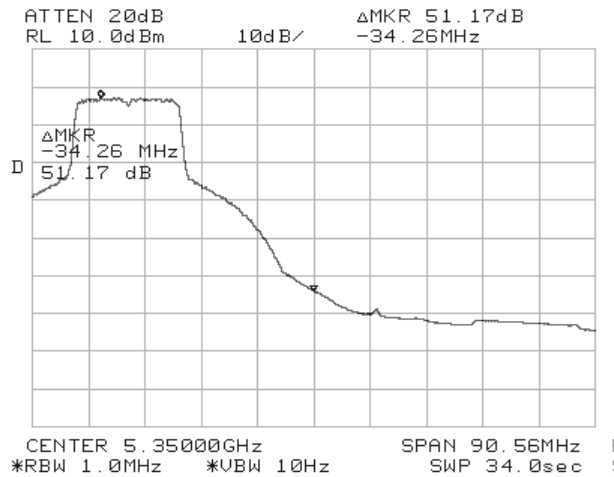
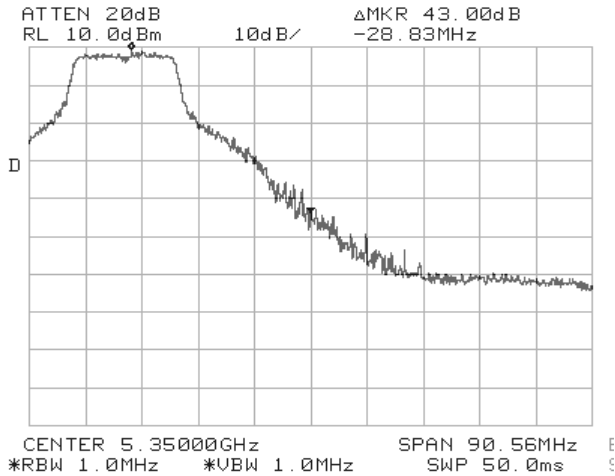


EMC Test Data

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

5.35 GHz band edge EUT operating on the highest channel:

The highest signal in the 5.35 to 5.46 GHz band was -43.00 dBc (Peak) / -51.17 dBc (Average)





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

FCC Part 15 Subpart E Tests

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:	1/18/2001
Test Engineer:	Jmartinez
Test Location:	SVOATS# 4

Config. Used: 1
 Config Change: None
 Host Unit Voltage 120Vac, 60Hz

General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT unless stated otherwise.

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected

Ambient Conditions: Temperature: 11°C
 Rel. Humidity: 80%

Summary of Results

Run #	Test Performed	Limit	Result	Comments
6a - 6b	RE, 1000 - 40000 MHz - Spurious Emissions	15.407(b)(6)	Pass	Refer to run

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.



EMC Test Data

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

Run #6a: Radiated Spurious Emissions, 1000 - 16,000 MHz

Limit for emissions in restricted bands:	54dBuV/m (Average)	74dBuV/m (Peak)
Limit for emissions outside of restricted bands:	EIRP < -27dBm/MHz	(68dBuV/m)

Fundamental signal measurements (to calculate the band edge field strengths):

Frequency MHz	Level dBuV/m	Pol v/h	15.209 / 15.407		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5179.815	109.3	V	-	-	Pk	238	1.0	Peak reading, peak limit
5181.072	99.4	V	-	-	Avg	238	1.0	Average reading, average limit
5179.947	104.2	H	-	-	Pk	0	0.0	Peak reading, peak limit
5181.313	94.8	H	-	-	Avg	0	0.0	Average reading, average limit
5320.010	113.1	V	-	-	Pk	0	0.0	Peak reading, peak limit
5321.202	103.9	V	-	-	Avg	0	0.0	Average reading, average limit
5320.757	106.2	H	-	-	Pk	250	1.1	Peak reading, peak limit
5321.074	98.5	H	-	-	Avg	250	1.1	Average reading, average limit

Band Edge Field Strength Calculations

Frequency MHz	Level dBuV/m	Pol v/h	15.209 / 15.407		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5150.0	59.8	v	74.0	-14.2	Pk	-	-	Note 1
5150.0	44.9	v	54.0	-9.1	Avg	-	-	Note 1
5150.0	54.7	h	74.0	-19.3	Pk	-	-	Note 1
5150.0	40.3	h	54.0	-13.7	Avg	-	-	Note 1
5350.0	70.1	v	74.0	-3.9	Pk	-	-	Note 2
5350.0	52.7	v	54.0	-1.3	Avg	-	-	Note 2
5350.0	63.2	h	74.0	-10.8	Pk	-	-	Note 2
5350.0	47.3	h	54.0	-6.7	Avg	-	-	Note 2

Note 1: EUT operating on the lowest channel available in the 5.15 - 5.25 MHz band. Signal level calculated using the relative measurements in run #5 (-49.50 dBc for peak and -54.50 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.

Note 2: EUT operating on highest channel available in the 5.25 - 5.35 MHz band. Signal level calculated using the relative measurements in run #5 (-43.00 dBc for peak and -51.17 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.



EMC Test Data

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

Run #6b: Radiated Spurious Emissions, 1000 - 40000 MHz

EUT On Highest Channel Available (5.32 GHz) (15 dBm on all frequencies. Testing with amp MINI-PCI card.)

With AP mini pci card.

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4256.0	42.2	v	74.0	-31.9	Pk	240	1.6	
4256.0	39.3	v	54.0	-14.7	Avg	240	1.6	
4256.0	40.7	h	74.0	-33.3	Pk	220	1.1	
4256.0	38.1	h	54.0	-15.9	Avg	220	1.1	
6384.0	43.6	v	68.3	-24.7	Note 3	135	1.0	
6384.0	38.9	h	68.3	-29.4	Note 3	335	2.0	
15960.0	68.3	h	74.0	-5.7	Pk	163	1.2	
15960.0	49.3	h	54.0	-4.7	Avg	163	1.2	
15960.0	61.6	v	74.0	-12.4	Pk	11	1.2	
15960.0	44.7	v	54.0	-9.3	Avg	11	1.2	
10640.0	56.4	v	74.0	-17.6	Pk	220	1.2	
10640.0	43.7	v	54.0	-10.3	Avg	220	1.2	
10640.0	55.8	h	74.0	-18.3	Pk	210	1.0	
10640.0	42.0	h	54.0	-12.0	Avg	210	1.0	

EUT On Lowest Channel Available (5.18 GHz)

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4144.0	43.2	v	74.0	-30.9	Pk	199	1.1	
4144.0	41.6	v	54.0	-12.4	Avg	199	1.1	
4144.0	41.0	h	74.0	-33.0	Pk	124	1.1	
4144.0	38.3	h	54.0	-15.7	Avg	124	1.1	
6216.0	53.5	h	68.3	-14.8	Note 3	295	1.0	
6216.0	60.9	v	68.3	-7.4	Note 3	180	1.1	
10360.0	48.5	v	68.3	-19.8	Note 3	0	1.1	
15540.0	55.3	v	74.0	-18.7	Pk	33	1.2	
15540.0	41.0	v	54.0	-13.0	Avg	33	1.2	
10360.0	50.2	h	68.3	-18.1	Note 3	222	1.1	
15540.0	61.2	h	74.0	-12.8	Pk	220	1.2	
15540.0	42.4	h	54.0	-11.6	Avg	220	1.2	



EMC Test Data

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

EUT On Center Channel (5.26 GHz)

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4208.0	41.9	v	74.0	-32.1	Pk	245	1.4	
4208.0	40.3	v	54.0	-13.7	Avg	245	1.4	
4208.0	41.8	h	74.0	-32.2	Pk	335	1.0	
4208.0	38.6	h	54.0	-15.4	Avg	335	1.0	
6312.0	48.8	v	68.3	-19.5	Note 3	217	1.0	
6312.0	44.7	h	68.3	-23.6	Note 3	202	1.1	
10520.0	48.6	v	68.3	-19.7	Note 3	12	1.1	
15780.0	60.4	v	74.0	-13.6	Pk	43	1.1	
15780.0	47.5	v	54.0	-6.5	Avg	43	1.1	
10520.0	46.7	h	68.3	-21.6	Note 3	0	1.0	
15780.0	65.8	h	74.0	-8.2	Pk	230	1.1	
15780.0	50.0	h	54.0	-4.0	Avg	230	1.1	



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

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: 1/25/2002

Config. Used: 1

Test Engineer: Rafael

Config Change: None

Test Location: SVOATS #3

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.



EMC Test Data

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
Contact:	Robert Paxman	Proj Eng:	Mark Briggs
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
			Limit	Margin		
MHz	dB μ V	Line			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	



EMC Test Data

Client:	Intel Corporation	Job Number:	J45863
Model:	WPCI5000	T-Log Number:	T45876
Contact:	Robert Paxman	Proj Eng:	Mark Briggs
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 MHz	Level dB μ V/m	Pol v/h	EN55022 B		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
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 MHz	Level dB μ V/m	Pol v/h	EN55022 B		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
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.

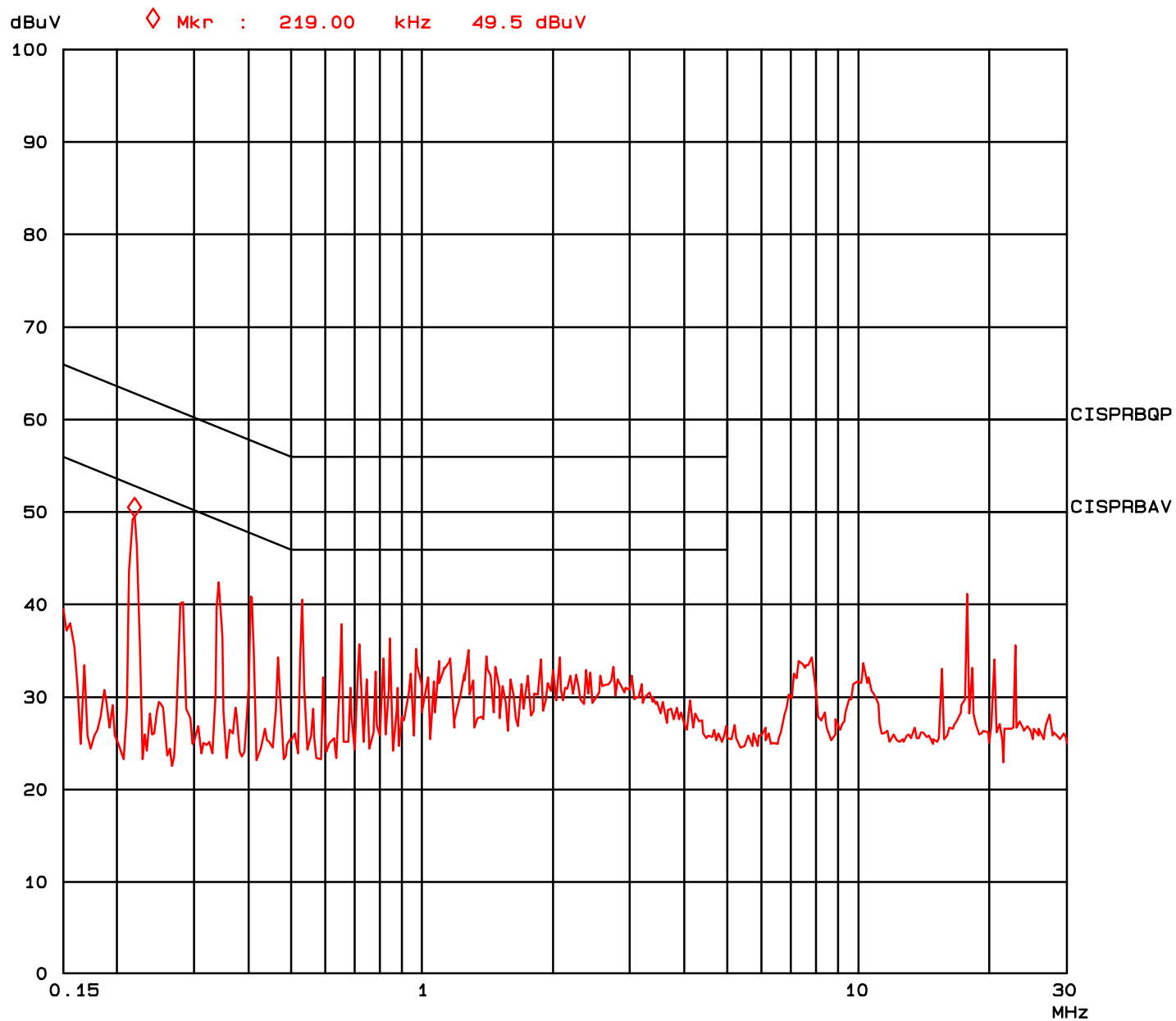
Note 1: Add note here

Note 2:

Elliott Laboratories Conducted Emissions

25. Jan 02 21: 11

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



Elliott Laboratories Conducted Emissions

25. Jan 02 21:32

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

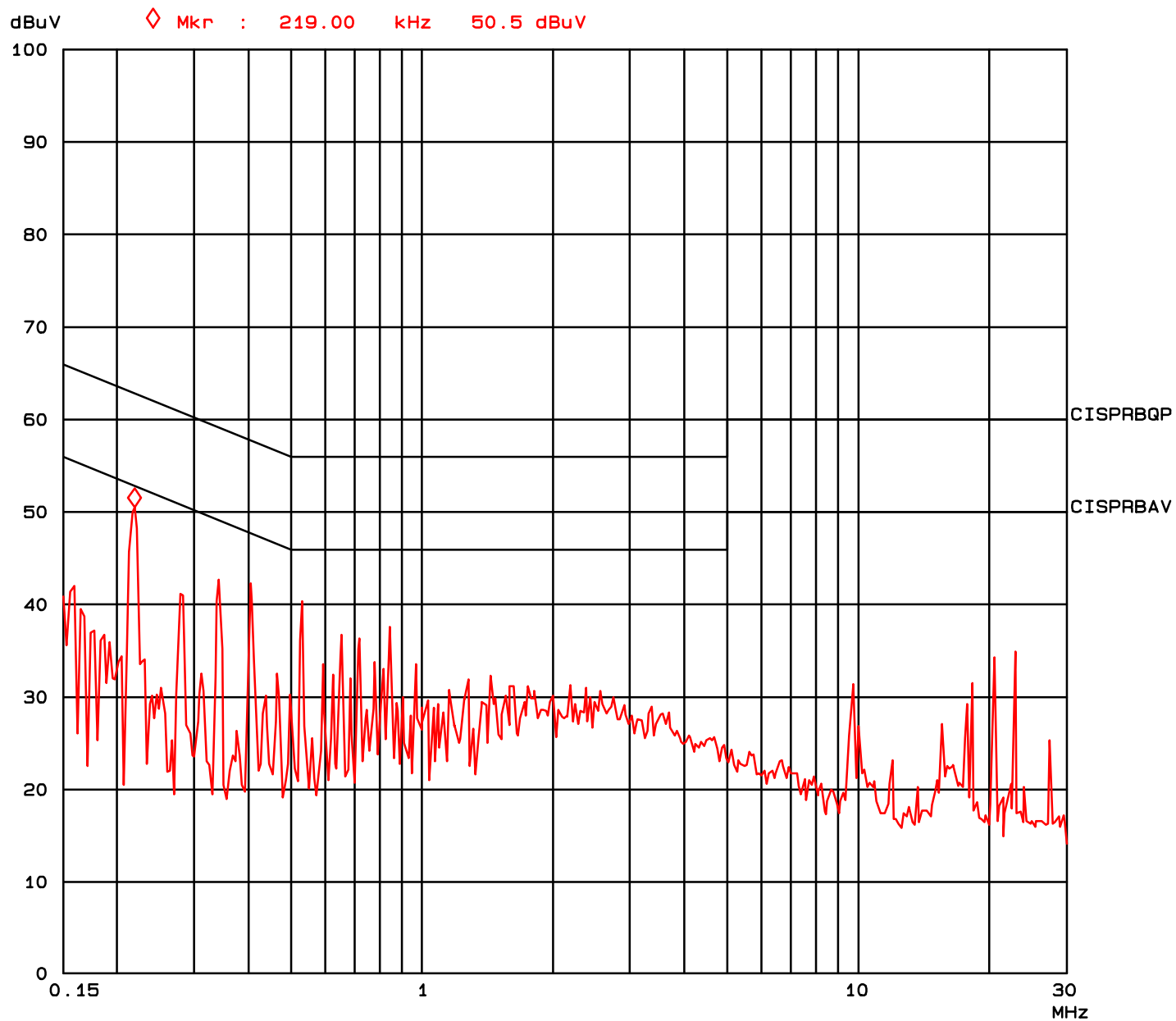


EXHIBIT 3: Test Configuration Photographs

2 Pages



Radiate emission above 1 GHz.



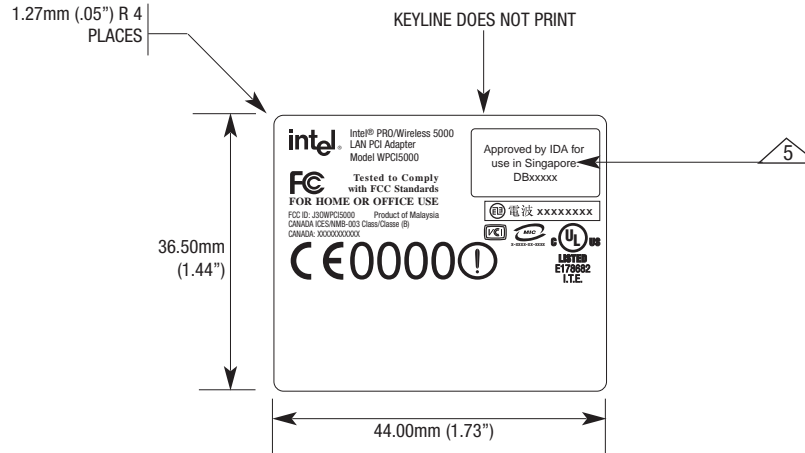
Radiate emission above 1 GHz.

EXHIBIT 4: Proposed FCC ID Label & Label Location

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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

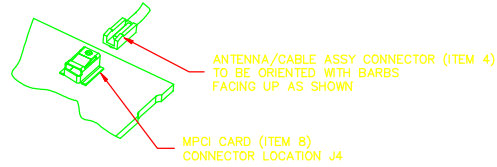
1 MATERIAL
 • MYLAR, WHITE, 2.3 MIL FACESTOCK, 3M#7815; ACRYLIC PERM ADHESIVE, 3M#310, 0.8 MIL (PENANG REQMT); OR XIRCOM APPROVED EQUIVALENT
 NOTES: (UNLESS OTHERWISE SPECIFIED)

PRELIMINARY LABEL

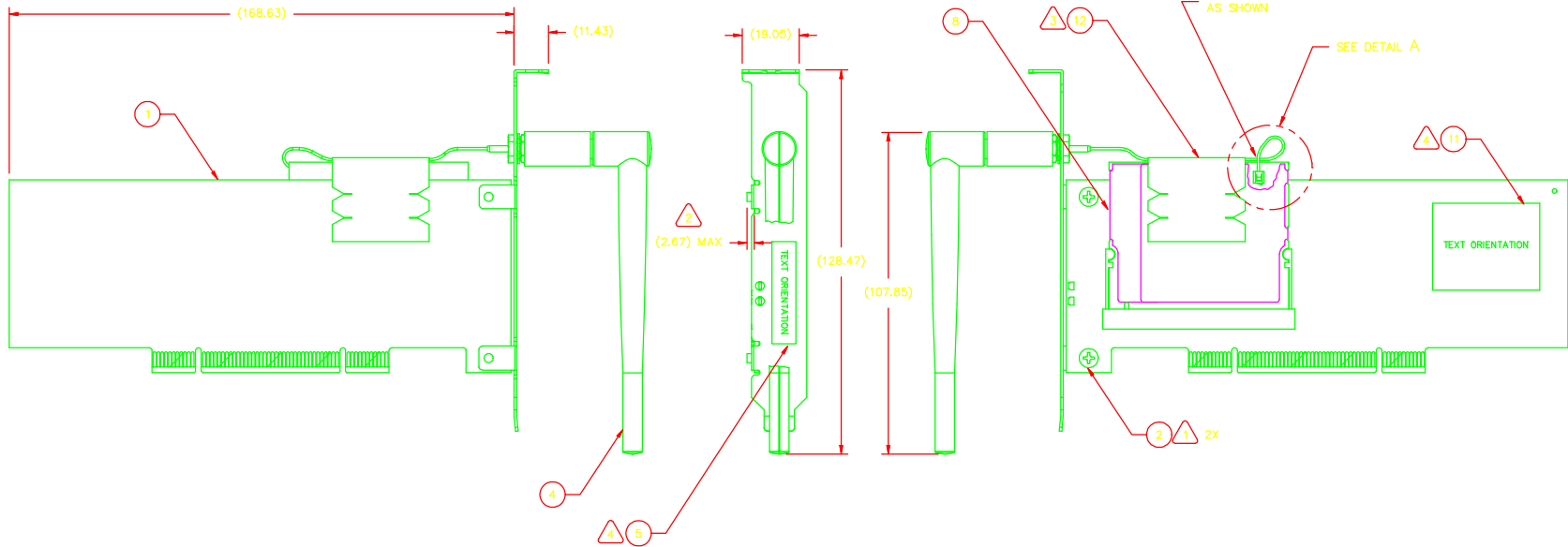
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .008	CONTRACT NO.				
	APPROVALS				DATE
MATERIAL	8	1	DRAWN K. Hovsepian	02-22-02	LABELS, APPRVLS, WPCI5000
FINISH	2		CHECKED N. Guetschoff		
DO NOT SCALE DRAWING			APPROVED R. San Jose C. Claybaugh B. Winters L. Thum	SIZE A	FSCM NO.
				DRAWING NO. 830-1649-001	REV. A
				SCALE = 1" = 1"	SHEET 1 OF 1

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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 lbf-in.

NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE MILLIMETER [INCH REF]		APPROVALS		DATE	Xircom
DWN	V.NORMAN	02/07/02	CHK	V.NORMAN	
ENG SER	.	.	ENG	D.EYRE	02/14/02
COMPL ENG	.	.	MFG	C.CLAYBAUGH	02/14/02
QA	C.WELLS	02/14/02	SCALE	B	175-1487-001
MKTG	.	.	DO NOT SCALE DRAWING	SCALE	AUTOCAD

TLA, WPCIS000		REV	2
SIZE	B	DRAWING NO.	175-1487-001
SCALE	-	AUTOCAD	SHEET 1 OF 1

**EXHIBIT 5: Detailed Photographs of
Intel Corporation Model WPCI5000 Construction**

8 Pages

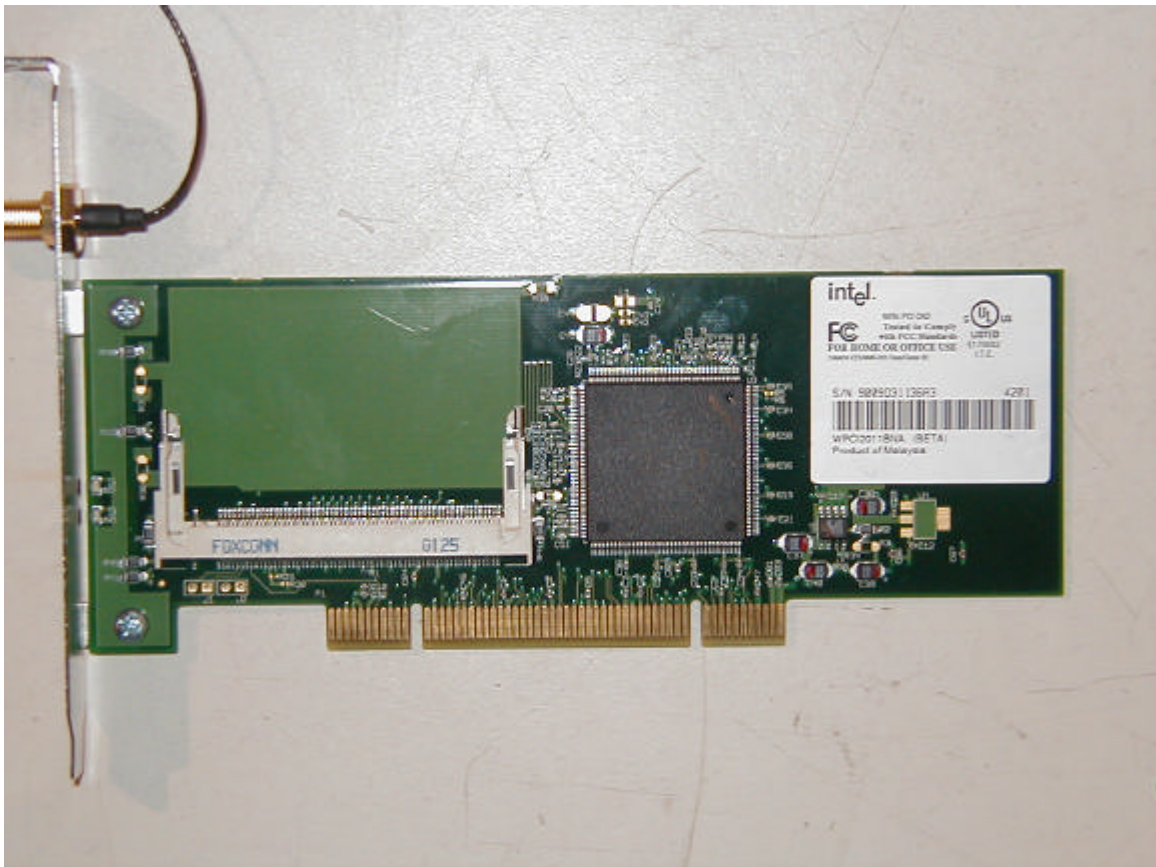
EUT has no enclosure so only internal photos were taken



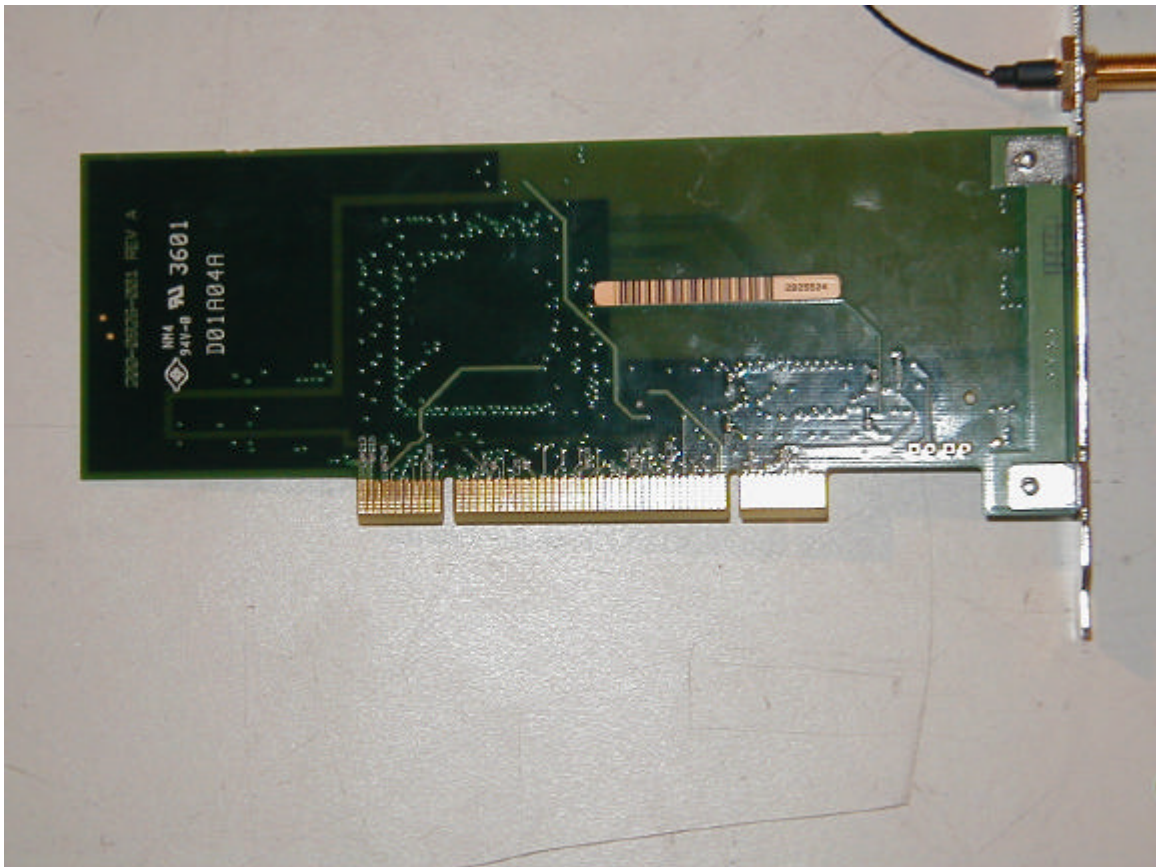
External Antenna



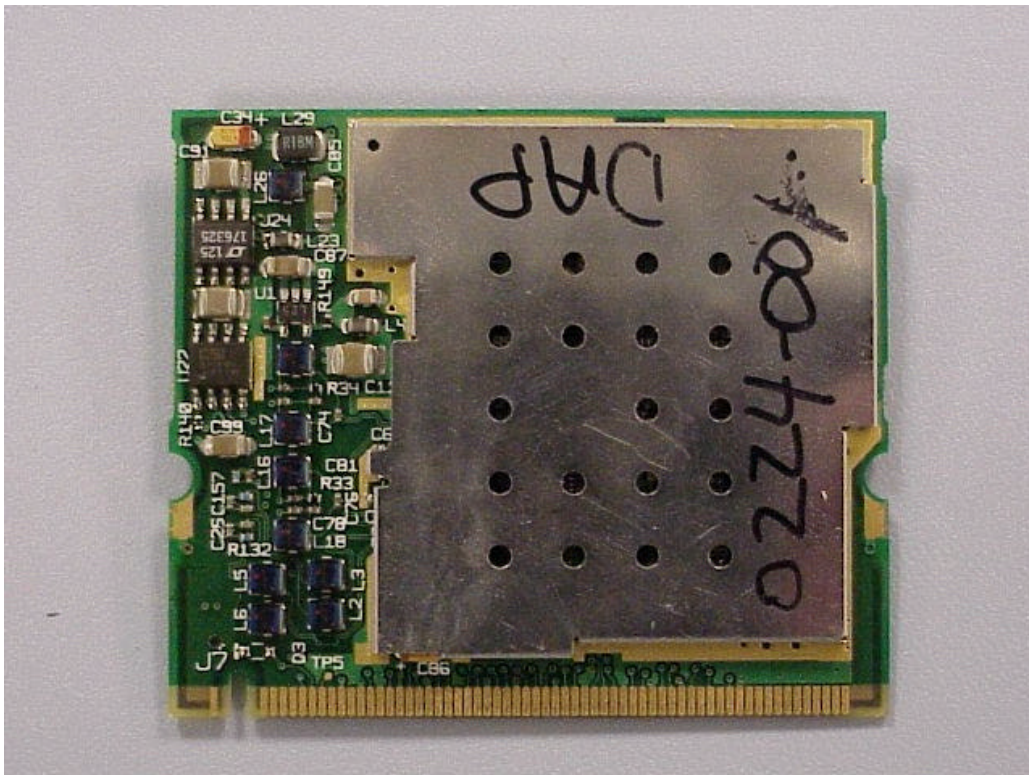
Front side of PCI Card with Mini PCI card



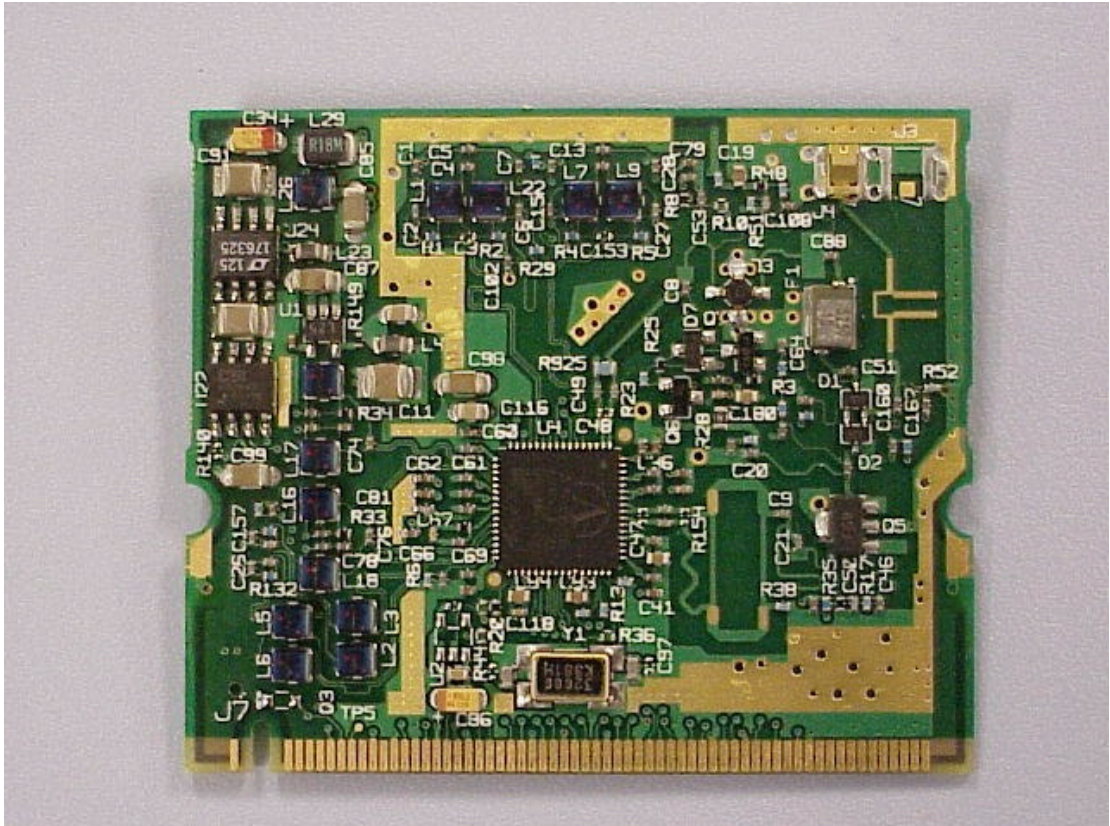
Front side of PCI Card



Back Side of PCI Card



Front side of Mini PCI Card with shield



Front side of Mini PCI Card without shield



Back side of Mini PCI card

**EXHIBIT 6: Operator's Manual for
Intel Corporation Model WPCI5000**

22 Pages

Intel® PRO/Wireless 5000 LAN Products

Quick Installation Guide

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Intel® PRO/Wireless 5000 LAN Products

User Documentation

In addition to this Quick Installation Guide, Intel provides extensive online documentation for the PRO/Wireless 5000 LAN product line on the Intel CD-ROM in HTML format.

Note: The Intel CD-ROM may contain documentation for other Intel products in addition to the PRO/Wireless 5000 LAN Products. Please disregard the documentation for other products.

All documentation for the PRO/Wireless 5000 LAN Products is accessible by clicking a button on the autorun menu screen displayed when the Intel CD-ROM is inserted into the computer (if this screen does not appear, run autorun.exe from the root directory of the Intel CD-ROM). Disregard any documentation on the CD-ROM that is not accessible through this autorun menu screen.

Installing the Access Point

Package Contents

- Intel® PRO/Wireless 5000 LAN Access Point (model WSAP5000)
- Mounting hardware
- Power supply and power cord
- CD-ROM containing software and online documentation
- Quick Installation Guide (this manual)

Installation Options and Requirements

- **(Recommended)** To set up and configure the access point, use a wired client workstation connected to the access point directly or connected to the wired LAN to which the access point is connected. Initial setup and configuration must be done over a wired connection, but subsequent changes can be made over a wireless connection.
- **(Optional)** Use DHCP server support for automatic assignment of an IP address to the access point over the wired network. You can configure the access point to use DHCP to get its IP address. See Using DHCP on page 8.

Connect and Power Up the Access Point

Connect the Access Point to the Wired Network

- Plug an RJ-45 Category 5 Ethernet cable into the RJ-45 connector on the access point and into a 10/100 Ethernet wall connector or hub.

Connect the Access Point to an AC Power Source

- Plug the power adapter into a wall outlet.
- Plug the power adapter cable into the socket on the bottom of the access point.

LED Indicators

Once the access point is connected to a wired network and is powered on, check the LED indicators to verify that the unit is functioning correctly. If the access point fails to initialize, restart it by disconnecting and reconnecting power.

- The "Ready" LED at the bottom of the row of LEDs should be lit.
- If the access point is connected to a LAN through an Ethernet cable, the "Wired Link" LED should be lit (green for 10 Mbps, orange for 100 Mbps) and the "Wired network activity" LED should be blinking.
- If the access point is communicating with a wireless adapter, the "Wireless radio activity" LED should be flashing.

Viewed top to bottom, the LED indicators on the access point have the following functions.

Wired link	Green for 10 Mbps wired network speed, orange for 100 Mbps.
Wired network activity	Yellow blinking shows activity.
Wireless radio association	Green will be ON if a client is associated to the access point and OFF if not.
Wireless radio activity	Yellow flashes steadily if no adapter associated, and more rapidly when transferring data.
Wireless radio association	Future use.
Wireless radio activity	Future use.
Ready	Green. This indicator will stay illuminated after the access point has completed the initialization sequence.

Configuring the Access Point for the First Time

1. Set up a portable or desktop computer as a configuration workstation from which to view the browser-based Configuration Management System used to configure the access point.
2. Connect the configuration workstation to the access point either directly (using a crossover RJ-45 cable) or through a hub or switch (using a standard RJ-45 cable).
3. The configuration workstation must be running Microsoft Windows® XP, 2000, Me, or 98, and one of the following web browsers: Microsoft Internet Explorer version 5.50 or Netscape Navigator version 4.78 or 5.x
4. Set up the configuration workstation initially with an IP address compatible with the **default IP address** and **default subnet** of the access point. For example, based on the access point default IP address 192.0.2.1 and default subnet 255.255.0.0, the client workstation could be set to 192.0.2.2, 192.0.2.3, or a similar address not in use by another device.
5. Once the workstation has been configured as just described, type the default access point IP address as a URL in the browser address field: **http://192.0.2.1**.
6. To access the Express Setup pages, type a user name and a password. The default for both is: **Intel**. The password is case-sensitive: capital "I," lower case "ntel."
7. Use Express Setup to configure the access point with a **new IP address, subnet, and other settings** suitable for the network to which it will be permanently connected (see table on page 7).
8. Click Apply first, then click Restart AP. After the access point has restarted, connect it to the required network.
9. Once the access point has been configured and connected to the network, the configuration interface can be viewed from any workstation on the same network segment or subnet. Open a compatible browser and type the actual IP address of the access point as a URL in the address field.

Note: To view configuration, function or option changes on the browser pages, turn off the browser's caching function.

- For Netscape, from the menu bar select Edit, Properties, Advanced, Cache, the select Document in cache is compared to document on network: Every time.
- For Internet Explorer, from the menu bar select View, Internet Options, Temporary Internet files, Settings, then select Check for newer versions of stored pages: Every visit to the page.

Settings for First Time Configuration (Express Setup)

For complete coverage of access point settings see the access point Help file or the online User's Guide.

Setting	Description
Default IP Address	The default IP address is 192.0.2.1. An IP address is not dynamically assigned to the access point under its default configuration. Use the default address initially, then change it to a valid address for the network to which the access point will be connected. For dynamic address assignment, see the section Using DHCP.
System Name	User-defined name for the access point. Any combination of letters and numbers from 1 to 32 characters. Default is the model number of the access point.
Default Subnet Mask	The default Subnet Mask is 255.255.0.0 if DHCP usage is Disabled or DHCP service is not available. Change this to a valid subnet mask for the network to which the access point will be connected.
Default Gateway	There is no default gateway initially configured. Use a valid gateway address for the network to which the access point will be connected. If no valid gateway is defined on your network, use the default gateway 0.0.0.0. For gateway assignment via DHCP, see the section Using DHCP.
DHCP	The Dynamic Host Configuration Protocol (DHCP) dynamically assigns IP addresses on a network with a DHCP server. DHCP default setting for the PRO/Wireless 5000 LAN Access Point is Disabled . To change this to Enabled and install the access point on a network using DHCP support, see Using DHCP.
Help URL	Location of the Help files accessible by clicking the Help button on a screen in the access point Configuration Management System. See the online User's Guide for information.
SSID 11A	Service Set Identifier (also called Network Name, Network ID, ESSID) identifies the network to which the access point is connected. All access points and client workstations on the same wireless LAN must have the same SSID, which can be any combination of letters and numbers up to 32 characters. Default for Intel PRO/Wireless 5000 LAN devices is " 101 ." The default SSID is intended only for preliminary setups and connections; it should usually be changed to a descriptive name for the wireless LAN network in question.

Using DHCP (Optional)

The Intel PRO/Wireless 5000 LAN Access Point can be configured to use DHCP to get its IP address, subnet mask, and default gateway:

1. Access the Express Setup page in the browser-based Configuration Management System as described in Steps 1-6 under Configuring the Access Point for the First Time on page 6.
2. Change the DHCP setting from Disabled to Enabled on the Express Setup page or the Configuration page. Save the new settings by clicking Apply, then click Restart AP. After the restart, connect the access point to the network to which it will be permanently connected.
3. The next time the access point is restarted after DHCP has been enabled, it will attempt to get its IP address, subnet mask, and default gateway from the DHCP server. If no server is available, the access point will use the Default IP Address and Default Subnet Mask settings.
4. When the access point used DHCP to obtain its IP address, you will have to determine the IP address before you can access the configuration pages. There are several strategies you can use for this, based on the MAC address assigned to the access point:
 - Before connecting the "DHCP Enabled" access point to a DHCP network, ask your network administrator to reserve an IP address, based on the MAC address for the access point, in the DHCP "lease table." This will allow the DHCP server to recognize the access point when it is connected to the network and assign it a known IP address based on the MAC address.
 - You can also connect a "DHCP Enabled" access point to a DHCP network immediately, without reserving the MAC address before connection. In this case an address will be assigned automatically, but you will have to request the address from your network administrator, who will obtain it from the DHCP "lease table."
 - You can also use the Intel Access Point Administration Tool AP Discovery to find the access point and display its IP address. See the online User's Guide for details.

Restore Factory Defaults

The access point has a Reset button that can be used to perform a hardware reset or to restore the access point's factory default settings.

The Reset button is located in a **pinhole** on the bottom of the access point. Insert the end of an unbent paper clip into the hole and apply pressure as follows:

- Press and release the Reset button quickly to perform a hardware reset.
- Press and hold the Reset button until the "Ready" LED flashes quickly 3 times. This will restore all access point parameters to factory default settings, including default user name, password, and IP address.

Access Point Factory Default Settings

System name	WSAP5000 (or the model number of your access point)
IP address	192.0.2.1
Subnet mask	255.255.0.0
Default gateway	None
User	Intel (case sensitive)
Password	Intel (case sensitive)
SSID 11A	101
WEP 11A	Disabled

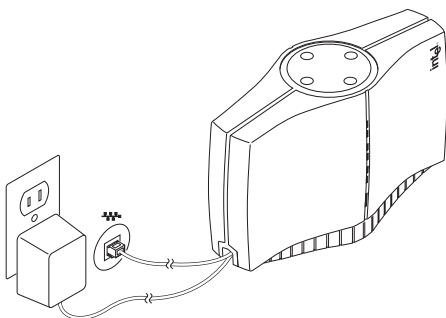
Setting Up a Wireless LAN

For detailed information on site survey, setup, positioning, and testing of access points on your wireless LAN, see the online User's Guides on the Intel CD-ROM. On the autorun menu screen (which displays when you load the CD-ROM or run autorun.exe from the CD-ROM), select "Access Point Manuals," "Main Contents," and "Administrator's Guide."

Mount the Access Point

Position each Access point using the following guidelines and illustrations. For best throughput and range, install the Access Point as high as practical.

Desktop or Table Top Location



Set the access point on a flat surface such as a table or desk. If the access point is positioned on a desk or table, the antenna should be on top (as shown above).

WARNING!!

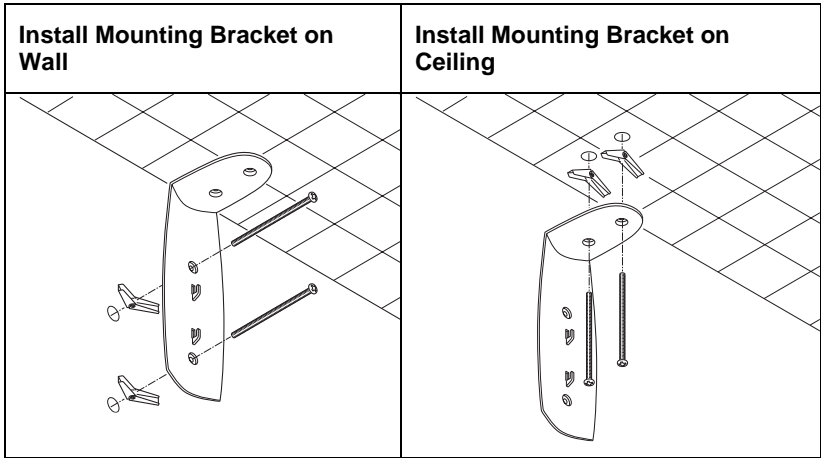
To comply with the FCC and ANSI C95.1 RF exposure limits, it is recommended for the Accesspoint, or a PCI Adapter card, installed in a desktop computer, that the antenna for this device be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or radio transmitter. Installers and end-users must follow the installation instructions provided in this user guide.

Radio Frequency Interference Requirements

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. FCC requires this product to be used indoors for the frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems. High power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with and /or damage this device.

Wall or Ceiling Mounted Location

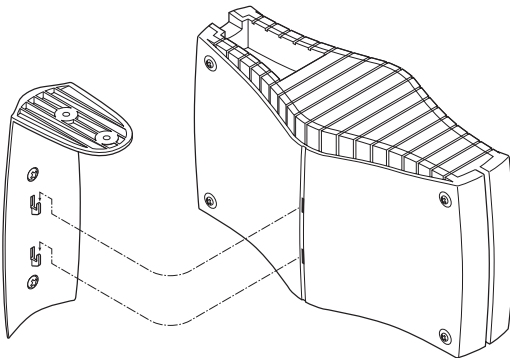
To install the mounting bracket on a hollow wall or ceiling, use the bracket to position and drill holes for the toggle screws supplied, using a 3/8-inch drill bit. Insert the bolt through the holes in the bracket, then screw on the toggle piece. **Insert bolt and toggle through the hole.** The toggle will open on the other side of the hole. Turn the bolt until the bracket is secure.



Attach Access Point to Bracket

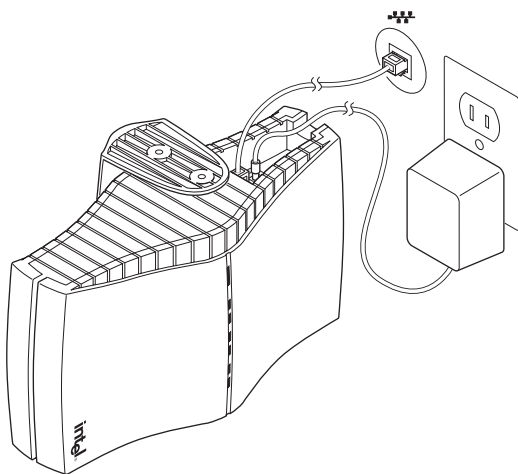
If the access point is attached to a ceiling or to a wall near the ceiling, it should be positioned with the antenna on the bottom (as shown below).

If the access point is mounted at a lower point on the wall, it should be positioned with the antenna on the top (see the illustration for Desk or Table Top location, page 9; the access point is designed so that it can be attached to the mounting bracket hooks in either orientation).



Connect Wall or Ceiling Mounted Access Point to Network and AC Power

Refer to Connect and Power Up the Access Point on page 5 for detailed instructions.



Installing the CardBus Adapter

Package Contents

- Intel® PRO/Wireless 5000 LAN CardBus Adapter (model WCB5000)
- CD-ROM containing software and user documentation
- Quick Installation Guide (this manual)

Hardware Installation

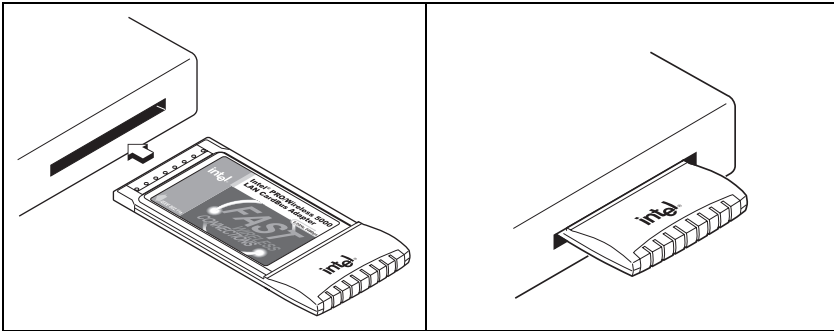
1. Turn on power to the computer and wait for Windows to load. (Windows 98SE, Me, 2000, or XP is required.)
2. Insert the CardBus Adapter into the CardBus PC Card slot on your computer, then proceed to **Step 3** to install drivers and software under the Windows operating system.

WARNING!!

To comply with the FCC and ANSI C95.1 RF exposure limits, it is recommended when using a wireless device with an integrated antenna, for the Cardbus inserted into a laptop computer that the antenna should not be positioned closer than 5 cm (two inches) from your body or nearby persons for extended periods of time while it is transmitting (or operating). If the antenna is positioned less than 5 cm (two inches) from the user, it is recommended that the user limit exposure time. The Device must not be co-located or operating in conjunction with any other antenna or radio transmitter. Installers and end-users must follow the installation instructions provided in this user guide.

Radio Frequency Interference Requirements

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. FCC requires this product to be used indoors for the frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems. High power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with and /or damage this device.



Windows® Installation (98SE, Me, 2000, XP)

3. Windows will detect the adapter. Follow the procedures below for your version of Windows, then continue with **Step 4**:

Windows 98SE

- The "Add New Hardware Wizard" dialog will appear. Click Next.
- Insert the Intel CD-ROM into your CD-ROM drive. If the PRO/Wireless LAN Products menu appears, leave it open.
- Click the New Hardware Wizard screen to make it active. Select "Search for the best driver for you device (Recommended)," and click Next, then select "CD-ROM drive" and click Next.
- The Adapter Properties screen will appear. On the Settings tab: (option a) click OK to install using a default profile or (option b) click Configure to set up a profile using configuration information obtained from your network administrator. On the My WLAN places dialog, click the New button to create a new profile. Type a configuration name and the SSID for your wireless network. Set up security and other parameters if required. Click OK twice, then Close.
- On the Add New Hardware Wizard screen, click Finish.
- When prompted to restart the computer, click No (restart manually after completing software installation). Proceed to **Step 4**.

Windows Me

- The "Add New Hardware Wizard" dialog will appear. DO NOT click Next. Verify that "Automatic search for a better driver (Recommended)" is checked.
- Insert the Intel CD-ROM into your CD-ROM drive. Windows will install the driver from the CD-ROM. If the PRO/Wireless LAN Products menu appears, leave it open.
- The Adapter Properties screen will appear. On the Settings tab: (option a) click OK to install using a default profile or (option b) click Configure to set up a profile using configuration information obtained from your network administrator. On the My WLAN places

dialog, click the New button to create a new profile. Type a configuration name and the SSID for your wireless network. Set up security and other parameters if. Click OK twice, then Close.

- Click Finish on the Add New Hardware Wizard screen when the driver installation is complete.
- When prompted to restart the computer, click No (restart manually after completing software installation). Proceed to **Step 4**.

Windows 2000

- The "Add New Hardware Wizard" dialog will appear. DO NOT click Next yet. Verify that "Automatic search for a better driver (Recommended)" is checked.
- Insert the Intel CD-ROM into your CD-ROM drive. Windows will install the driver from the CD-ROM. If the PRO/Wireless LAN Products menu appears, leave it open.
- The Adapter Properties screen will appear. On the Settings tab: (option a) click OK to install using a default profile or (option b) click Configure to set up a profile using configuration information obtained from your network administrator. On the My WLAN places dialog, click the New button to create a new profile. Type a configuration name and the SSID for your wireless network. Set up security and other parameters if required. Click OK twice, then Close.
- Click Finish on the Add New Hardware Wizard screen. Proceed to **Step 4**.

Windows XP

- The "Found New Hardware Wizard" dialog will appear.
 - Insert the Intel CD-ROM into your CD-ROM drive. The driver files will be copied to your hard drive. If the PRO/Wireless LAN Products menu appears, leave it open.
 - If a Windows Logo testing dialog appears, click "Continue Anyway."
 - The My WLAN Places screen will appear. You can (option a) click Next to install using a default profile or (option b) click Configure to set up a profile using configuration information obtained from your network administrator. On the My WLAN Places dialog, click the New button to create a new profile. Type a configuration name and the SSID for your wireless network. Set up security and other parameters if required. Click OK twice, click Close.
 - On the Found New Hardware Wizard screen, click Finish. Proceed to **Step 4**.
4. On the PRO/Wireless LAN Products menu screen, click Install Software (if the menu screen is not visible, remove and re-insert the Intel CD-ROM to display it, or run autorun.exe from the Intel CD-ROM).
 5. Click I Accept on the Software Agreement screen to continue.
 6. Select Yes when prompted to install or upgrade PROSet II LAN Software, then click Next.

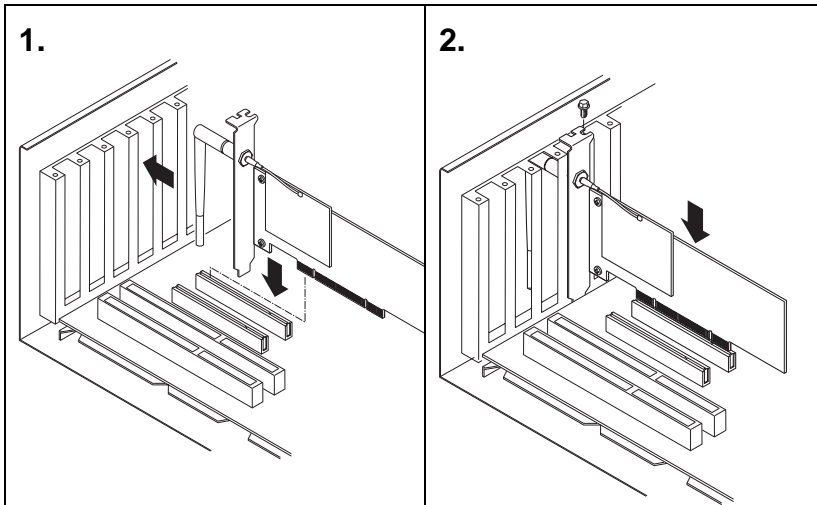
7. Select No (recommended) when asked if you want to install Access Point Administration Tools, then click Next. (If you are a network administrator, select Yes. See the Administrator's Guide in the online User's Guide for information on how to use the Administration Tools.)
8. After the software is installed on your computer, click Finish.
9. Restart the computer.

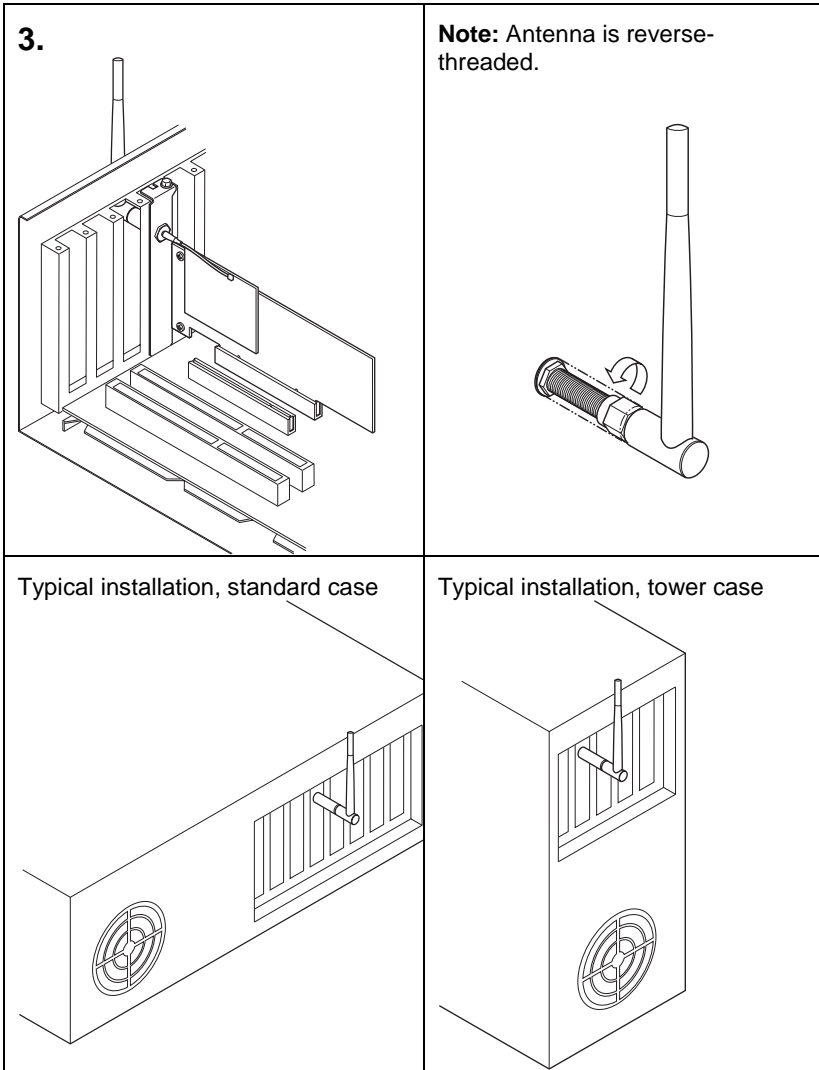
Installing the PCI Adapter

Package Contents

- Intel® PRO/Wireless 5000 LAN PCI Adapter (model WPCI5000)
- CD-ROM containing software and user documentation
- Quick Installation Guide (this manual)

Hardware Installation





Windows® Installation (98SE, Me, 2000, XP)

1. Install the PCI Adapter hardware according to the illustrations shown, then close and secure the computer case.
2. Turn on power to the computer and wait for Windows to load. (Windows 98SE, Me, 2000, or XP is required.)
3. Proceed to Windows® Installation, Step 3, on page 12.

Customer Support

Web and Internet Sites

- Support: <http://support.intel.com>
- Network Products: <http://www.intel.com/network>
- Corporate: <http://www.intel.com>

Customer Support Technicians

For the U.S. and Canada

If you are using this product in conjunction with Intel® PRO/Wireless 5000 LAN hardware in a business or office environment and want customer support, please call +1 916-377-7000 (7:00 – 17:00 M–F Pacific Time). You can also visit the Intel customer support web site (<http://support.intel.com>).

For Worldwide Access

Intel has technical support centers worldwide. Many of the centers are staffed by technicians who speak the local languages. For a list of all Intel support centers, the telephone numbers, and the times they are open, refer to the Customer Support Phone Numbers web site at

<http://www.intel.com/support/9089.htm>

Product Warranties

For details of product warranties, see the online manuals.

Regulatory and Safety Notices

All regulatory and safety notices are provided in the online manuals and on the web at <http://www.intel.com/support>.

Software License Agreement

Software included with this product is protected by a specific Software License Agreement, provided in the online manuals. By using this software you agree to the provisions in the Software License Agreement.

Register Online

Register online to receive technical support, product upgrade notices, information updates, and special offers. To register online, re-insert the Intel CD-ROM and click Online Registration on the menu.

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](#)
- [FCC Regulations](#)
- [Canadian Department of Communications](#)
- [Japan Regulatory Notices](#)

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:
 - o The use of wireless devices in hazardous locations is limited to the constraints posed by the safety directors of such environments.
 - o The use of wireless devices on airplanes is governed by the Federal Aviation Administration (FAA).
 - o The use of wireless devices in hospitals is restricted to the limits set forth by each hospital.
- Antenna use:
 - o 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 conform 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.

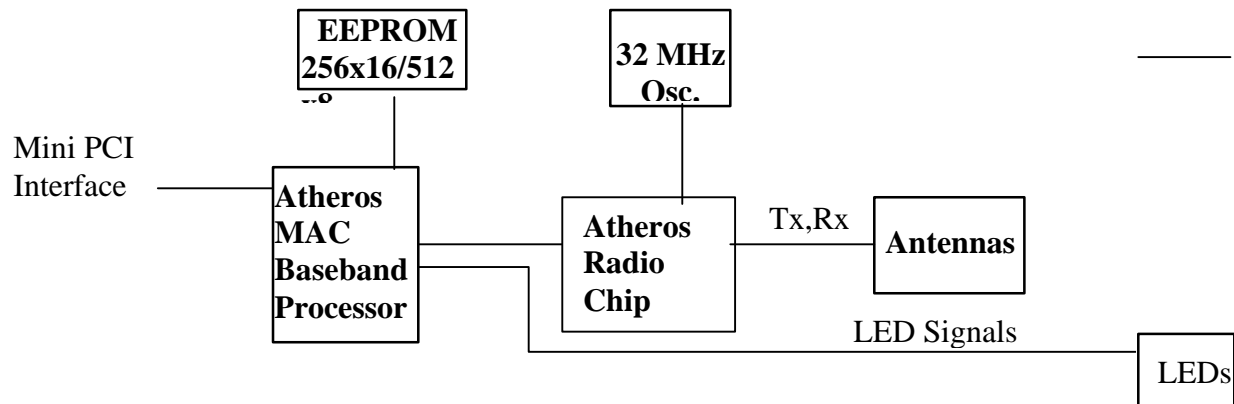
**EXHIBIT 7: Block Diagram of
Intel Corporation Model WPCI5000**

WM3A Block_Diagram 1 Page
WPCI5000 Block Diagram 1 Page

3. Functional Description

This section contains a complete description of the WM3A5000 hardware architecture. It includes a block diagram of the Mini PCI Card followed by a functional description of each block.

3.1. Functional Block Diagram



3.2. Functional Description of PC Card

3.2.1. Mini PCI Interface

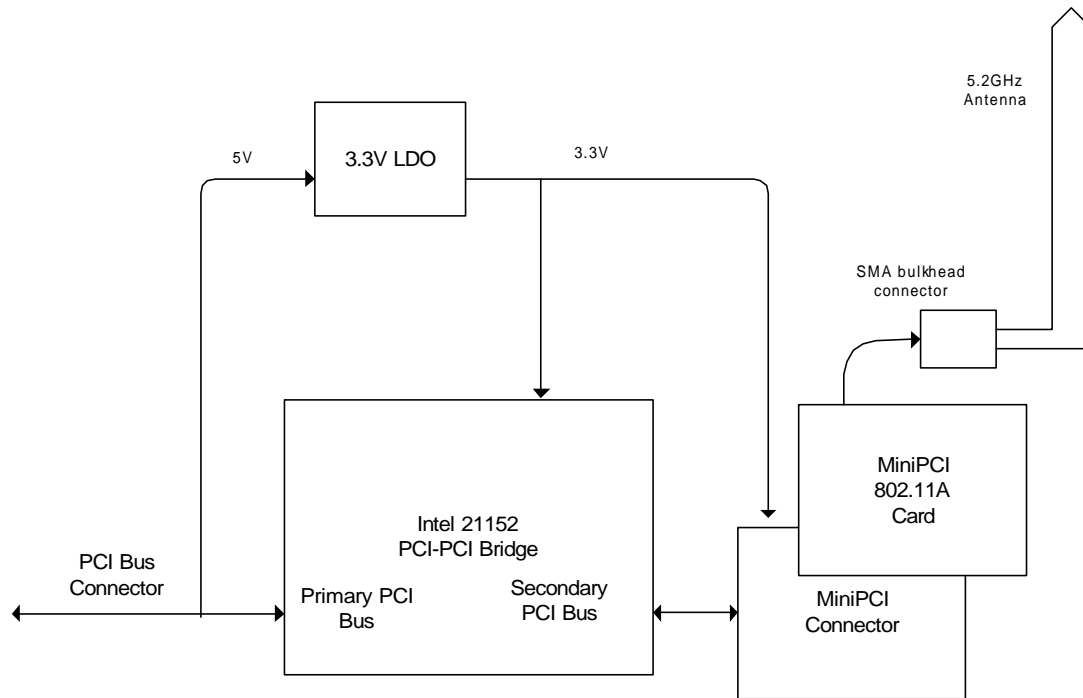
The WM3A5000 interfaces with the host PC via an enhanced 68-pin connector. The 3.3V signaling conforms to the PCI Card Standard. The Mini PCI signals interface with the Atheros AR5210 MAC Baseband Processor.

3.2.2. Atheros MAC Baseband Processor (AR5210)

The AR5210 Processor integrates the Media Access Control (MAC) and baseband processing functions. It supports either the PCI or CardBus host interface. When this chip is used along with the Atheros Radio-on-a-Chip (AR5110) the result is an IEEE 802.11a 5GHz design.

The AR5210 Processor implements a half-duplex, Orthogonal Frequency Division Multiplexing (OFDM) baseband processor supporting data rates from 6 Mbps to 54 Mbps. It uses the following modulation schemes: BPSK (binary phase shift keying), QPSK (quadrature phase shift keying), 16QAM (16 quadrature amplitude modulation), and 64QAM (64 quadrature amplitude modulation). Other features include: channel estimation, symbol timing, frequency offset estimation, signal detection, automatic gain

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 and the MiniPCI card 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.

**EXHIBIT 8: Schematic Diagrams & Parts List for
Intel Corporation Model WPCI5000**

Schematics 5 Pages
WM3A Parts List 5 Pages

8

7

6

5

4

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1

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REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	PRODUCTION RELEASE ECN#23843	01OCT11	
	B	PRODUCTION RELEASE ECN#23897	01NOV08	
	C	PRODUCTION RELEASE ECN#24128	01DEC17	

802.11a Mini PCI3A
WM3A5000DAP
Atheros

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CONTRACT NO.				
DRAWN: LYNN SCHILDER				
DATE: 01OCT11		TITLE: SCHEMATIC, 802.11a WM3A5000DAP		
CHECK:		DESIGN: LYNN SCHILDER		
SIZE: B	FSCM NO.	DRAWING NO. 130-0920-002	REV: C	
NEXT ASSY USED ON APPLICATION		APPROVED:		SCALE
			SHEET 1 of 5	

D

D

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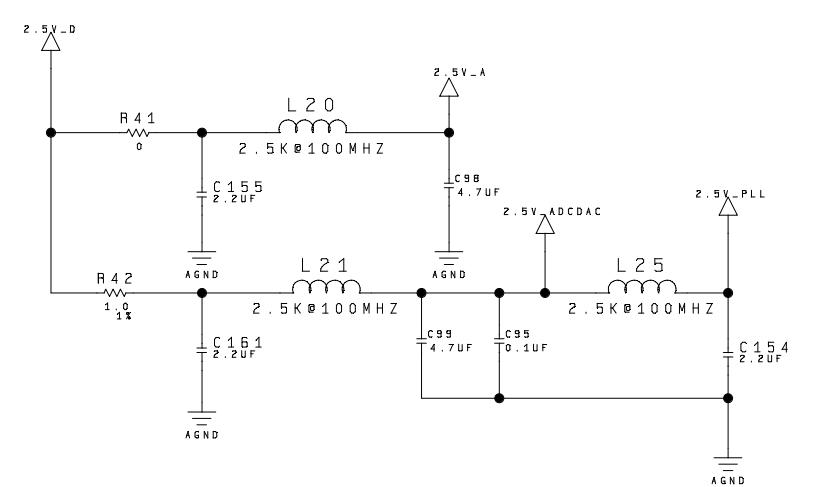
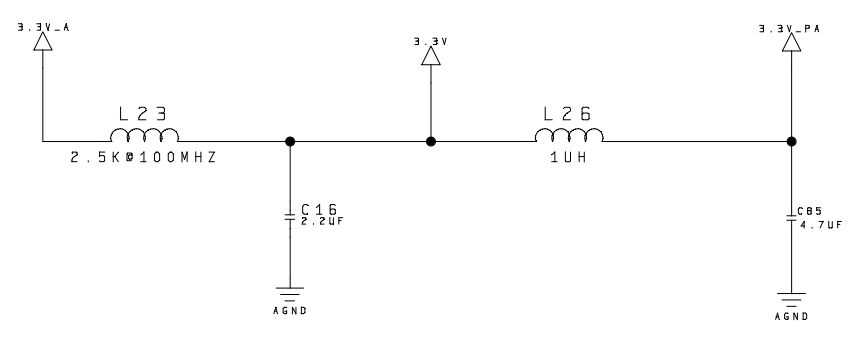
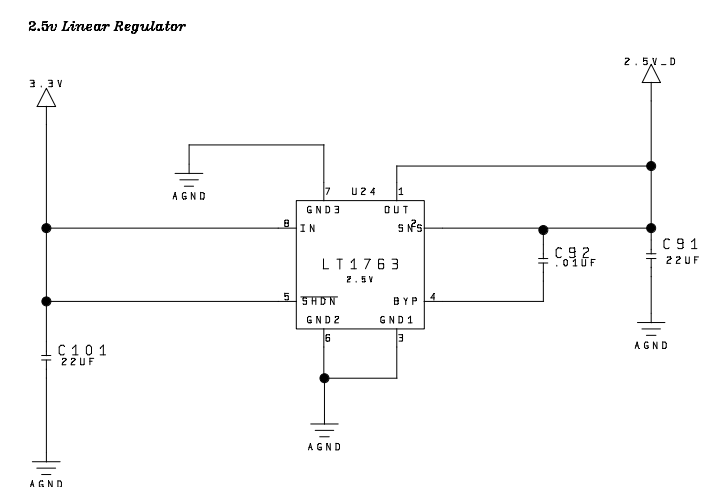
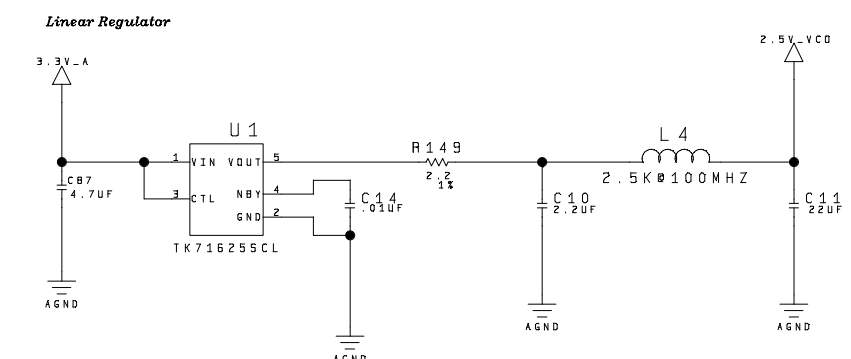
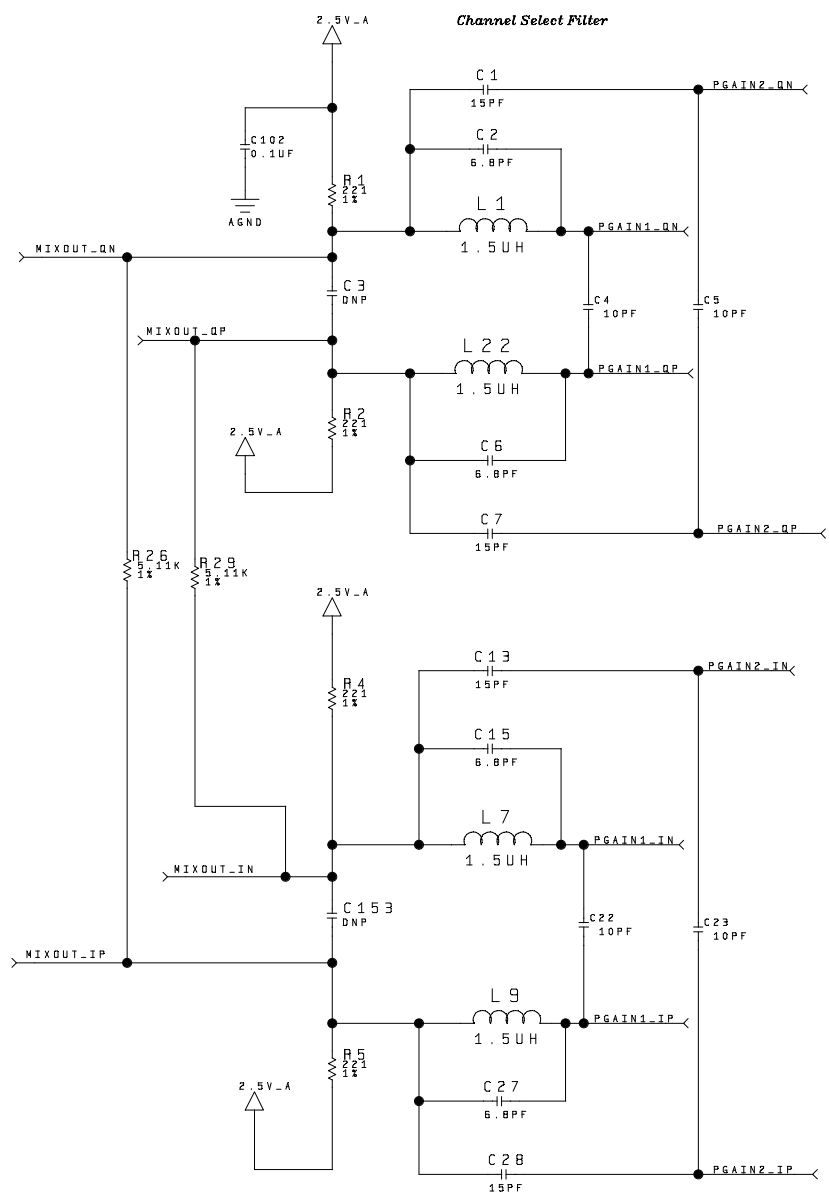
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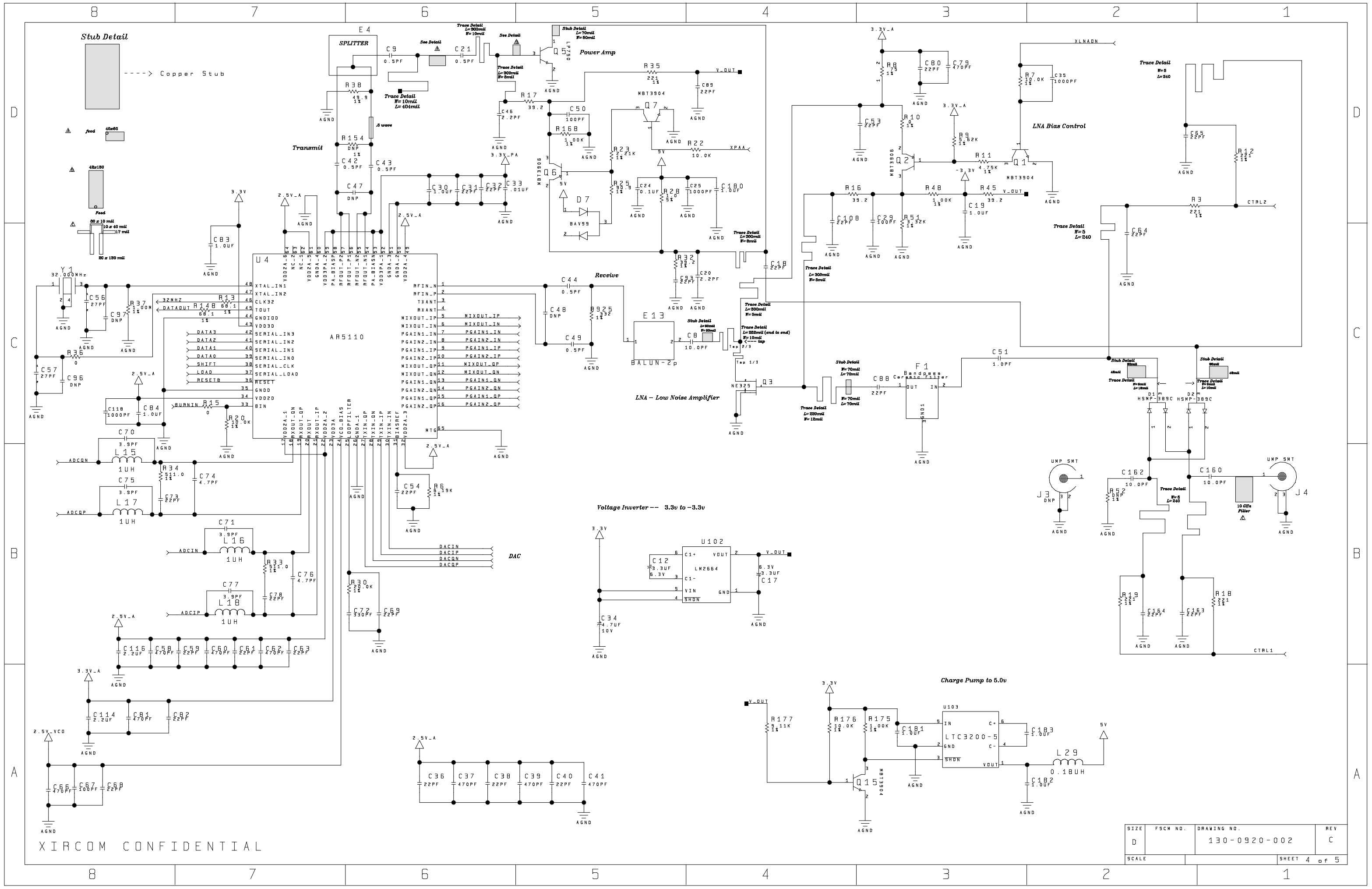
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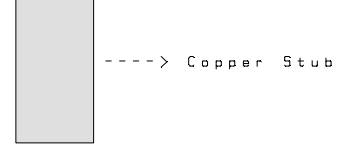


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D		130-0920-002	C
SCALE	SHEET 3 of 5		



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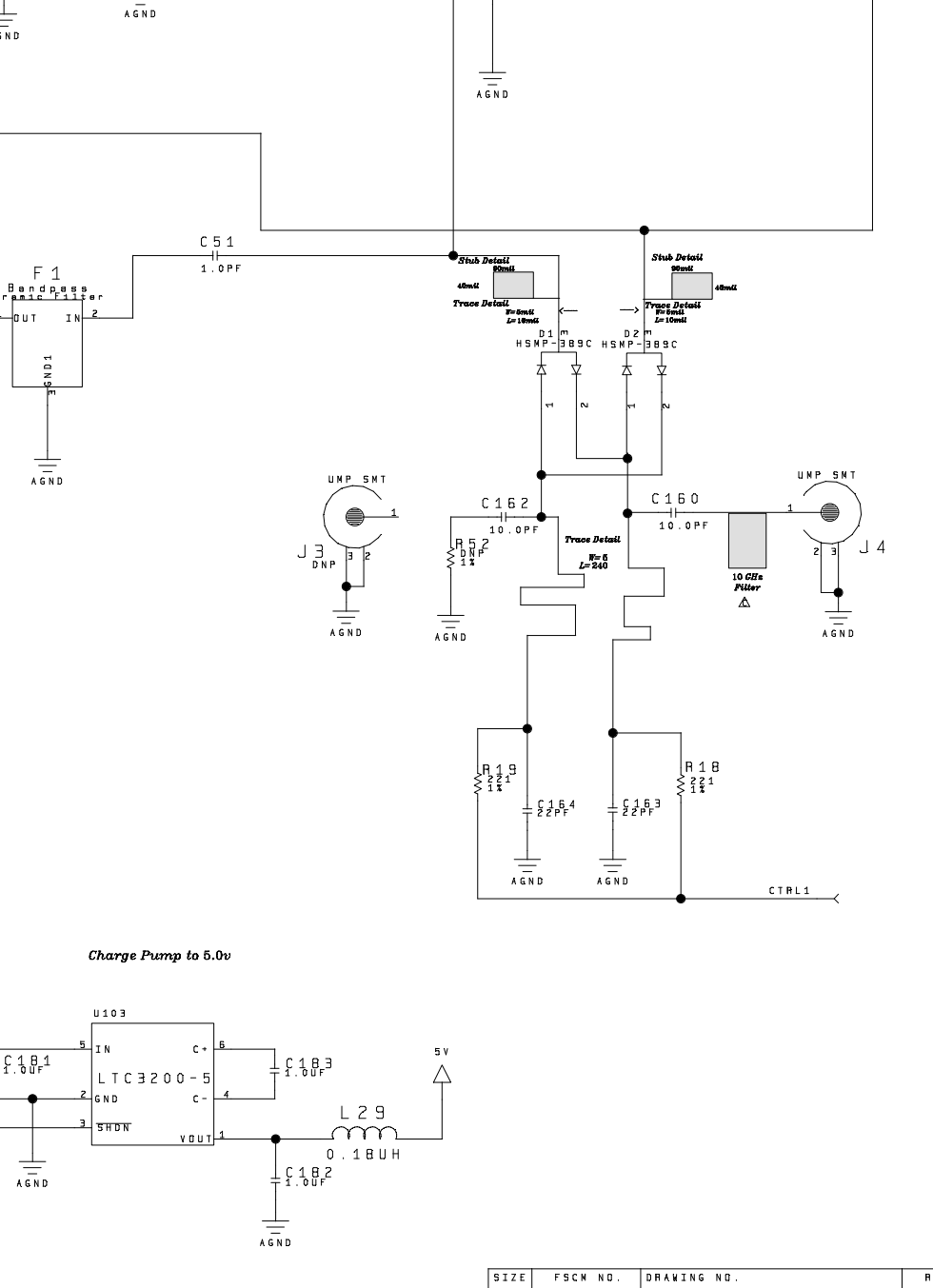
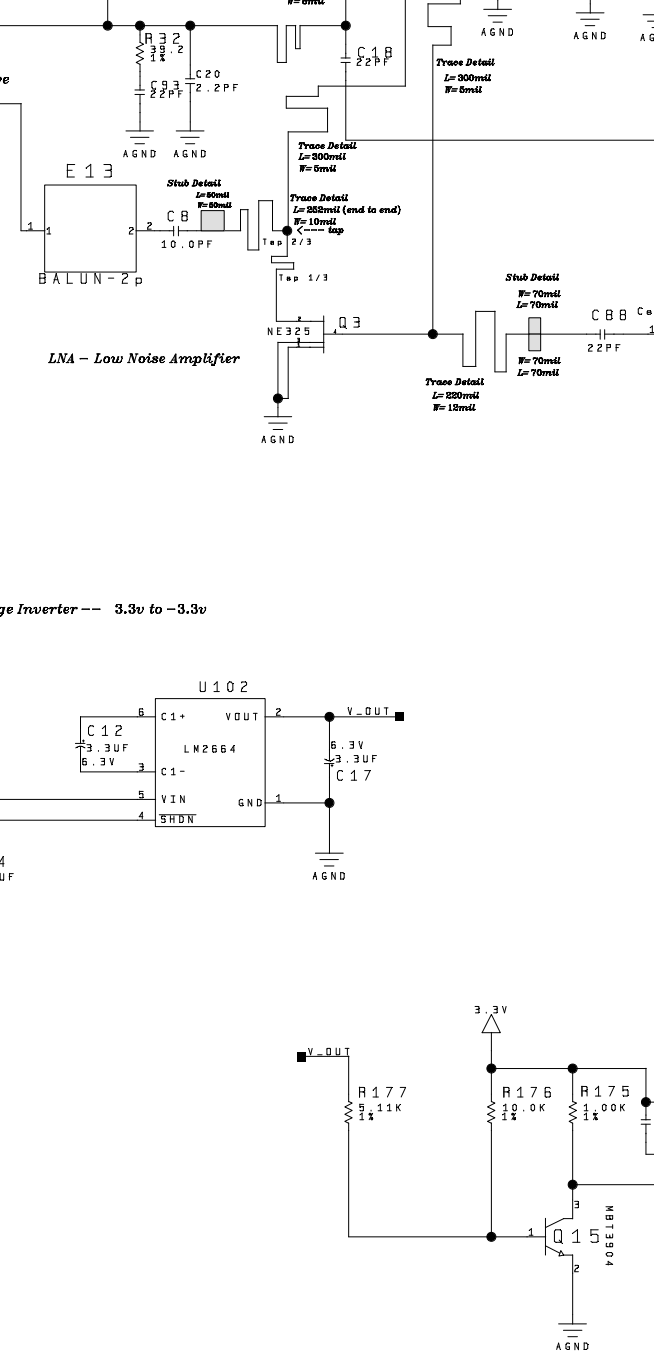
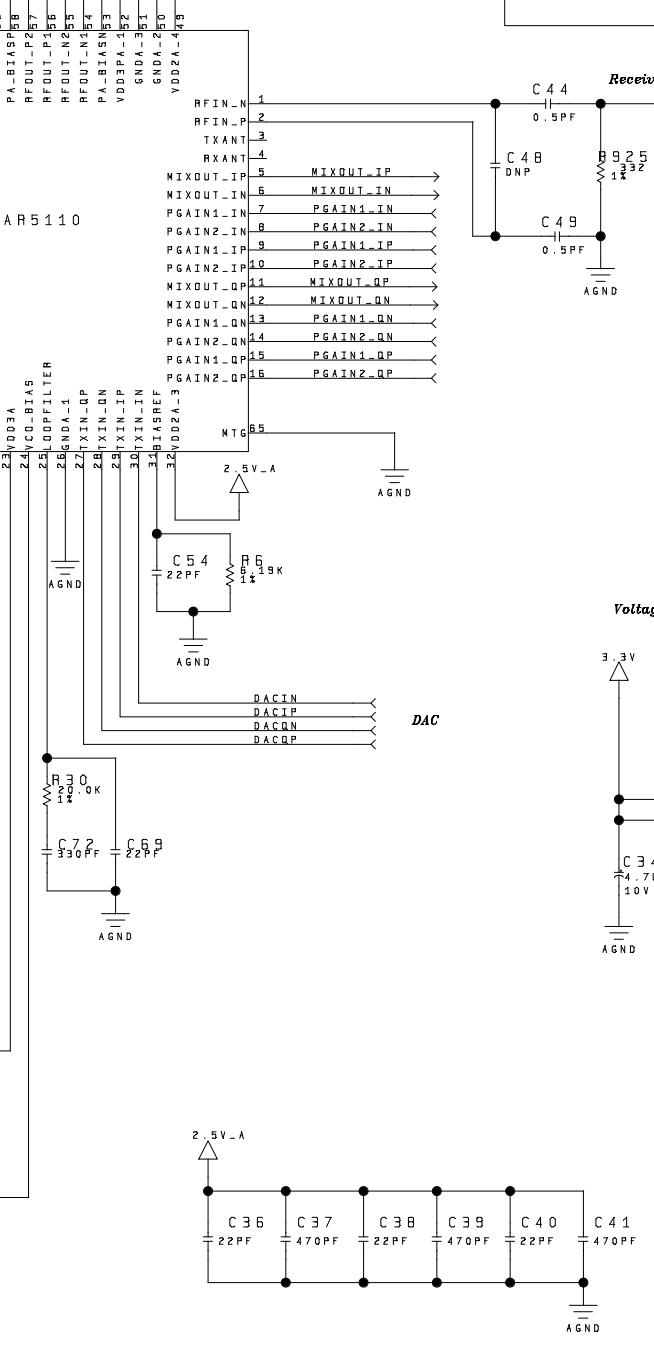
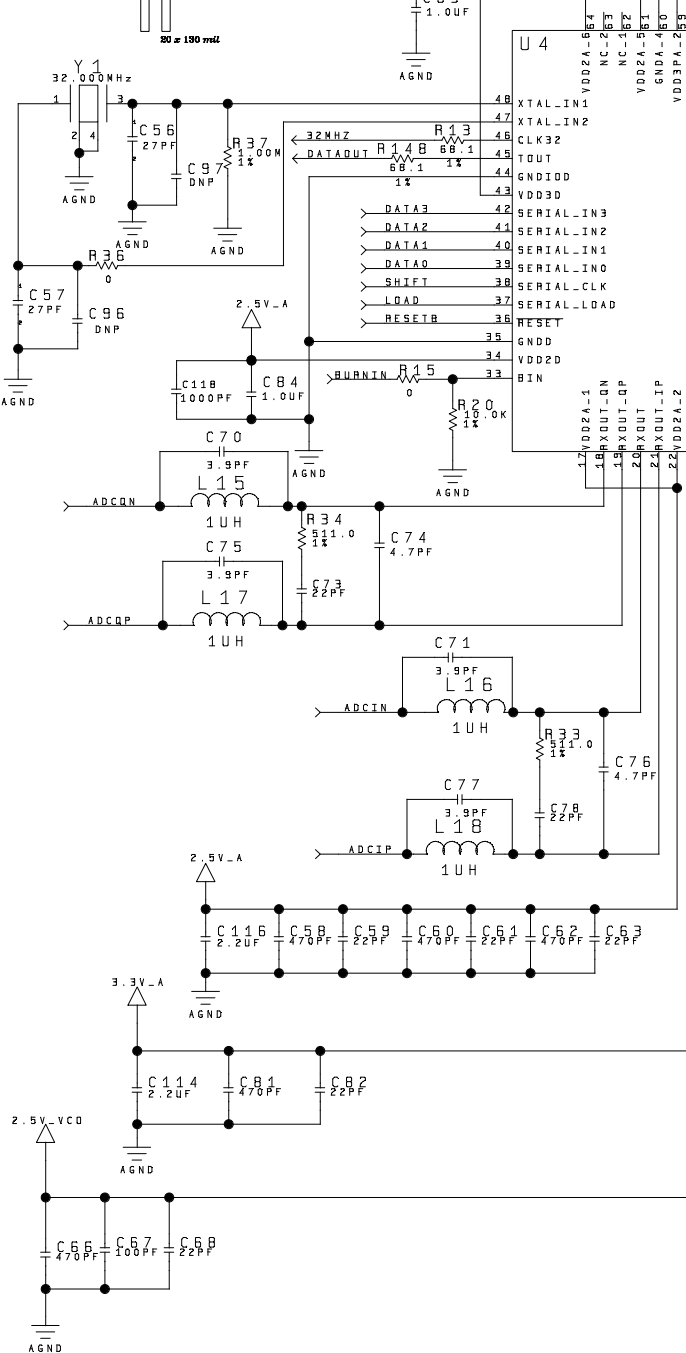


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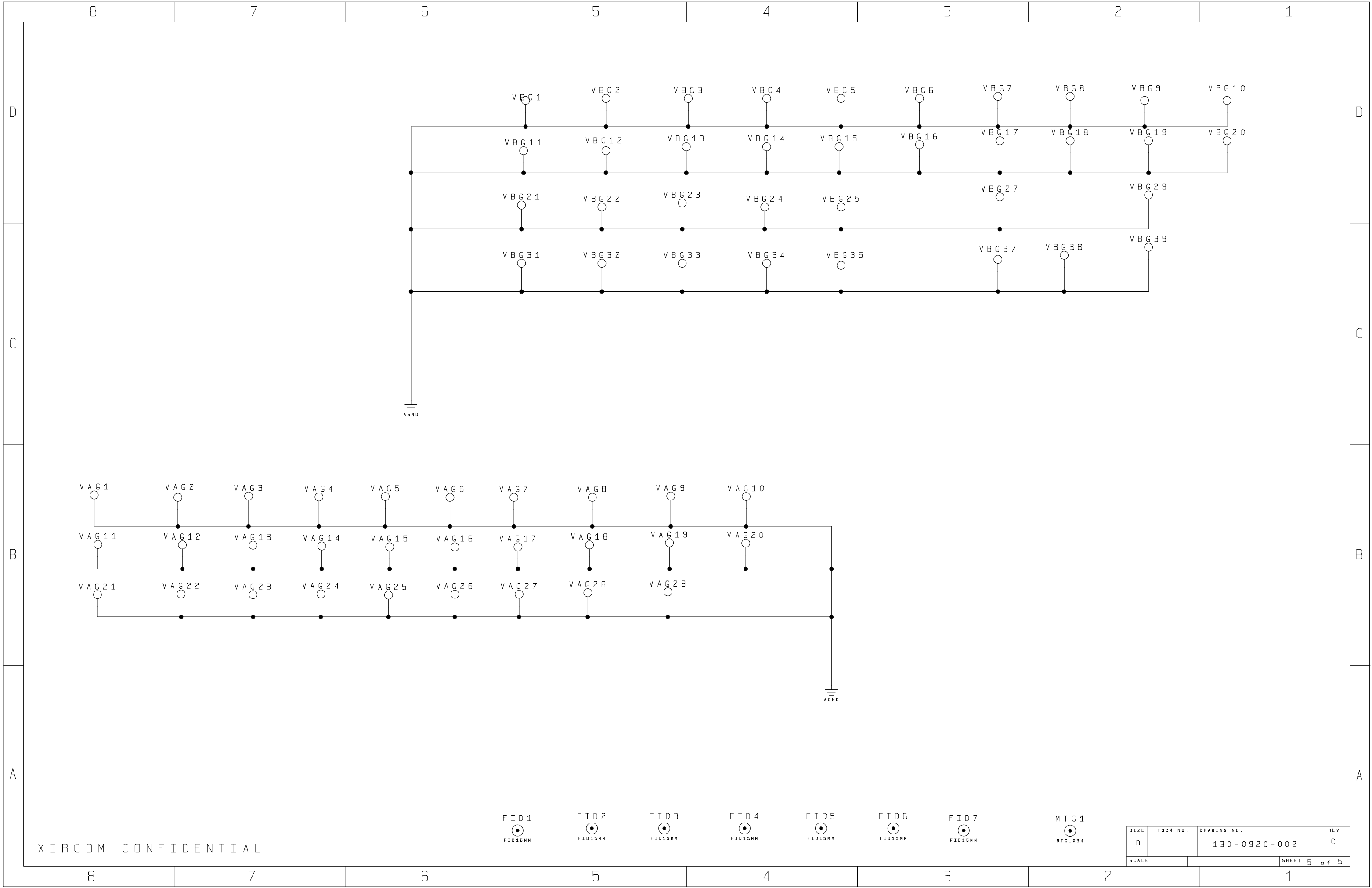
80 ± 10 mil
10 ± 40 mil
17 mil

80 ± 180 mil



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SIZE	FSCM NO.	DRAWING NO.	REV
D		130-0920-002	C
SCALE			SHEET 4 of 5



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FID1
FID15MM

FID2
FID15MM

FID3
FID15MM

FID4
FID15MM

FID5
FID15MM

FID6
FID15MM

FID7
FID15MM

MTG1
MTG-034

SIZE	FSCM NO.	DRAWING NO.	REV
D		130-0920-002	C
SCALE	SHEET 5 of 5		

**BOM EXPLOSION REPORT**

Part Number 100-0920-004
Part Revision 01
Part Description PCBA,WM3A5000RICK,W/SHIELD FOR RICKSHAW



Level	Part Type	Item Number	Rev	Part Description	Find Num	Qty	Ref Des	Notes
0	Part	100-0920-004		PCBA, WM3A5000RICK, W/SHIELD FOR RICKSHAW				
.1	Part	200-0920-002	B	PCB, WM3A5000DAP, 5V	1	1		
..2	Part	200-SPEC-001	B	SPEC, QA REQUIREMENTS, PCB	10	0		
.1	Part	600-0330-001	A	CAP, C0G, 15pF, 5%, 50V, 0402, T=0.61mm MAX	2	4	C1, C7, C13, C28	
.1	Part	600-0331-001	A	CAP, C0G, 6.8pF, +/- .25pF, 50V, 0402, T=0.55mm MAX	3	4	C2, C6, C15, C27	
.1	Part	600-0332-001	A	CAP, C0G, 10pF, +/- .25pF, 50V, 0402, T=0.55mm MAX	4	7	C4, C5, C8, C22, C23, C160, C162	
.1	Part	600-0333-001	A	CAP, C0G, 2.2pF, +/- .25pF, 50V, 0402, T=0.55mm MAX	5	2	C20, C46	
.1	Part	601-0030-001	A3	CAP, TANT, 3.3uF, 20%, 6.3V, 0805, EIA 2012	6	2	C12, C17	
.1	Part	600-0206-001	A1	CAP, C0G, 22pF, 5%, 50V, 0402, T=0.61mm MAX	7	26	C18, C31, C32, C36, C38, C40, C53, C54, C59, C61, C63-C65, C68, C69, C73, C78, C80, C82, C88, C89, C93, C108, C156, C163, C164	
.1	Part	600-0343-001	A	CAP, X5R, 2.2uF, 10%, 10V, 0805, T=1.45mm MAX	8	7	C10, C16, C114, C116, C154, C155, C161	
.1	Part	600-0334-001	A	CAP, X5R, 22uF, 20%, 6.3V, 1210, T=2.2mm MAX	9	3	C11, C91, C101	
.1	Part	600-0205-001	A4	CAP, X7R, 0.01uF, 10%, 16V, 0402, T=0.60mm MAX	10	3	C14, C33, C92	
.1	Part	600-0335-001	A	CAP, C0G, 8.0pF, +/- .25pF, 50V, 0402, T=0.55mm MAX	11	2	C26, C157	
.1	Part	600-0296-001	A	CAP, X5R, 1.0uF, 10%, 10V, 0603, T=0.9mm MAX	12	8	C19, C30, C83, C84, C180-C183	
.1	Part	600-0302-001	A1	CAP, X7R, 1000pF, 10%, 50V, 0402, T=0.60mm MAX	13	10	C25, C35, C118, C145-C151	

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**BOM EXPLOSION REPORT**

Part Number 100-0920-004
Part Revision 01
Part Description PCBA,WM3A5000RICK,W/SHIELD FOR RICKSHAW



Level	Part Type	Item Number	Rev	Part Description	Find Num	Qty	Ref Des	Notes
.1	Part	600-0310-001	A1	CAP, X7R, 470pF, 10%, 50V, 0402, T=0.55mm MAX	14	9	C37, C39, C41, C58, C60, C62, C66, C79, C81	
.1	Part	600-0336-001	A	CAP, C0G, 0.5pF, +/- .1pF, 50V, 0402, T=0.55mm MAX	15	6	C9, C21, C42-C44, C49	
.1	Part	600-0337-001	A	CAP, C0G, 27pF, 1%, 50V, 0603, T=0.90mm MAX	16	2	C56, C57	
.1	Part	600-0339-001	A	CAP, C0G, 39pF, 5%, 50V, 0402, T=0.61mm MAX	17	2	C52, C55	
.1	Part	600-0204-001	A1	CAP, C0G, 100pF, 5%, 50V, 0402	18	3	C29, C50, C67	
.1	Part	600-0338-001	A	CAP, C0G, 3.9pF, +/- .25pF, 50V, 0402, T=0.55mm MAX	19	4	C70, C71, C75, C77	
.1	Part	600-0315-001	B1	CAP, X7R, 330pF, 10%, 50V, 0402, T=0.60mm MAX	20	1	C72	
.1	Part	600-0301-001	A1	CAP, C0G, 4.7pF, +/- .25pF, 50V, 0402, T=0.55mm MAX	21	2	C74, C76	
.1	Part	600-0342-001	A	CAP, X5R, 4.7uF, 10%, 10V, 1206, T=1.8mm MAX	22	4	C85, C87, C98, C99	
.1	Part	600-0276-001	A	CAP, X5R, 0.1uF, 10%, 10V, 0402, T=0.55mm MAX	23	10	C24, C95, C102, C121, C122, C126, C128, C132, C135, C138	
.1	Part	600-0306-001	A1	CAP, C0G, 1.0pF, +/- .25pF, 50V, 0402, T=0.60mm MAX	24	1	C51	
.1	Part	600-0171-001	A2	CAP, X7R, 0.1uF, 10%, 16V, 0603, T=0.035"MAX	25	1	C45	
.1	Part	601-0012-001	A5	CAP, TANT, 10uF, 10%, 6.3V, 1206, EIA 3216 (A)	26	1	C86	
.1	Part	601-0011-001	A6	CAP, TANT, 4.7uF, 20%, 10V, 1206, EIA 3216 (A)	27	1	C34	
.1	Part	420-0100-001	A	DIODE, PIN, 100V, 1A, HSMP-389C, SOT-323	28	2	D1, D2	
.1	Part	2000587	A1	DIODE, SW, ARY, BAV99, SOT23	29	1	D7	
.1	Part	702-0044-001	A	FILTER, BANDPASS, 5.3GHz, SMD-3	30	1	F1	
.1	Part	240-0386-001	A	CONN, RCPT, 5GHz COAX, RA, SMD	31	1	J4	

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**BOM EXPLOSION REPORT**

Part Number 100-0920-004
Part Revision 01
Part Description PCBA,WM3A5000RICK,W/SHIELD FOR RICKSHAW



Level	Part Type	Item Number	Rev	Part Description	Find Num	Qty	Ref Des	Notes
.1	Part	535-0156-001	A	IND, 1.5uH, 2%, 330mA, 2.3 OHM, 1008	32	4	L1, L7, L9, L22	
.1	Part	535-0158-001	A	IND, 1uH, 2%, 370mA, 1.75 OHM, 1008	33	9	L2, L3, L5, L6, L15-L18, L26	
.1	Part	533-0051-001	A	FERRITE BEAD, 2.5K @ 100MHz, 150mA, 0805	34	5	L4, L20, L21, L23, L25	
.1	Part	535-0172-001	A	IND, 0.18uH, 20%, 220mA, 0.81 OHM, 1210	35	1	L29	
.1	Part	2001835	A4	XSTR, NPN, 3904, 40V/60V, 200mA, 625mW, SOT-23, T=1.28mm MAX	36	3	Q1, Q7, Q15	
.1	Part	2000630	B4	XSTR, PNP, 3906, 40V, 200mA, 225mW, SOT-23, T=1.15mm MAX	37	2	Q2, Q6	
.1	Part	532-0093-001	A	XSTR, HJ-FET, N-CH, NE325S01, 4V, -3V, 20mA, 165mW, SMD-4	38	1	Q3	
.1	Part	532-0092-001	A1	XSTR, PHEMT, LP750, 7V, -3V, 940mW, SMD-4	39	1	Q5	
.1	Part	502-0105-001	A1	RES CHP, 221 OHM, 1%, 0402	40	9	R1-R5, R12, R18, R19, R35	
.1	Part	502-0245-001	A	RES CHP, 6.19K, 1%, 0402	41	2	R6, R103	
.1	Part	502-0027-001	A7	RES CHP, 10.0K, 1%, 0402	42	5	R7, R20, R22, R27, R176	
.1	Part	502-0007-001	A5	RES CHP, 75.0 OHM, 1%, 0402	43	1	R8	
.1	Part	502-0055-001	A5	RES CHP, 4.75K, 1%, 0402	44	1	R11	
.1	Part	502-0184-001	A	RES CHP, 5.62K, 1%, 0402	45	1	R9	
.1	Part	502-0092-001	A1	RES CHP, 2.21K, 1%, 0402	46	1	R23	
.1	Part	502-0056-001	A2	RES CHP, 68.1 OHM, 1%, 0402	47	8	R13, R21, R24, R141-R144, R148	
.1	Part	502-0045-001	A5	RES CHP, 330 OHM, 5%, 0402	48	2	R14, R145	
.1	Part	502-0132-001	A1	RES CHP, 5.11K, 1%, 0402	49	3	R26, R29, R177	
.1	Part	503-0233-001	A	RES CHP, 1.0 OHM, 5%, 0603	50	1	R28	
.1	Part	502-0175-001	A2	RES CHP, 49.9 OHM, 1%, 0402	51	2	R38, R49	

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**BOM EXPLOSION REPORT**

Part Number 100-0920-004
Part Revision 01
Part Description PCBA,WM3A5000RICK,W/SHIELD FOR RICKSHAW



Level	Part Type	Item Number	Rev	Part Description	Find Num	Qty	Ref Des	Notes
.1	Part	502-0029-001	A5	RES CHP, 20.0K, 1%, 0402	52	1	R30	
.1	Part	502-0004-001	A6	RES CHP, 39.2 OHM, 1%, 0402	53	4	R16, R17, R32, R45	
.1	Part	502-0106-001	A1	RES CHP, 511 OHM, 1%, 0402	54	2	R33, R34	
.1	Part	502-0060-001	A1	RES CHP, 1.00M, 1%, 0402	55	1	R37	
.1	Part	502-0251-001	A	RES CHP, 1.0 OHM, 5%, 0402	56	1	R42	
.1	Part	502-0206-001	A	RES CHP, 90.9 OHM, 1%, 0402	57	1	R25	
.1	Part	502-0252-001	A	RES CHP, 2.2 OHM, 5%, 0402	58	1	R149	
.1	Part	502-0021-001	A6	RES CHP, 3.32K, 1%, 0402	59	1	R51	
.1	Part	502-0079-001	A1	RES CHP, 365 OHM, 1%, 0402	60	2	R131, R132	
.1	Part	502-0001-001	A5	RES CHP, 0 OHM JUMPER, 0402	61	7	R10, R15, R31, R36, R41, R44, R50	
.1	Part	502-0015-001	A6	RES CHP, 1.00K, 1%, 0402	62	3	R48, R168, R175	
.1	Part	2000785	A2	RES CHP, 0 OHM JUMPER, 0805	63	2	R46, R47	
.1	Part	503-0062-001	B	RES CHP, 332 OHM, 1%, 0603	64	1	R925	
.1	Part	413-0084-001	A	IC, REG, LDO, 2.5V, 2%, 150mA, TK71625, SOT-23-5	65	1	U1	
.1	Part	419-0023-001	A	IC, RADIO-ON-A-CHIP, 5GHz, AR5110, LLPCC-64	66	1	U4	
.1	Part	419-0024-001	A	IC, MAC BASEBAND PROC, 5GHz, AR5210, BGA-196	67	1	U17	
.1	Part	407-0018-001	A2	IC, EEPROM, SER, 256x16/512x8, 2.5-5.5V, 93C66, SOIC-8	68	1	U22	
.1	Part	413-0103-001	A	IC, REG, LDO, ADJ, 2.5V, 500mA, 1763, MSOP-8	69	1	U24	
.1	Part	433-0010-001	A	IC, CMOS, CHARGE PUMP, 1.8-5.5V, 50mA, SOT23-6	70	1	U102	
.1	Part	433-0011-001	A	IC, LOW NOISE, CHARGE PUMP, 2.7-4.5V, 100mA, THINSOT23-6	71	1	U103	

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**BOM EXPLOSION REPORT**

Part Number 100-0920-004
Part Revision 01
Part Description PCBA,WM3A5000RICK,W/SHIELD FOR RICKSHAW



Level	Part Type	Item Number	Rev	Part Description	Find Num	Qty	Ref Des	Notes
.1	Part	620-0097-001	A	XTAL, 32.000MHz, 10/10ppm, 19.5pF, 500uW, 6.0x3.7x1.0mm	72	1	Y1	
.1	Part	830-1760-002	01	LBL, APPVLS, WM3A5000	73	1		
.1	Part	830-1102-001	A	LABEL, SMALL, MPC1	75	1		Print [1] S/N barcode, TLA code 09V [2] Model="WM3A5000" [3] Mac ID [4] Date code. "Product of" info not reqd.. Affix label onto insulator wrap 830-1760-002
.1	Part	230-0224-002	B	SHIELD, WM3A5000DAP	76	1		
.1	Part	144-0329-001	C	TEST SFW, WM3A5000	701	0		
.1	Part	100-SPEC-001	A	SPEC, QA REQUIREMENTS, PCBA	703	0		

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Created by: Robert Paxman

**EXHIBIT 9: Theory of Operation for
Intel Corporation Model WPCI5000**

6 Pages

Hardware Functional Specification
WM3A5000 Mini PCI 3A 802.11a
(Atheros Chipset)

Original: Lynn Schilder

1. SUMMARY

The Mini PCI 802.11a (WM3A5000) is Xircom's Mini PCI 3A wireless card. This Type 3A card is designed to operate with the Access Point mother board. This 802.11a wireless card is IEEE compliant, features bus mastering, and supports BPSK, QPSK, 16QAM, and 64QAM modulation schemes. The adapter supports the following data rates: 6, 9, 12, 18, 24, 36, 48 and 54 Mbps and operates in the unlicensed 5-GHz spectrum. The card operates with a 3.3V supply from the host socket. The Host interface is PCI 2.2 and PC Card 7.1 Standards compliant.

2. MRD REQUIREMENTS

The WM3A5000 hardware generally meets the requirements outlined in the Marketing Requirements Document (MRD), Xircom document number 103-0926-001. The WM3A5000 is functionality, virtually identical to Xircom's WCB5000 802.11a adapter. Both products may share the same software drivers.

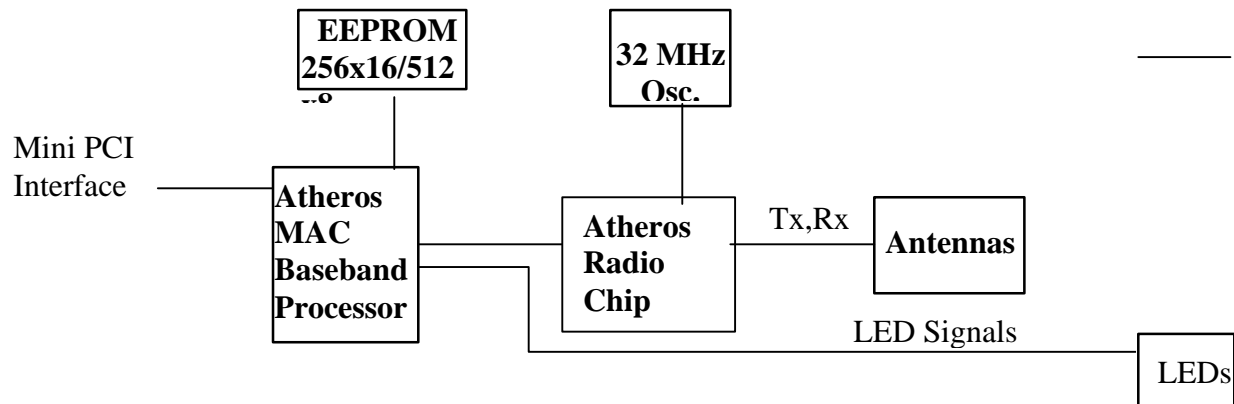
The typical 3.3V current has been measured on pre-production units under a variety of conditions, and is listed in the following chart:

WCB5000 state	3.3V Current (mA)
Initial Power-On state	32.0
No Association	420.0
Associated, idle	420.0
Associated, active	450.0-475.0

3. Functional Description

This section contains a complete description of the WM3A5000 hardware architecture. It includes a block diagram of the Mini PCI Card followed by a functional description of each block.

3.1. Functional Block Diagram



3.2. Functional Description of PC Card

3.2.1. Mini PCI Interface

The WM3A5000 interfaces with the host PC via an enhanced 68-pin connector. The 3.3V signaling conforms to the PCI Card Standard. The Mini PCI signals interface with the Atheros AR5210 MAC Baseband Processor.

3.2.2. Atheros MAC Baseband Processor (AR5210)

The AR5210 Processor integrates the Media Access Control (MAC) and baseband processing functions. It supports either the PCI or CardBus host interface. When this chip is used along with the Atheros Radio-on-a-Chip (AR5110) the result is an IEEE 802.11a 5GHz design.

The AR5210 Processor implements a half-duplex, Orthogonal Frequency Division Multiplexing (OFDM) baseband processor supporting data rates from 6 Mbps to 54 Mbps. It uses the following modulation schemes: BPSK (binary phase shift keying), QPSK (quadrature phase shift keying), 16QAM (16 quadrature amplitude modulation), and 64QAM (64 quadrature amplitude modulation). Other features include: channel estimation, symbol timing, frequency offset estimation, signal detection, automatic gain

control, and forward error correction coding at rates of 1/2, 2/3 and 3/4. The AR5210 operates in accordance to the 802.11a specification with regards to transmit and receive frame filtering, frame encryption, and error recovery. It also controls data transfers with the host, interrupts, status and error reporting, power-down sequencing and hardware register access. Following is a description of the hardware interfaces on the ASIC utilized by the WM3A5000.

3.2.3.1. Host Interface

The host interface on the AR5210 is designed for PCI/CardBus applications. It consists of 32 bits of address and data, as well as all the required PCI control signals. The chip supports the 3.3V signaling environment, with clock speeds up to 33 MHz. Most of the host interface signals are bi-directional. The DMA block is a full bus mastering descriptor based engine.

3.2.3.2. Serial EEPROM Interface

The WM3A5000 is designed to support an EEPROM. The ROM contains configuration options, subsystem vendor IDs, CIS Pointers to be stored in AR5210, Boot ROM code, and manufacturing information. The EEPROM is a 256x16/512x8.

The AR5210 supports the industry standard I²C “2-wire” serial interface to an external 256x16 bit EEPROM. The EEPROM stores configuration information for the PCI/CardBus. At power-up, the serial EEPROM reads logic internal to AR5210, automatically downloads configuration information and the Card Information Structure (CIS) into internal SRAM for the host PC to read. For more information on the serial EEPROM, refer to the Atheros AR5210 MAC/Baseband Processor Specification (attached to P/N 419-0024-001).

3.2.3.3. General Purpose Bits

The AR5210 has 6 bi-directional GPIO ports that are independently configured as input or output via the GPIO control register. One port is used on this design as an output LED driver for “ASSOCIATE”.

3.2.3.4 LED Drivers

Two output pins are provided for LED drivers. Only one is used on this design, LED_0 which is used for network “ACTIVITY”. Blinking of LED indicates network activity.

3.2.3.5 Antenna Switch

The AR5210 supports two antennas through Host software processing. The default antenna is the first antenna on which transmission is attempted. The same antenna is used for receive. If two transmissions fail in a row the second antenna is switched in for transmission and receive.

3.2.3.6 Phase Locked Loop

The PLL takes the base 32MHz clock from the AR5110 and derives either 40MHz or 80MHz as a core frequency. The baseband processor and the ADC/DAC use these clock frequencies.

3.2.3 Single-chip Radio (AR5110)

The AR5110 radio chip is an integrated, IEEE 802.11a compliant, 5GHz CMOS transceiver. It requires no external active components or SAW filters. The transceiver core, digital logic, and VCO are powered by 2.5V. The I/O's are powered by 3.3V.

The AR5110 supports eight channels between 5.15 and 5.35 GHz, leaving two 20MHz channels unused as a guard band. Across the 5.12 and 5.25 GHz band the FCC permits a maximum transmit power of 50mW, the design outputs less than 40mW. The FCC permits a maximum power rating of 250mW in the 5.25 to 5.35 GHz band, but is limited to less than 100mW in this design. The 20MHz channels are divided into 52 carriers, 48 carry data and 4 are pilot signals. All 52 carriers are always used. Varying modulation and error-correction coding supports standard IEEE 802.11a data rates that range from 6 to 54 Mbps. Each of the carriers are ~300KHz wide, resulting in raw data that ranges from 125Kbps to 1.5Mbps.

3.2.4 Antenna Connection

The antennas are connected using UMP SMT connectors. See Access Point descriptions for antenna description.

Special FCC 15.407 Requirements Frequency Stability (15.407 (g))

FCC 15.407(g) states: “Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.”

The device uses 8 channels between 5.18GHz and 5.32GHz. The carrier is 20MHz wide centered at these frequencies. IE: Channel 6 (5.18GHz) would have the fc centered at 5.18GHz with a bandwidth of 20Mhz or 5.17 to 5.19 GHz. This provides a guard band of 20 MHz (5.17 GHz - 5.15 GHz).

The device also requires a +/- 20 ppm XTAL over temperature and with aging. This is required per the 802.11a specification. Based on the tolerance of the XTAL and the 20 MHz guard band between 5.15GHz and 5.35 GHz the device will maintain emissions within the UNII 1 and 2 bands under normal operating conditions specified in the user manual.

Insuring Indoor Use in 5.15-5.25 GHz Band (15.407 (e))

FCC 15.407(e) states: “Within the 5.15-5.25 GHz band, U-NII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations.”

The user manual includes the following statement:

“Radio Frequency interference requirements: This device is restricted to indoor use only. Industry Canada and FCC requires this product to be used indoors due to its operation in the frequency range 5.15 to 5.25 GHz”

Discontinue Transmitting with absence of Data or operational failure (15.407 (c))

FCC 15.407(e) states: “*The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.*”

Data transmission is always initiated by software, which is then passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets (ACKs, CTS, PSpoll, etc...) are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted.

EXHIBIT 10: RF Exposure Information

MPE Calculations 1 Page
WPC5000 Antenna Info 8 Pages

MPE Calculations

FCC part 1.1310, Table 1 limits the power density for uncontrolled exposure to $1\text{mW}/\text{cm}^2$ for systems operating in the UNII bands. The distance, $d(\text{cm})$ from the antenna at which the power density, $P_d (\text{mW}/\text{cm}^2)$ is below this limit is calculated from the maximum EIRP, $P_t (\text{mW})$ using the equation:

$$P_d = P_t / (4 \pi d^2)$$

Re-arranging for the distance at which the power density is $1\text{mW}/\text{cm}^2$ gives:

$$d = \sqrt{P_t / (4 \pi)}$$

The device under test is designed to use an integral antenna with a gain of 2 dBi. The maximum output power for the two modes and all channels is 21 dBm.

The maximum EIRP is, therefore, $21 \text{ dBm} + 2 \text{ dBi} = 23 \text{ dBm}$ (199.52 mW):

$$d = \sqrt{199.52 / (4 \pi)} = \underline{\underline{3.98 \text{ cm}}}$$

The distance from the antenna that the power density is $1\text{mW}/\text{cm}^2$ is, therefore, 3.98 cm.

The users guide instructs the user to install the device such that it has a separation of at least 20cm from persons (see text below) to comply with the FCC's requirements. This separation of 20cm more than meets the FCC's and Industry Canada RF exposure requirements.

Mode	EIRP	P_d at 20cm	Calculated distance (in cm) where $P_d < 1\text{mW}/\text{cm}^2$
Normal	21 dBm (199.52 mW)	$0.0396 \text{ mW}/\text{cm}^2$	3.98

RF Exposure Requirements

To ensure compliance with FCC RF exposure requirements, the antenna used for this device must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or radio transmitter. Installers and end-users must follow the installation instructions provided in this user guide.

Extract From User's Manual

SPECIFICATIONS:

ANTENNA TYPE: OMNIDIRECTIONAL, SLEEVE DIPOLE ANTENNA

1. ELECTRICAL CHARACTERISTICS:

- 1-1 LOW LEVEL CONTACT RESISTANCE: 20 mini- ohms Max.
- 1-2 PRODUCT VSWR IN 5.15 GHZ TO 5.35 GHZ IN FREE AIR : 2.0 Max..
- 1-3 INSULATION RESISTANCE : 5000 M ohms Min.
- 1-4 DIELECTRIC WITHSTANDING VOLTAGE : 500 VAC
- 1-5 IMPEDANCE : 50 ohms.
- 1-6 CONNECTOR VSWR : 1.5 Max..
- 1-7 PRODUCT AVERAGE GAIN IN 5.15 TO 5.35 GHZ IN FREE AIR : -6 dB Min
- 1-8 PRODUCT PEAK GAIN IN 5.15 TO 5.35 GHZ IN FREE AIR : 2 dB Max

2. MECHANICAL CHARACTERISTICS:

- 2-1 MECHANICAL SHOCK : No discontinuity > 1 μ s per Method EIA-364-27B.
- 2-2 VIBRATION: No discontinuity > 1 μ s per Method EIA-364-28D, Condition V, letter D.
- 2-3 DURABILITY : 500 cycles.
- 2-4 CONNECTOR CRIMP FORCE : 3 kg Min..

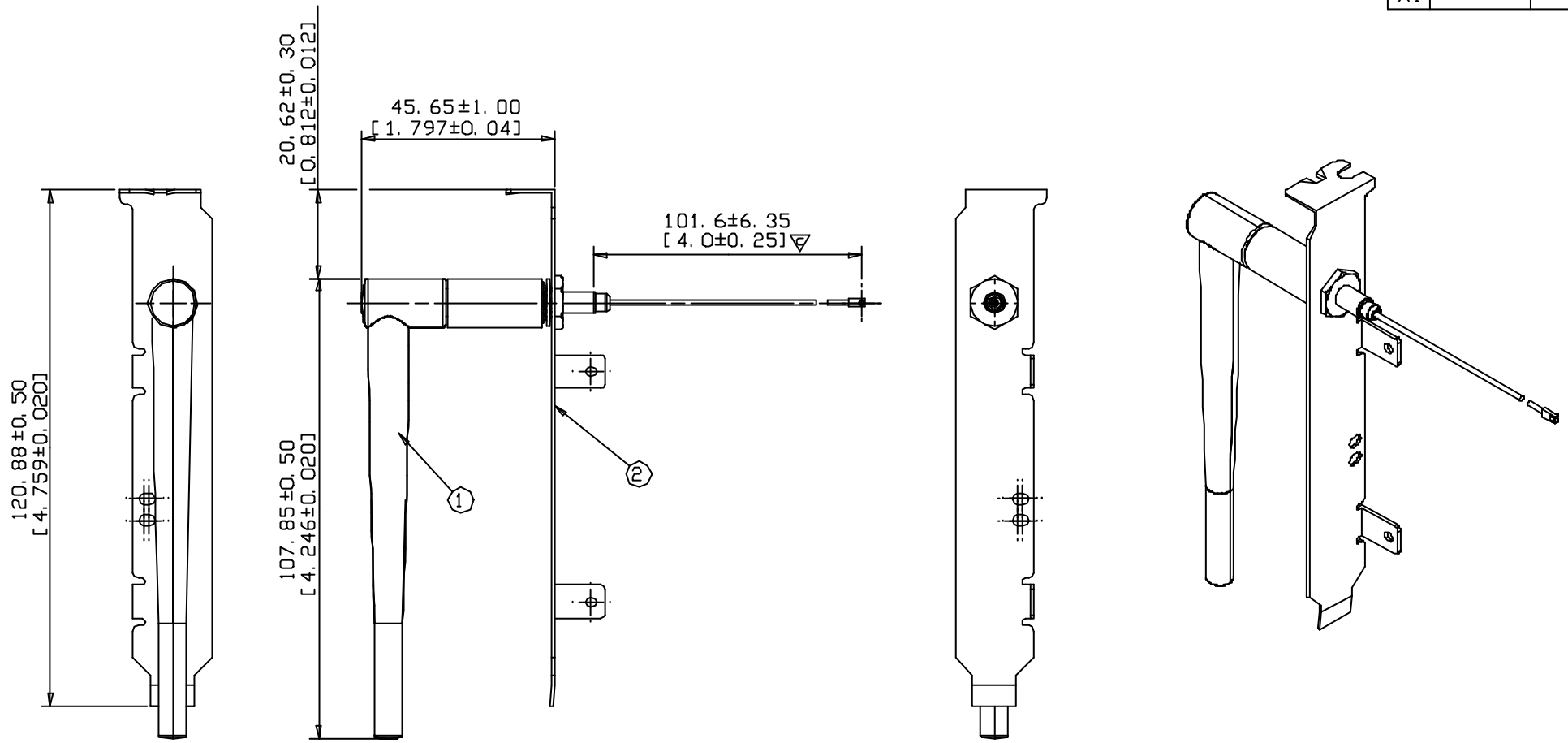
3. ENVIRONMENTAL CHARACTERISTICS:

- 3-1 OPERATING TEMPERATURE: -40°C TO +125°C
- 3-2 TEMPERATURE LIFE: Subject mated samples at 105 \pm 3°C for 1000 hours per Method EIA-364-17B.
- 3-3 TEMPERATURE HUMIDITY CYCLING: Subject mated samples to 10 cycles between 25 to 65°C at 95% RH for 240 hours per Method EIA-364-31A, Method III and Condition C unpowered, omitting sub-cycle 7b.
- 3-4 THERMAL SHOCK: Subject mated samples to 5 cycles between -40 to 125°C per Method EIA-364-32.

X1	SMKTB18 - 11206	H.C.YU 12/13/01
REV	ECN.NO.	APPD.

FOXCONN HON HAI PRECISION INDUSTRY CO.,LTD. TAIPEI TAIWAN R.O.C.			
TITLE: XIRCOM RICKSHAW A WHIP WIRELESS ANTENNA		APPD: H.C.YU 12/13/01	
		CHKD: H.C.YU 12/13/01	
PROD.NO.:	FX01A88-00 FX01A88-01 FX01A88-02	DR.: H.L.HSIAO 12/13/01	
DWG. NO.: 389-0000-026		REV.: X1	SHEET: 1 OF 1

REV.	ECN. NO.	APPD.
X1	SMKTBL8-11206	



NOTES:

- HAND TIGHTEN ANTENNA ASSY TO CABLE ASSY, DON'T USE ANY TOOLS TO TIGHTEN.
- THE ANTENNA AND CABLE CONNECTORS ARE REVERSE THREADED AND REVERSED POLARITY.
- ANTENNA TO BE POSITIONED AS SHOWN AFTER TIGHTENING.
- IMPEDANCE : 50 OHMS.
- VSWR IN 5.15 GHZ TO 5.35 GHZ : 2.0 MAX.
- AVERAGE GAIN IN 5.15 GHZ TO 5.35 GHZ IN FREE AIR SITUATION : -6 dB MIN.
- OPERATING TEMPERATURE : -40° TO 125° ,

ITEM	DESCRIPTION	P/N
①	EXTERNAL ANTENNA ASSEMBLY	FX01A88-01
②	INTERNAL CABLE ASSEMBLY	FX01A88-02

X, ±	X*, ±	UNITS mm [in]	NAME (INTENDED USE) XIRCOM RICKSHAW A WHIP WIRELESS ANTENNA	FOXCONN HON HAI PRECISION IND. CO., LTD. TAIPEI, TAIWAN, R. O. C.
. X ±	. X* ±	MAT'L	PART NO. (INTENDED USE) FX01A88-00	TITLE: CUSTOMER DWG.
. XX ±	. XX* ±	FINISH	APPD:	DWG NO : 389-0000-015
. XXX ±	. XXX* ±	Q' TY	CHKD:	SCALE SHEET REV. NONE 1/1 X1
<small>THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF HON HAI PRECISION IND. CO., LTD. AND SHALL NOT BE REPRODUCED, COPIED OR USED IN ANY MANNER WITHOUT THE PRIOR WRITTEN CONSENT OF HON HAI PRECISION IND. CO., LTD.</small>			DR: H. L. HSIAD 12/13/01	

ITEM	DESCRIPTION	Q'TY	MATERIAL	TREATMENT	REMARK
1	UMP CONNECTOR CABLE ASSEMBLY	1 PC	CONNECTOR : COPPER ALLOY AND TEFLON CABLE : COPPER WIRE AND FEP CONNECTOR NO. : 107-003-000	CONTACT : GOLD PLATED CABLE COLOR : BLACK	
2	SMA JACK CONNECTOR ; REVERSED THREAD & POLARITY	1 PC	COPPER ALLOY AND TEFLON	INNER CONTACT : 30 u" GOLD PLATED	
3	BRACKET	1 PC	SPCC	100u" NICKEL PLATED	
4	SMA JACK CONNECTOR HEAT SHRINKING TUBE	11 mm	POLYOLEFIN	COLOR : BLACK	
5	SMA PLUG CONNECTOR ; REVERSED THREAD & POLARITY	1 PC	COPPER ALLOY	INNER CONTACT : 30 u" GOLD PLATED	
6	RF ANTENNA CABLE	60.5 mm	COPPER WIRE AND FEP	IEEE 802.11A CONFORMED	
7	LONG TUBE	1 PC	COPPER ALLOY AND TEFLON	NONE	
8	MALE HOUSING	1 PC	PC-ABS UL 94V-0	COLOR : YACHT BLUE XIRCOM COLOR CHIP XQI-0001-138, GE BL1A090	
9	FEMALE HOUSING	1 PC	PC-ABS UL 94V-0	COLOR : YACHT BLUE XIRCOM COLOR CHIP XQI-0001-138, GE BL1A090	
10	SLEEVE	1 PC	SILICON	COLOR : YACHT BLUE XIRCOM COLOR CHIP XQI-0001-138, GE BL1A090	

REMARK

[1] PRODUCT NO :

FX 01A 88 00

R/F

EXTENSION CODE

ANTENNA ASSEMBLY

XIRCOM RICKSHAW A ANTENNA

**FOXCONN HON HAI PRECISION INDUSTRY CO.,LTD.
TAIPEI TAIWAN R.O.C.**

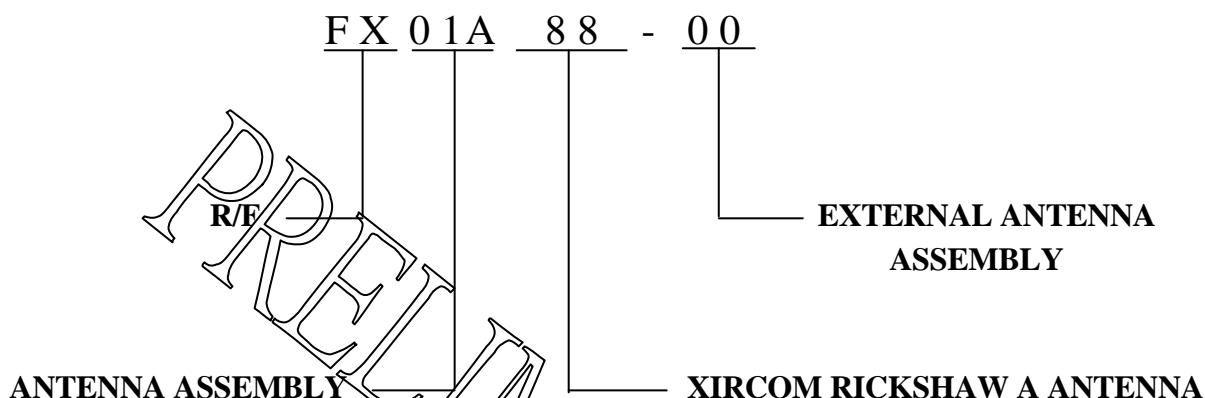
X2	SMKTB18 -11207	H.C.YU 12/14/01
X1	SMKTB18 -11206	H.C.YU 12/13/01
REV	ECN.NO.	APPD.

TITLE: XIRCOM RICKSHAW A WHIP WIRELESS ANTENNA		APPD: H.C.YU 12/14/01
PROD.NO.: FX01A88-00		CHKD: H.C.YU 12/14/01
DRG. NO.: 389-0000-024		DR.: H.L.HSIAO 12/14/01
REV.: X2		SHEET: 1 OF 3

ITEM	DESCRIPTION	Q'TY	MATERIAL	TREATMENT	REMARK
1	SMA PLUG CONNECTOR ; REVERSED THREAD & POLARITY	1 PC	COPPER ALLOY	INNER CONTACT : 30 u" GOLD PLATED	
2	RF ANTENNA CABLE	60.5 mm	COPPER WIRE AND FEP	IEEE 802.11A CONFORMED	
3	LONG TUBE	1 PC	COPPER ALLOY AND TEFLON	NONE	
4	MALE HOUSING	1 PC	PC-ABS UL 94V-0	COLOR : YACHT BLUE XIRCOM COLOR CHIP XQI-0001-138, GE BL1A090	
5	FEMALE HOUSING	1 PC	PC-ABS UL 94V-0	COLOR : YACHT BLUE XIRCOM COLOR CHIP XQI-0001-138, GE BL1A090	
6	SLEEVE	1 PC	SILICON	COLOR : YACHT BLUE XIRCOM COLOR CHIP XQI-0001-138, GE BL1A090	

REMARK

[1] PRODUCT NO :



FOXCONN HON HAI PRECISION INDUSTRY CO.,LTD.
TAIPEI TAIWAN R.O.C.

			TITLE: XIRCOM RICKSHAW A EXTERNAL ANTENNA ASSEMBLY	APPD: H.C.YU 12/14/01
X2	SMKTB18 -11207	H.C.YU 12/14/01		CHKD: H.C.YU 12/14/01
X1	SMKTB18 -11206	H.C.YU 12/13/01	PROD.NO.: FX01A88-00	DR.: H.L.HSIAO 12/14/01
REV	ECN.NO.	APPD.	DWG. NO.: 389-0000-024	REV.: X2 SHEET: 2 OF 3

Radiation Pattern Gain Test Report

Part Name: Xircom Rickshaw A RF Antenna

Part No: FX01A88-00

Spec: Minimum average gain in 5.15 to 5.25 GHz under free air situation: -6 dB

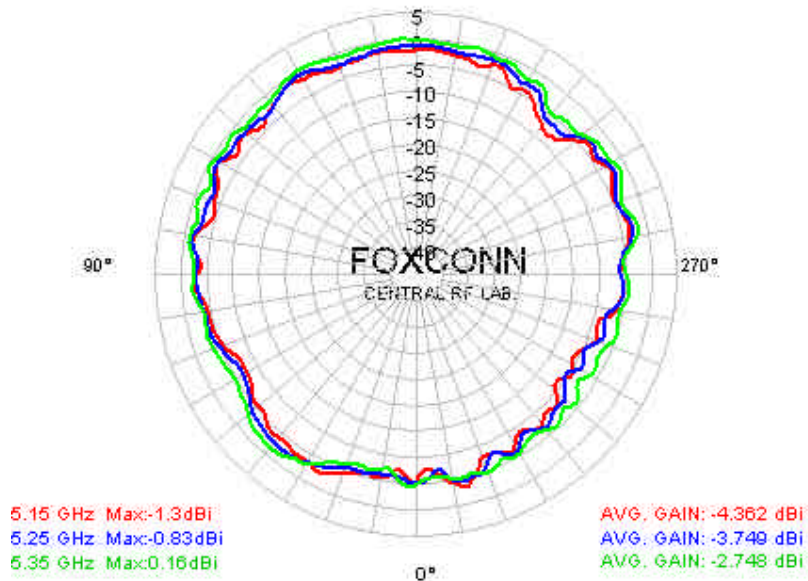
Maximum peak gain in 5.15 to 5.25 GHz under free air situation: 2 dB

Date: 12/24/2001

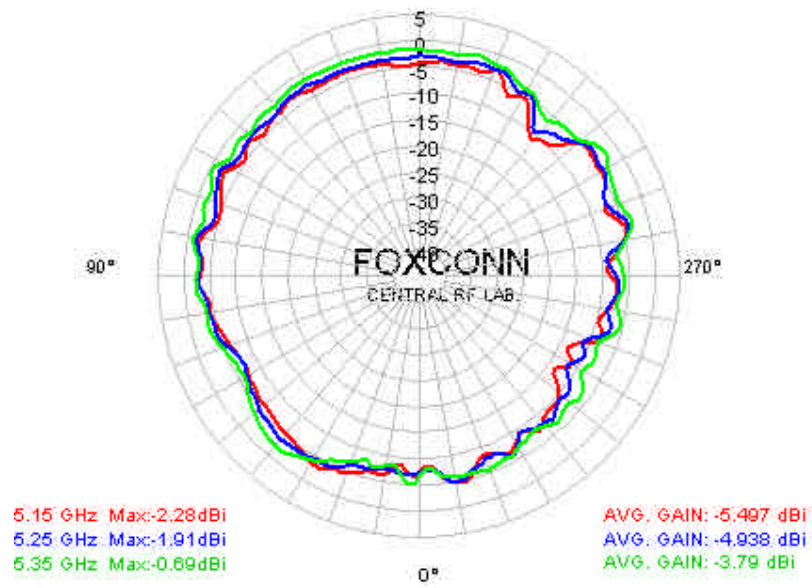
	MIN. Average gain @5.15~5.25 GHz	Result
Sample 1	-4.362	OK
Sample 2	-4.748	OK
Sample 3	-5.497	OK
Sample 4	-5.402	OK
Sample 5	-5.314	OK

	MAX. Peak gain @5.15~5.25 GHz	Result
Sample 1	0.16	OK
Sample 2	-0.39	OK
Sample 3	-0.69	OK
Sample 4	-0.72	OK
Sample 5	-0.83	OK

Sample 1 Radiation Pattern Figure



Sample 2. Radiation Pattern Figure



Approved By : Landy Hsiao 12/24 ' 2001 Prepared By : Hawk Cheng 12/24 ' 2001

VSWR Test Report for Rickshaw A RF Antenna

Part No : FX01A88-00

Dwg No : 389-0000-015

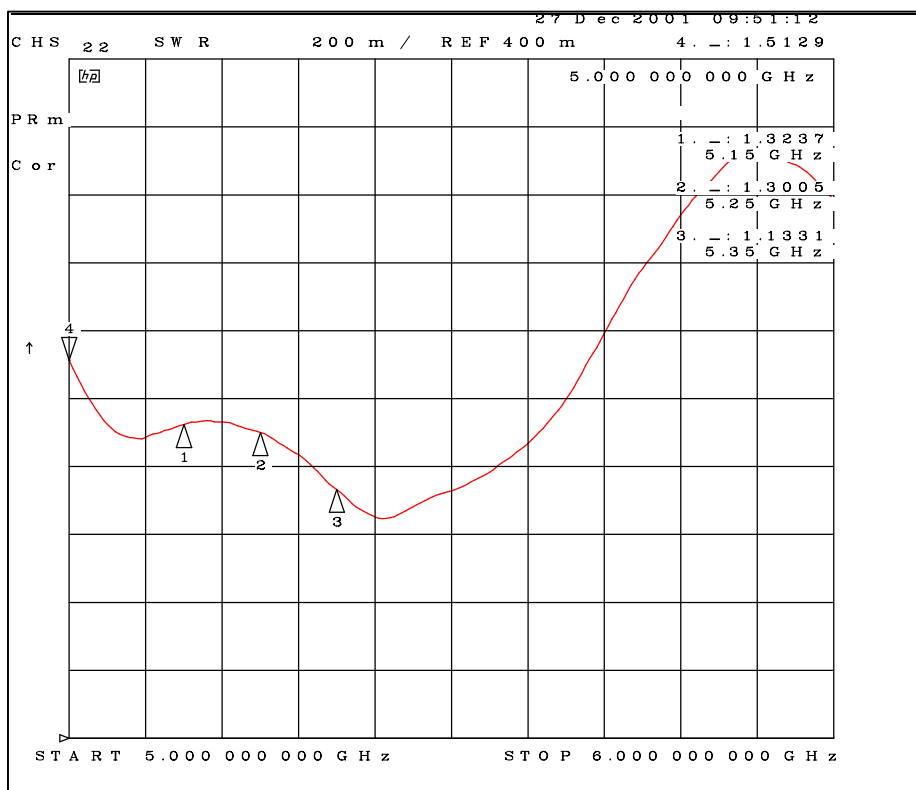
Rev : A

VSWR Test Spec : 2.0 Max in 5.15GHz ~ 5.35GHz

Date : 12/24' 2001

Sample No	5.15GHz	5.25GHz	5.35GHz	Result
1	1.324	1.301	1.133	OK
2	1.344	1.335	1.171	OK
3	1.616	1.613	1.593	OK
4	1.172	1.197	1.121	OK
5	1.346	1.451	1.549	OK

VSWR testing figure on Network Analyzer show below:



Approved By : Landy Hsiao 12/24 ' 2001

Prepare By : Hawk Cheng 12/24 ' 2001