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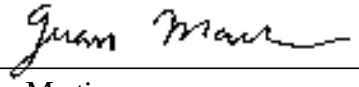
Electromagnetic Emissions Test Report and Request for Class II Permissive Change pursuant to FCC Part 15, Subpart C (15.247) DTS Specifications and Industry Canada RSS 210 Issue 5 for an Intentional Radiator on the Intel Corporation Model: WM3B2200BG

FCC ID:	PD9WM3B2200BG
UPN:	1000M-B2200BG
GRANTEE:	Intel Corporation 13280 Evening Creek Drive San Diego, CA. 92128
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	December 8, 2003
FINAL TEST DATE:	December 5, 2003

AUTHORIZED SIGNATORY: 

Juan Martinez
Senior EMC Engineer

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:
WM3B2200BG

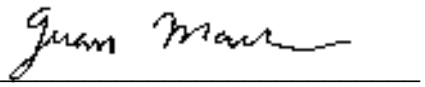
Manufacturer:
Intel Corporation
13280 Evening Creek Drive
San Diego, CA. 92128

Tested to applicable standards:
RSS-210, Issue 5, November 2001 (Low Power License-Exempt Radiocommunication Devices)
FCC Part 15.247 (DTS)

Measurement Facility Description Filed With Department of Industry:

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 5); and that the equipment performed in accordance with the data submitted in this report.



Signature	
Name	Juan Martinez
Title	Senior EMC Engineer
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA
Date:	December 8, 2003

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.).

TABLE OF CONTENTS

SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation model WM3B2200BG pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators and RSS-210 Issue 5 for licence-exempt low power 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 WM3B2200BG 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 C of Part 15 of FCC Rules and RSS-210 Issue 5 for license-exempt low power devices 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	Measured Value	Comments	Result
15.247(a)	6.2.2(o)(b)	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	6.2.2(o)(b)	6dB Bandwidth	16MHz & 9Mhz	Minimum allowed is 500kHz	Complies
	RSP 100	99% Bandwidth	16.6MHz & 9.25Mhz	For information only	Complies
15.247 (b) (3)	6.2.2(o)(b)	Output Power, 2400 – 2483.5 MHz (802.11B)	17 dBm (0.05 Watts)	Multi-point applications: Maximum permitted is 1Watt, with EIRP limited to 4 Watts.	Complies
15.247 (b) (3)	6.2.2(o)(b)	Output Power, 2400 – 2483.5 MHz (802.11G)	16 dBm (0.04 Watts)	Multi-point applications: Maximum permitted is 1Watt, with EIRP limited to 4 Watts.	Complies
15.247(c) / 15.209		Radiated Spurious Emissions – 30MHz – 24 GHz	53.9 dBuV/m @ 2483.5 MHz (-0.1dB)	Emissions in restricted bands must meet the radiated emissions limits detailed in 15.207. All others must be < -20dBc	Complies
15.247 (b) (5)		RF Exposure Requirements	MPE Calculation		
15.203		RF Connector	Antenna will be professionally installed into laptops	Standard rf connectors permitted for professionally installed systems	Complies

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 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	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Intel Corporation model WM3B2200BG is a wireless 802.11 B/G card which is designed to provided wireless network capabilties. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end-user environment. EUT is powered by the host pc.

The sample was received on December 5, 2003 and tested on December 5, 2003. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number	Proposed FCC ID #
Intel/WM3B2200BG/Mini PCI	N/A	PD9WM3B2200BG
Hitachi/HFD04-R/Antenna	N/A	N/A
Yokowo/YCE-5008/antenna#1	N/A	N/A
Nissei Electric/Reversed-F/antenna#2	N/A	N/A

OTHER EUT DETAILS

N/A

ENCLOSURE

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer.

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
Hewlett Packard/ 3820/Printer	CN2451D1YS	DoC
Netgear/ EN104 /Hub	N/A	DoC
HP/ 5183 / Keyboard	BF33339247	E5XKB5183
HP/ MO42KC/Mouse	30823470	DoC
Dell/ 828FI/Monitor	22794E28CJ29	DoC

EUT INTERFACE PORTS

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

		Cable(s)		
Port	Connected to	Description	Shielded / Unshielded	Length (m)
RJ45	PC host	Cat 5	Unshielded	1
USB	PC host	Multiwire	Shielded	1
Keyboard	PC host	Multiwire	Unshielded	1.5
Mouse	PC host	Multiwire	Unshielded	1.5
VGA	PC host	Multiwire	Shielded	1.2

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

		Cable(s)		
Port	Connected to	Description	Shielded or Unshielded	Length (m)
RJ45	Laptop	Cat 5	Unshielded	1
USB	Laptop	Multiwire	Shielded	1

EUT OPERATION DURING TESTING

The EUT continuously transmitted on a specific channel during testing

ANTENNA REQUIREMENTS

The antenna port is a UFN, which is permitted as the antenna systems are to be professionally installed into laptops

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on December 5, 2003at the Elliott Laboratories Open Area Test Site #4 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 5 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

A power meter and peak power sensor are used for all direct output power measurements from transmitters as they provide a broadband indication of the power output.

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 temrs 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:

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

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)and RSS 210 (o) 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
902 – 928	1 Watts (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watts (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watts (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

RSS 210 (o) AND FCC 15.247 SPURIOUS RADIATED EMISSIONS LIMITS

T limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands detailed in Part 15.205 and for all spurious emissions from the receiver are:

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

All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level.

FCC 15.205 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.

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

RSS-210 SECTION 6.6 AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in 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:

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 09-Dec-03
Engineer: Juan Martinez

Manufacturer	Description	Model #	Assett #	Cal Due
Hewlett Packard	Microwave EMI test system (SA40, 9kHz - 40GHz)	84125C	1149	12-Mar-04
Rohde & Schwarz	Power Sensor 100uW - 10 Watts	NRV-Z53	1236	11-Sep-04
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	11-Sep-04

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T53629_Hitachi 12 Pages
T53563_Antennas 20 Pages

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EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Emissions Spec:	FCC 15.247 / RSS 210	Class:	Radio
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Intel Corporation

Model

WM3B2200 b/g with Hitachi Antenna

Date of Last Test: 12/5/2003

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Emissions Spec:	FCC 15.247 / RSS 210	Class:	Radio
Immunity Spec:	-	Environment:	-

EUT INFORMATION

The EUT is a wireless 802.11 B/G card which is designed to provided wireless network capabilties. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end-user environment. EUT is powered by the host pc.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Intel Corporation	WM3B2200BG	Mini PCI	N/A	PD9WM3B2200BG
Hitachi	HFD04-R	Antenna (-0.07dBi)	N/A	N/A

EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer.

Modification History

Mod. #	Test	Date	Modification
1			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

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EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Emissions Spec:	FCC 15.247 / RSS 210	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	3820	Printer	CN2451D1YS	DoC
Netgear	EN104	Hub	N/A	DoC
Hewlett Packard	5183	Keyboard	BF33339247	E5XKB5183
Hewlett Packard	MO42KC	Mouse	30823470	DoC
Dell	828FI	Monitor	22794E28CJ29	DoC

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
none				

Interface Cabling and Ports

		Cable(s)		
Port	Connected To	Description	Shielded or Unshielded	Length(m)
RJ 45	PC Host	Cat 5	Unshielded	1
USB	PC Host	Multiwire	Shielded	1
Keyboard	PC Host	Multiwire	Unshielded	1.5
Mouse	PC Host	Multiwire	Unshielded	1.5
VGA	PC Host	Multiwire	Shielded	1.2

Note: The other ports were not connected as the minimum configuration does not required them.

EUT Operation During Emissions(Radio)

The EUT continuously transmitted on a specific channel during testing

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Radiated Emissions

Test Specifics

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

Date of Test: 12/4/2003
Test Engineer: Marissa Faustino
Test Location: SVOATS #4

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

General Test Configuration

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

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

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 used.

Ambient Conditions:

Temperature: 9 °C
Rel. Humidity: 77 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a-1c	RE, Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	Refer to individual runs

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

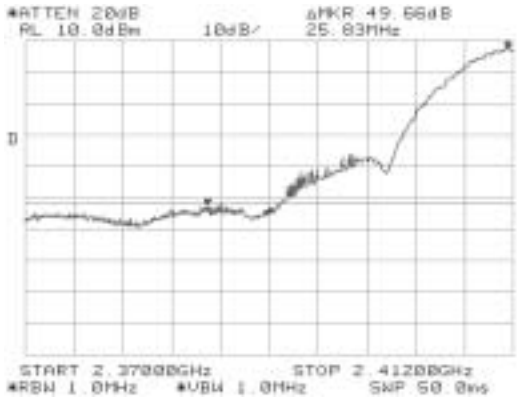
Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

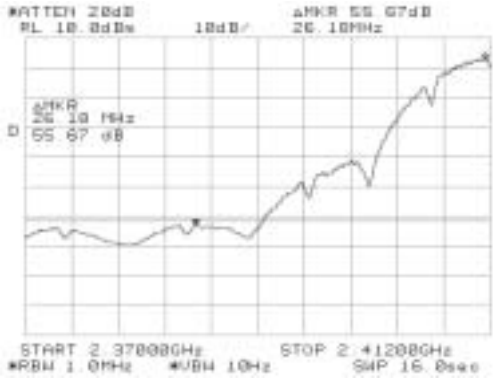
EUT running with CRTU tool version 2.2.7.3000
All power measurements were made using a peak power meter

Channel	Freq. (MHz)	Mode	Rate		Gain (Main)	Pout (dBm)	Band Edge Delta P, A		Comment
							Peak	Average	
1	**2412**	**B**	1		28.5	16.8			
6	**2437**	**B**	1		29	17.1			
11	**2462**	**B**	1		29	17.2			

Run #1a: Radiated Spurious Emissions. Low Channel @ 2412 MHz

Channel 1 Bandedge plots





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EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1a: Radiated Spurious Emissions. Low Channel @ 2412 MHz

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	103.4	97.3	Peak Measurement (RBW=VBW = 1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	100.2	94.3	Average Measurement (RBW=VBW = 10Hz)
Delta Marker - Peak	49.66	dBc	
Delta Marker - Average	55.67	dBc	
Calculated Band-Edge Measurement:	53.74	dBuV/m	Peak Measurement (RBW=VBW = 1MHz)
Calculated Band-Edge Measurement:	44.53	dBuV/m	Average Measurement (RBW=VBW = 10Hz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
12059.55	53.5	H	54.0	-0.5	AVG	305	1.0	
4823.995	52.0	V	54.0	-2.0	AVG	310	1.0	
12058.96	51.9	V	54.0	-2.1	AVG	330	1.0	
4824.00	51.8	H	54.0	-2.2	AVG	335	1.0	
14472.11	49.7	H	54.0	-4.3	AVG	320	1.0	
2311.895	46.7	H	54.0	-7.3	AVG	316	1.0	103 Mhz offset
14472.06	44.1	V	54.0	-9.9	AVG	0	1.0	
2311.975	44.1	V	54.0	-9.9	AVG	30	1.0	103 Mhz offset
12059.55	59.7	H	74.0	-14.3	PK	305	1.0	
12058.96	58.1	V	74.0	-15.9	PK	330	1.0	
14472.11	57.9	H	74.0	-16.1	PK	320	1.0	
14472.06	56.1	V	74.0	-17.9	PK	0	1.0	
4824.00	55.1	H	74.0	-18.9	PK	335	1.0	
4823.995	55.1	V	74.0	-19.0	PK	310	1.0	
2311.895	53.2	H	74.0	-20.9	PK	316	1.0	103 Mhz offset
2311.975	51.7	V	74.0	-22.4	PK	30	1.0	103 Mhz offset

Note 1:	The measurement antenna was placed less than 10cm from the EUT to "sniff" for signals from 18-26.5 GHz. No significant emissions were found.

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

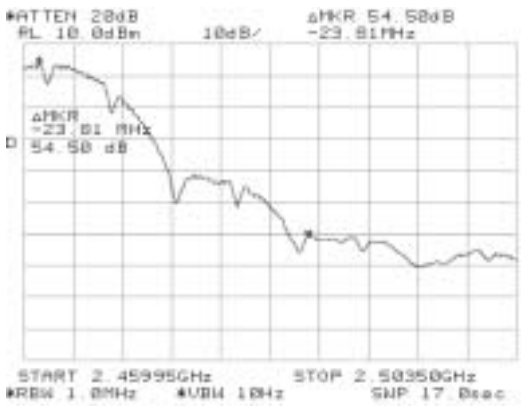
Run #1b: Radiated Spurious Emissions, 1000 - 25000 MHz. Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.090	52.3	H	54.0	-1.7	AVG	332	1.0	2x #6 Fundamental
12184.54	51.2	H	54.0	-2.8	AVG	342	1.0	
14622.05	48.7	H	54.0	-5.4	AVG	346	1.0	
4874.04	48.6	V	54.0	-5.4	AVG	290	1.0	2x #6 Fundamental
12183.92	47.2	V	54.0	-6.8	AVG	335	1.0	
2336.035	46.7	H	54.0	-7.3	AVG	322	1.0	103MHz offset
14623.07	44.8	V	54.0	-9.2	AVG	105	1.0	
2335.920	44.7	V	54.0	-9.3	AVG	31	1.0	103MHz offset
7311.910	40.5	H	54.0	-13.5	AVG	327	1.0	3x #6 Fundamental
7311.77	38.5	V	54.0	-15.5	AVG	0	1.0	3x #6 Fundamental
14622.05	58.3	H	74.0	-15.7	PK	346	1.0	
12184.54	58.2	H	74.0	-15.8	PK	342	1.0	
14623.07	56.2	V	74.0	-17.8	PK	105	1.0	
4874.090	56.1	H	74.0	-17.9	PK	332	1.0	2x #6 Fundamental
12183.92	54.8	V	74.0	-19.2	PK	335	1.0	
2336.035	54.3	H	74.0	-19.7	PK	322	1.0	103MHz offset
4874.04	53.0	V	74.0	-21.0	PK	290	1.0	2x #6 Fundamental
2335.920	52.9	V	74.0	-21.1	PK	31	1.0	103MHz offset
7311.910	50.9	H	74.0	-23.1	PK	327	1.0	3x #6 Fundamental
7311.77	50.0	V	74.0	-24.0	PK	0	1.0	3x #6 Fundamental

Note 1:	The measurement antenna was placed less than 10cm from the EUT to "sniff" for signals from 18-26.5 GHz. No significant emissions were found.

Run #1c: Radiated Spurious Emissions. High Channel @ 2462 MHz

Channel 11 Bandedge plots



Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1c: Radiated Spurious Emissions. High Channel @ 2462 MHz

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	102.9	100.9	Peak Measurement (RBW=VBW = 1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	99.8	97.8	Average Measurement (RBW=VBW = 10Hz)
Delta Marker - Peak	49.34	dBc	
Delta Marker - Average	54.5	dBc	
Calculated Band-Edge Measurement:	53.56	dBuV/m	Peak Measurement (RBW=VBW = 1MHz)
Calculated Band-Edge Measurement:	45.3	dBuV/m	Average Measurement (RBW=VBW = 10Hz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.000	50.9	H	54.0	-3.1	AVG	329	1.0	2x #11 Fundamental
12309.04	49.1	H	54.0	-4.9	AVG	337	1.0	
12309.47	48.6	V	54.0	-5.4	AVG	320	1.0	
4924.015	47.7	V	54.0	-6.3	AVG	284	1.0	2x #11 Fundamental
2360.580	43.4	H	54.0	-10.6	AVG	318	1.0	103MHz offset
2361.560	41.0	V	54.0	-13.0	AVG	32	1.0	103MHz offset
7385.050	40.9	H	54.0	-13.1	AVG	311	1.0	3x #11 Fundamental
7385.285	38.3	V	54.0	-15.7	AVG	0	1.0	3x #11 Fundamental
12309.04	56.6	H	74.0	-17.4	PK	337	1.0	
12309.47	56.6	V	74.0	-17.4	PK	320	1.0	
4924.000	55.1	H	74.0	-19.0	PK	329	1.0	2x #11 Fundamental
4924.015	53.6	V	74.0	-20.5	PK	284	1.0	2x #11 Fundamental
2360.580	52.3	H	74.0	-21.7	PK	318	1.0	103MHz offset
7385.050	51.9	H	74.0	-22.2	PK	311	1.0	3x #11 Fundamental
7385.285	50.5	V	74.0	-23.5	PK	0	1.0	3x #11 Fundamental
2361.560	50.2	V	74.0	-23.8	PK	32	1.0	103MHz offset

Note 1:	The measurement antenna was placed less than 10cm from the EUT to "sniff" for signals from 18-26.5 GHz. No significant emissions were found.

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Radiated Emissions

Test Specifics

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

Date of Test: 12/3/2003 Config. Used: 1
Test Engineer: Marissa Faustino Config Change: None
Test Location: SVOATS #4 Host Unit Voltage 120V/60Hz

General Test Configuration

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

For radiated emissions testing the measurement antenna was located 1 meter from the EUT and extrapolated to 3 meters when the 103Mhz offset spurs were measured. For all other measurements, the measurement antenna was 3 meters from the EUT.

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 used.

Ambient Conditions:

Temperature: 9 °C
Rel. Humidity: 77 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a-1c	RE, Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	Refer to individual runs

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.

EUT running with CRTU tool version 2.2.7.3000

Channel	Freq. (MHz)	Mode	Rate	BW (MHz)	Gain (Main)	Pout (dBm)	Band Edge Delta P, A		Comment
							Peak	Average	
1	**2412**	**G**	6	16.5	24	15.7			
6	**2437**	**G**	6	16.7	24.5	15.8			
11	**2462**	**G**	6	16.6	24.5	15.7			

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1a: Radiated Spurious Emissions. Low Channel @ 2412 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2312.035	53.3	V	54.0	-0.8	AVG	257	1.0	103 Mhz offset, note 3
2312.065	51.4	H	54.0	-2.6	AVG	239	1.0	103 Mhz offset, note 3
2390.000	49.3	V	54.0	-4.7	AVG	289	1.0	#1 Band Edge, note 2
2390.000	48.5	H	54.0	-5.5	AVG	152	1.0	#1 Band Edge, note 2
14470.95	44.9	H	54.0	-9.2	AVG	260	1.0	
14471.71	44.5	V	54.0	-9.5	AVG	85	1.0	
12058.74	42.5	H	54.0	-11.5	AVG	360	1.0	
2390.000	61.9	V	74.0	-12.1	PK	289	1.0	#1 Band Edge, note 2
12061.49	41.9	V	54.0	-12.1	AVG	29	1.0	
2312.035	60.1	V	74.0	-14.0	PK	257	1.0	103 Mhz offset, note 3
2390.000	59.9	H	74.0	-14.1	PK	152	1.0	#1 Band Edge, note 2
2312.065	58.6	H	74.0	-15.5	PK	239	1.0	103 Mhz offset, note 3
4822.740	37.0	H	54.0	-17.0	AVG	312	1.0	
14470.95	56.2	H	74.0	-17.8	PK	260	1.0	
4823.620	36.1	V	54.0	-17.9	AVG	0	1.0	
14471.71	55.5	V	74.0	-18.6	PK	85	1.0	
12061.49	53.2	V	74.0	-20.8	PK	29	1.0	
12058.74	53.1	H	74.0	-20.9	PK	360	1.0	
4822.740	48.6	H	74.0	-25.4	PK	312	1.0	
4823.620	48.5	V	74.0	-25.5	PK	0	1.0	

Note 1:	The measurement antenna was placed less than 10cm from the EUT to "sniff" for signals from 18-26.5 GHz. No significant emissions were found.
Note 2:	Band edge measurements for 802.11G mode were performed by maximizing the field "LEVEL" at 2390 MHz and 2483.5 MHz at 3m and recording both Peak and Average levels.
Note 3:	Tested 103MHz Offset at 1meter (Used 1 to 3 meter extrapolation)

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: Radiated Spurious Emissions. Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2336.035	53.2	V	54.0	-0.8	AVG	261	1.0	103MHz offset, note 3
2335.970	50.9	H	54.0	-3.1	AVG	40	1.0	103MHz offset, note 3
14623.14	44.5	H	54.0	-9.5	AVG	126	1.0	
14620.97	43.9	V	54.0	-10.1	AVG	359	1.6	
12183.64	41.2	H	54.0	-12.8	AVG	321	1.0	
2336.035	60.4	V	74.0	-13.7	PK	261	1.0	103MHz offset, note 3
12183.84	40.2	V	54.0	-13.8	AVG	108	1.0	
2335.970	60.2	H	74.0	-13.8	PK	40	1.0	103MHz offset, note 3
7311.105	37.4	H	54.0	-16.6	AVG	262	1.0	3x #6 Fundamental
7310.43	36.7	V	54.0	-17.3	AVG	313	1.0	3x #6 Fundamental
4872.715	36.3	H	54.0	-17.7	AVG	0	1.0	2x #6 Fundamental
14620.97	56.3	V	74.0	-17.7	PK	359	1.6	
14623.14	55.9	H	74.0	-18.1	PK	126	1.0	
4874.33	35.5	V	54.0	-18.5	AVG	362	1.0	2x #6 Fundamental
12183.64	52.1	H	74.0	-21.9	PK	321	1.0	
12183.84	51.8	V	74.0	-22.2	PK	108	1.0	
7310.43	48.7	V	74.0	-25.3	PK	313	1.0	3x #6 Fundamental
7311.105	48.3	H	74.0	-25.7	PK	262	1.0	3x #6 Fundamental
4872.715	47.4	H	74.0	-26.6	PK	0	1.0	2x #6 Fundamental
4874.33	46.5	V	74.0	-27.5	PK	362	1.0	2x #6 Fundamental

Note 1:	The measurement antenna was placed less than 10cm from the EUT to "sniff" for signals from 18-26.5 GHz. No significant emissions were found.
Note 2:	Band edge measurements for 802.11G mode were performed by maximizing the field "LEVEL" at 2390 MHz and 2483.5 MHz at 3m and recording both Peak and Average levels.
Note 3:	Tested 103MHz Offset at 1meter (Used 1 to 3 meter extrapolation)

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g with Hitachi Antenna	T-Log Number:	T53629
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1c: Radiated Spurious Emissions. High Channel @ 2462 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	52.0	V	54.0	-2.0	AVG	305	1.0	#11 Band Edge
2483.500	65.3	V	74.0	-8.8	PK	305	1.0	#11 Band Edge
2483.500	52.8	H	54.0	-1.2	AVG	310	1.0	#11 Band Edge
2483.500	66.8	H	74.0	-7.2	PK	310	1.0	#11 Band Edge
2358.695	49.4	V	54.0	-4.6	AVG	263	1.0	103MHz offset
2358.695	58.5	V	74.0	-15.5	PK	263	1.0	103MHz offset
2358.665	47.5	H	54.0	-6.5	AVG	43	1.0	103MHz offset
2358.665	57.4	H	74.0	-16.6	PK	43	1.0	103MHz offset
4925.150	35.1	V	54.0	-18.9	AVG	219	1.0	2x #11 Fundamental
4925.150	46.6	V	74.0	-27.5	PK	219	1.0	2x #11 Fundamental
7384.640	36.6	V	54.0	-17.5	AVG	231	1.0	3x #11 Fundamental
7384.640	48.4	V	74.0	-25.7	PK	231	1.0	3x #11 Fundamental
12308.92	39.1	V	54.0	-14.9	AVG	361	1.0	
12308.92	49.7	V	74.0	-24.4	PK	361	1.0	
4924.375	35.0	H	54.0	-19.0	AVG	0	1.0	2x #11 Fundamental
4924.375	46.6	H	74.0	-27.5	PK	0	1.0	2x #11 Fundamental
7386.030	36.9	H	54.0	-17.1	AVG	361	1.0	3x #11 Fundamental
7386.030	48.4	H	74.0	-25.6	PK	361	1.0	3x #11 Fundamental
12309.26	38.9	H	54.0	-15.1	AVG	312	1.0	
12309.26	50.4	H	74.0	-23.6	PK	312	1.0	

Note 1:	The measurement antenna was placed less than 10cm from the EUT to "sniff" for signals from 18-26.5 GHz. No significant emissions were found.
Note 2:	Band edge measurements for 802.11G mode were performed by maximizing the field "LEVEL" at 2390 MHz and 2483.5 MHz at 3m and recording both Peak and Average levels.
Note 3:	Tested 103MHz Offset at 1meter (Used 1 to 3 meter extrapolation)

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Emissions Spec:	FCC 15.247 / RSS 210	Class:	Radio
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Intel Corporation

Model

WM3B2200 b/g w/ New Antennas

Date of Last Test: 12/5/2003

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Emissions Spec:	FCC 15.247 / RSS 210	Class:	Radio
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a wireless 802.11 B/G card which is designed to provided wireless network capabilties. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end-user environment. EUT is powered by the host pc.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Intel	WM3B2200BG	Mini PCI	N/A	PD9WM3B2200BG
Yokowo	YCE-5008	antenna# 1(2.08dBi)	N/A	N/A
Nissei Electric	Reversed-F	antenna# 2 (1.5dBi)	N/A	N/A

EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer.

Modification History

Mod. #	Test	Date	Modification
1			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Emissions Spec:	FCC 15.247 / RSS 210	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	3820	Printer	CN2451D1YS	DoC
Netgear	EN104	Hub	N/A	DoC

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
none				

Interface Cabling and Ports

		Cable(s)		
Port	Connected To	Description	Shielded or Unshielded	Length(m)
RJ 45	Laptop	Cat 5	Unshielded	1
USB	Laptop	Multiwire	Shielded	1

Note: The other ports were not connected as the minimum configuration does not required them.

EUT Operation During Emissions(Radio)

The EUT continuously transmitted on a specific channel during testing

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Radiated Emissions

Test Specifics

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

Date of Test: 12/5/2003
Test Engineer: Marissa Faustino
Test Location: SVOATS #4

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

General Test Configuration

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

For radiated emissions testing the measurement antenna was located 1 meter from the EUT and extrapolated to 3 meters when the 103Mhz offset spurs were measured. For all other measurements, the measurement antenna was 3 meters from the EUT.

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 used.

Ambient Conditions:

Temperature: 8 °C
Rel. Humidity: 93 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a-1c	RE, Spurious Emissions	FCC Part 15.209 / 15.247(c)	Eval	Refer to individual runs

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.

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1a: Radiated Spurious Emissions. Low Channel @ 2412 MHz
Analyzer method was used for measuring the Output Power for all channels tested
Used latest Tool with 90% Duty Cycle (12/3/03), Tested with Antenna #1
Bandedge at 2390 MHz and 2483.5 MHz restricted frequency field strenght "LEVEL" was measured at 3 meter distance.
Peak and Average readings were taken.
103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

						6-dB BW			
Channel	**Freq.**	Mode	Rate	BW (MHz)	Gain	Pout	Band Edge Delta P, A		Comment
	(MHz)				(Main)	(dBm)	Peak	Average	
1	**2412**	**G**	6	16.6	24	15.7			6-dB
6	**2437**	**G**	6	16.6	24.5	15.8			6-dB
11	**2462**	**G**	6	16.6	24.5	15.7			6-dB

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.8	H	54.0	-0.2	AVG	73	1.0	#1 Band Edge
2312.020	53.1	H	54.0	-0.9	AVG	77	1.0	103MHz offset
2390.000	52.0	V	54.0	-2.0	AVG	108	1.0	#1 Band Edge
2312.095	50.3	V	54.0	-3.7	AVG	113	1.0	103MHz offset
2390.000	67.3	H	74.0	-6.7	PK	73	1.0	#1 Band Edge
2390.000	65.1	V	74.0	-9.0	PK	108	1.0	#1 Band Edge
14471.74	44.1	H	54.0	-9.9	AVG	26	1.0	
14473.18	44.1	V	54.0	-10.0	AVG	286	2.0	
12059.53	41.4	H	54.0	-12.6	AVG	279	2.0	
12059.80	41.2	V	54.0	-12.8	AVG	158	1.0	
2312.020	58.4	H	74.0	-15.6	PK	77	1.0	103MHz offset
2312.095	55.5	V	74.0	-18.5	PK	113	1.0	103MHz offset
4823.595	35.4	V	54.0	-18.6	AVG	84	2.0	
14471.74	55.4	H	74.0	-18.6	PK	26	1.0	
4824.440	35.4	H	54.0	-18.7	AVG	0	1.0	
14473.18	55.3	V	74.0	-18.7	PK	286	2.0	
12059.80	52.7	V	74.0	-21.4	PK	158	1.0	
12059.53	52.3	H	74.0	-21.7	PK	279	2.0	
4824.440	47.1	H	74.0	-27.0	PK	0	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: Radiated Spurious Emissions. Center Channel @ 2437 MHz
Analyzer method was used for measuring the Output Power for all channels tested
Used latest Tool with 90% Duty Cycle (12/3/03), Tested with Antenna #1
Bandedge at 2390 MHz and 2483.5 MHz restricted frequency field strenght "LEVEL" was measured at 3 meter distance.
Peak and Average readings were taken.
103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
14622.73	44.2	H	54.0	-9.8	AVG	245	1.0	
14621.80	43.6	V	54.0	-10.4	AVG	362	1.0	
12184.58	40.4	H	54.0	-13.6	AVG	54	1.0	
12184.67	40.2	V	54.0	-13.8	AVG	139	1.1	
2337.01	39.3	V	54.0	-14.7	AVG	90	1.0	103MHz offset
2336.06	39.0	H	54.0	-15.1	AVG	90	1.0	103MHz offset
7311.92	36.4	H	54.0	-17.6	AVG	88	1.0	3x #6 Fundamental
7309.880	36.4	V	54.0	-17.6	AVG	-1	1.0	3x #6 Fundamental
4872.65	36.0	H	54.0	-18.0	AVG	278	1.0	2x #6 Fundamental
14621.80	55.4	V	74.0	-18.6	PK	362	1.0	
4873.220	35.1	V	54.0	-18.9	AVG	91	1.0	2x #6 Fundamental
14622.73	55.1	H	74.0	-18.9	PK	245	1.0	
12184.58	52.3	H	74.0	-21.7	PK	54	1.0	
12184.67	51.1	V	74.0	-22.9	PK	139	1.1	
2337.01	50.3	V	74.0	-23.7	PK	90	1.0	103MHz offset
2336.06	50.0	H	74.0	-24.1	PK	90	1.0	103MHz offset
7311.92	47.7	H	74.0	-26.3	PK	88	1.0	3x #6 Fundamental
7309.880	47.6	V	74.0	-26.4	PK	-1	1.0	3x #6 Fundamental
4872.65	47.5	H	74.0	-26.5	PK	278	1.0	2x #6 Fundamental
4873.220	45.9	V	74.0	-28.1	PK	91	1.0	2x #6 Fundamental

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1c: Radiated Spurious Emissions. High Channel @ 2462 MHz
Analyzer method was used for measuring the Output Power for all channels tested
Used latest Tool with 90% Duty Cycle (12/3/03), Tested with Antenna #1
Bandedge at 2390 MHz and 2483.5 MHz restricted frequency field strenght "LEVEL" was measured at 3 meter distance.
Peak and Average readings were taken.
103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.50	53.5	V	54.0	-0.5	AVG	96	1.0	#11 Band Edge
2483.50	52.3	H	54.0	-1.7	AVG	115	1.0	#11 Band Edge
2360.52	51.5	H	54.0	-2.5	AVG	71	1.0	103MHz offset
2360.55	48.7	V	54.0	-5.3	AVG	108	1.0	103MHz offset
2483.50	68.2	V	74.0	-5.8	PK	96	1.0	#11 Band Edge
2483.50	66.2	H	74.0	-7.8	PK	115	1.0	#11 Band Edge
4924.620	43.6	V	54.0	-10.4	Pk	180	1.0	2x #11 Fundamental
12308.90	40.0	H	54.0	-14.0	AVG	180	1.0	
12308.87	39.3	V	54.0	-14.7	AVG	187	1.0	
7387.410	37.4	H	54.0	-16.6	AVG	172	1.0	3x #11 Fundamental
7386.780	37.0	V	54.0	-17.0	AVG	179	1.0	3x #11 Fundamental
2360.52	56.7	H	74.0	-17.3	PK	71	1.0	103MHz offset
4923.225	36.3	H	54.0	-17.7	AVG	88	1.0	2x #11 Fundamental
4924.180	36.1	V	54.0	-17.9	AVG	179	1.0	2x #11 Fundamental
2360.55	55.1	V	74.0	-18.9	PK	108	1.0	103MHz offset
12308.90	50.6	H	74.0	-23.4	PK	180	1.0	
12308.87	50.5	V	74.0	-23.5	PK	187	1.0	
7387.410	49.1	H	74.0	-24.9	PK	172	1.0	3x #11 Fundamental
7386.780	48.7	V	74.0	-25.3	PK	179	1.0	3x #11 Fundamental
4923.225	48.4	H	74.0	-25.6	PK	88	1.0	2x #11 Fundamental
4924.180	46.8	V	74.0	-27.2	PK	179	1.0	2x #11 Fundamental
7384.610	44.1	V	74.0	-29.9	Pk	180	1.0	3x #11 Fundamental

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Radiated Emissions

Test Specifics

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

Date of Test: 12/5/2003
Test Engineer: Marissa Faustino
Test Location: SVOATS #4

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

General Test Configuration

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

For radiated emissions testing the measurement antenna was located 1 meter from the EUT and extrapolated to 3 meters when the 103Mhz offset spurs were measured. For all other measurements, the measurement antenna was 3 meters from the EUT.

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 used.

Ambient Conditions:

Temperature: 8 °C
Rel. Humidity: 93 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
	RE, Spurious Emissions	FCC Part 15.209 / 15.247(c)	Eval	Refer to individual runs

Modifications Made During Testing:

No modifications were made to the EUT during testing

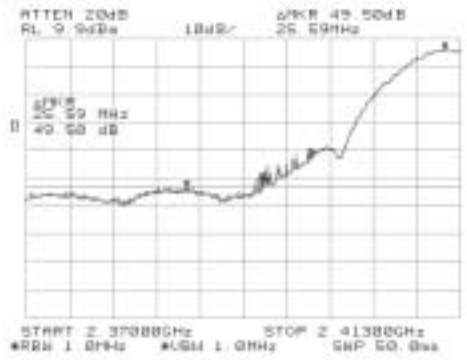
Deviations From The Standard

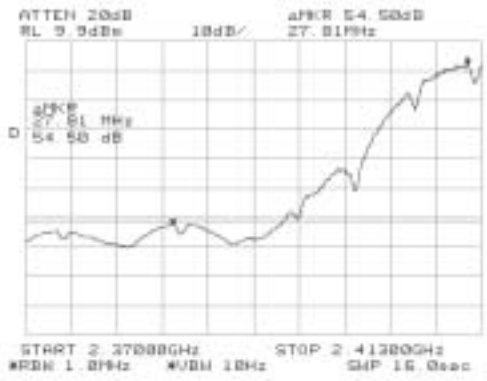
No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1a: Radiated Spurious Emissions. Low Channel @ 2412 MHz
Power meter was used for measuring the Output Power for all channels tested
Used latest Tool with 90% Duty Cycle (12/3/03), tested with Antenna #1

Channel	Freq. (MHz)	Mode	Rate		Gain (Main)	Pout (dBm)	Band Edge Delta P, A Peak	Band Edge Delta P, A Average	Comment
1	2412	B	1		28.5	16.8			
6	2437	B	1		29	17.1			
11	2462	B	1		29	17.2			





	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	109.7	106.8	Peak Measurement (RBW=VBW = 1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	106.6	103.9	Average Measurement (RBW=VBW = 10Hz)
Delta Marker - Peak-Conducted Method	49.5 dB		
Delta Marker - Average-Conducted Method	54.5 dB		
Calculated Band-Edge Measurement:	60.2 dBuV/m		Peak Measurement (RBW=VBW = 1MHz)
Calculated Band-Edge Measurement:	52.1 dBuV/m		Average Measurement (RBW=VBW = 10Hz)

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1a: Continued

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2311.950	48.8	H	54.0	-5.3	AVG	78	1.0	103MHz offset, Note 2
12059.435	47.0	V	54.0	-7.0	AVG	354	1.4	
2311.905	46.5	V	54.0	-7.5	AVG	111	1.0	103MHz offset, Note 2
14472.195	44.0	H	54.0	-10.0	AVG	1	1.0	
14472.180	43.9	V	54.0	-10.2	AVG	248	1.1	
12058.725	42.0	H	54.0	-12.0	AVG	106	1.0	
4824.015	39.3	V	54.0	-14.7	AVG	13	1.6	
4823.965	37.6	H	54.0	-16.4	AVG	318	1.3	
14472.195	55.6	H	74.0	-18.4	PK	1	1.0	
12059.435	55.6	V	74.0	-18.4	PK	354	1.4	
14472.180	55.2	V	74.0	-18.8	PK	248	1.1	
2311.950	54.9	H	74.0	-19.1	PK	78	1.0	103MHz offset, Note 2
2311.905	54.2	V	74.0	-19.8	PK	111	1.0	103MHz offset, Note 2
12058.725	52.9	H	74.0	-21.1	PK	106	1.0	
4824.015	48.3	V	74.0	-25.7	PK	13	1.6	
4823.965	47.6	H	74.0	-26.4	PK	318	1.3	
2411.505	106.6	H			AVG	66	1.0	#1 Fundamental
2411.505	109.7	H			PK	66	1.0	#1 Fundamental
2411.530	103.9	V			AVG	105	1.9	#1 Fundamental
2411.530	106.8	V			PK	105	1.9	#1 Fundamental

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.
Note 2:	103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

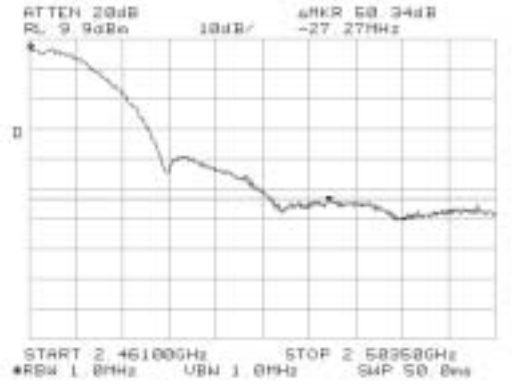
Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

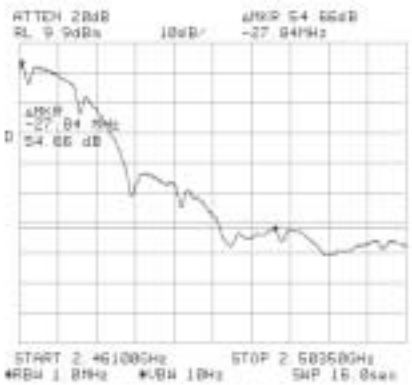
Run #1b: Radiated Spurious Emissions. Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
14623.470	44.0	V	54.0	-10.0	AVG	104	1.0	
14622.915	43.9	H	54.0	-10.1	AVG	15	1.0	
12184.575	41.7	V	54.0	-12.4	AVG	339	1.0	
12185.175	40.5	H	54.0	-13.5	AVG	350	1.0	
2337.370	39.1	V	54.0	-14.9	AVG	90	1.0	103MHz offset
2337.185	38.9	H	54.0	-15.1	AVG	90	1.0	103MHz offset
7310.000	36.6	H	54.0	-17.4	AVG	-1	1.0	3x #6 Fundamental
7310.925	36.6	V	54.0	-17.4	AVG	34	1.0	3x #6 Fundamental
4875.270	36.2	H	54.0	-17.8	AVG	128	1.0	2x #6 Fundamental
4872.515	35.8	V	54.0	-18.2	AVG	360	1.0	2x #6 Fundamental
14622.915	55.7	H	74.0	-18.3	PK	15	1.0	
14623.470	55.3	V	74.0	-18.7	PK	104	1.0	
12184.575	52.6	V	74.0	-21.4	PK	339	1.0	
12185.175	51.1	H	74.0	-22.9	PK	350	1.0	
2337.185	50.4	H	74.0	-23.6	PK	90	1.0	103MHz offset
2337.370	50.3	V	74.0	-23.7	PK	90	1.0	103MHz offset
4875.270	47.8	H	74.0	-26.2	PK	128	1.0	2x #6 Fundamental
4872.515	47.8	V	74.0	-26.2	PK	360	1.0	2x #6 Fundamental
7310.925	47.5	V	74.0	-26.6	PK	34	1.0	3x #6 Fundamental
7310.000	47.2	H	74.0	-26.8	PK	-1	1.0	3x #6 Fundamental

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

Run #1c: Radiated Spurious Emissions. High Channel @ 2462 MHz





Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1c: Continued

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	110.4	107.1	Peak Measurement (RBW=VBW = 1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	107.3	104	Average Measurement (RBW=VBW = 10Hz)
Delta Marker - Peak	50.34 dB		
Delta Marker - Average	54.66 dB		
Calculated Band-Edge Measurement:	60.06 dBuV/m		Peak Measurement (RBW=VBW = 1MHz)
Calculated Band-Edge Measurement:	52.64 dBuV/m		Average Measurement (RBW=VBW = 10Hz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2361.465	45.3	V	54.0	-8.7	AVG	112	1.0	103MHz offset
2360.570	44.8	H	54.0	-9.2	AVG	91	1.0	103MHz offset
12310.645	39.5	H	54.0	-14.6	AVG	106	1.0	
4923.935	38.1	H	54.0	-15.9	AVG	268	1.2	2x #11 Fundamental
7386.505	37.2	H	54.0	-16.8	AVG	360	1.0	3x #11 Fundamental
4922.745	37.0	V	54.0	-17.1	AVG	110	1.0	2x #11 Fundamental
7385.815	36.5	V	54.0	-17.5	AVG	294	1.0	3x #11 Fundamental
2361.465	53.1	V	74.0	-20.9	PK	112	1.0	103MHz offset
2360.570	52.4	H	74.0	-21.6	PK	91	1.0	103MHz offset
12308.915	51.8	V	74.0	-22.2	PK	358	1.3	
12310.645	51.0	H	74.0	-23.0	PK	106	1.0	
7386.505	49.8	H	74.0	-24.2	PK	360	1.0	3x #11 Fundamental
4923.935	48.4	H	74.0	-25.6	PK	268	1.2	2x #11 Fundamental
7385.815	48.0	V	74.0	-26.0	PK	294	1.0	3x #11 Fundamental
4922.745	47.7	V	74.0	-26.3	PK	110	1.0	2x #11 Fundamental
12308.915	42.4	V	74.0	-31.6	AVG	358	1.3	
2461.485	107.3	H			AVG	67	1.0	#11 Fundamental
2461.485	110.4	H			PK	67	1.0	#11 Fundamental
2461.075	104.0	V			AVG	104	1.0	#11 Fundamental
2461.075	107.1	V			PK	104	1.0	#11 Fundamental

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Radiated Emissions

Test Specifics

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

Date of Test: 12/3/2003
Test Engineer: Rafael Varelas
Test Location: SVOATS #4

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

General Test Configuration

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

For radiated emissions testing the measurement antenna was located 1 meter from the EUT and extrapolated to 3 meters when the 103Mhz offset spurs were measured. For all other measurements, the measurement antenna was 3 meters from the EUT.

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 used.

Ambient Conditions:

Temperature: 8 °C
Rel. Humidity: 93 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a-1c	RE, Spurious Emissions	FCC Part 15.209 / 15.247(c)	Eval	Refer to individual runs

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.

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1a: Radiated Spurious Emissions. Low Channel @ 2412 MHz

Analyzer method was used for measuring the Output Power for all channels tested

Used latest Tool with 90% Duty Cycle (12/3/03), Tested with Antenna #2

Bandedge at 2390 MHz and 2483.5 MHz restricted frequency field strenght "LEVEL" was measured at 3 meter distance. Peak and Average readings were taken.

103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

Power was measured with the spectrum analyzer channel power integration

						6-dB BW			
Channel	**Freq.**				Gain	Pout	Band Edge Delta P, A		Comment
	(MHz)	Mode	Rate	BW (MHz)	(Main)	(dBm)	Peak	Average	
1	**2412**	**G**	6	16.6	24	16.3			6-dB
6	**2437**	**G**	6	16.6	24.5	16.8			6-dB
11	**2462**	**G**	6	16.5	24	15.8			6-dB

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	50.8	V	54.0	-3.2	AVG	12	1.0	#1 Bandedge
2390.000	62.9	V	74.0	-11.1	PK	12	1.0	#1 Bandedge
2390.000	51.9	H	54.0	-2.2	AVG	61	1.0	#1 Bandedge
2390.000	64.4	H	74.0	-9.6	PK	61	1.0	#1 Bandedge
2312.025	48.2	V	54.0	-5.8	AVG	123	1.0	103MHz Offset Spur
2312.025	54.2	V	74.0	-19.8	PK	123	1.0	103MHz Offset Spur
2312.045	50.1	H	54.0	-3.9	AVG	143	1.0	103MHz Offset Spur
2312.045	55.3	H	74.0	-18.7	PK	143	1.0	103MHz Offset Spur
9648.075	58.1	H	Note 1		PK	345	1.1	#1 4th harmonic-Unrestricted
6432.010	53.9	H	Note 1		PK	138	1.0	#1 Unrestricted Spur
9648.015	58.4	V	Note 1		PK	62	1.0	#1 4th harmonic-Unrestricted
6432.020	56.3	V	Note 1		PK	165	1.0	#1 Unrestricted Spur

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1b: Radiated Spurious Emissions. Center Channel @ 2437 MHz
103 MHz offsets were measured at 1 meter and extrapolated to 3 meters
Power was measured with the spectrum analyzer channel power integration

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2336.100	49.8	H	54.0	-4.3	AVG	71	1.0	103MHz Offset Spur
2336.100	54.9	H	74.0	-19.1	PK	71	1.0	103MHz Offset Spur
2336.020	48.0	V	54.0	-6.0	AVG	121	1.0	103MHz Offset Spur
2336.020	54.0	V	74.0	-20.0	PK	121	1.0	103MHz Offset Spur
9747.980	57.0	H	Note 1		PK	344	1.0	#6 4th harmonic-Unrestricted
9748.005	57.9	V	Note 1		PK	58	1.0	#6 4th harmonic-Unrestricted

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Run #1c: Radiated Spurious Emissions. High Channel @ 2462 MHz
Bandedge at 2390 MHz and 2483.5 MHz restricted frequency field strenght "LEVEL" was measured at 3 meter distance.
Peak and Average readings were taken.
103 MHz offsets were measured at 1 meter and extrapolated to 3 meters
Power was measured with the spectrum analyzer channel power integration

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.9	H	54.0	-0.1	AVG	303	1.0	#11 Band Edge
2483.500	68.2	H	74.0	-5.8	PK	303	1.0	#11 Band Edge
2483.500	52.0	V	54.0	-2.0	AVG	215	1.0	#11 Band Edge
2483.500	65.4	V	74.0	-8.6	PK	215	1.0	#11 Band Edge
2360.005	45.9	V	54.0	-8.1	AVG	119	1.0	103MHz Offset Spur
2360.005	52.3	V	74.0	-21.7	PK	119	1.0	103MHz Offset Spur
2360.060	48.7	H	54.0	-5.3	AVG	143	1.0	103MHz Offset Spur
2360.060	54.6	H	74.0	-19.4	PK	143	1.0	103MHz Offset Spur
9848.015	55.3	H	Note 1		PK	357	1.0	#11 4th harmonic-Unrestricted
6565.433	53.3	H	Note 1		PK	70	1.0	#11 Unrestricted Spur
9848.045	57.7	V	Note 1		PK	57	1.0	#11 4th harmonic-Unrestricted
6565.335	56.9	V	Note 1		PK	160	1.0	#11 Unrestricted Spur

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Radiated Emissions

Test Specifics

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

Date of Test: 12/3/2003
Test Engineer: Rafael Varelas
Test Location: SVOATS #4
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

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

For radiated emissions testing the measurement antenna was located 1 meter from the EUT and extrapolated to 3 meters when the 103Mhz offset spurs were measured. For all other measurements, the measurement antenna was 3 meters from the EUT.

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 used.

Ambient Conditions:

Temperature: 8 °C
Rel. Humidity: 93 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a-1c	RE, Spurious Emissions	FCC Part 15.209 / 15.247(c)	Eval	Refer to individual runs

Modifications Made During Testing:

No modifications were made to the EUT during testing

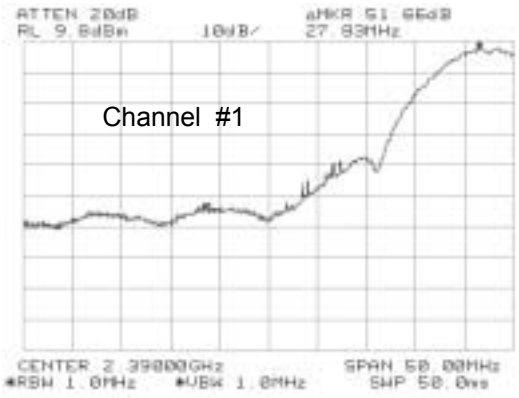
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1a: Radiated Spurious Emissions. Low Channel @ 2412 MHz
Analyzer method was used for measuring the Output Power for all channels tested
Used latest Tool with 90% Duty Cycle (12/3/03), tested with Antenna #2

						6-dB BW			
Channel	**Freq.**	Mode	Rate	BW (MHz)	Gain	Pout	Band Edge Delta P, A		Comment
	(MHz)				(Main)	(dBm)	Peak	Average	
1	**2412**	**B**	1	9.35	28.5	17.4	51.66	54.5	6-dB
6	**2437**	**B**	1	9.35	29	17.6			6-dB
11	**2462**	**B**	1	9.35	29	17.6	50.83	55.33	6-dB



	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	105.4	103.4	Peak Measurement (RBW=VBW = 1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	102.4	100.5	Average Measurement (RBW=VBW = 10Hz)
Delta Marker - Peak-Conducted Method	51.666 dB		
Delta Marker - Average-Conducted Method	54.5 dB		
Calculated Band-Edge Measurement:	53.7 dBuV/m		Peak Measurement (RBW=VBW = 1MHz)
Calculated Band-Edge Measurement:	47.9 dBuV/m		Average Measurement (RBW=VBW = 10Hz)

Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1a: Continued

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2411.233	100.5	V	-	-	AVG	113	1.0	#1 Fundamental
2411.233	103.4	V	-	-	PK	113	1.0	#1 Fundamental
2411.200	102.4	H	-	-	AVG	63	1.0	#1 Fundamental
2411.200	105.4	H	-	-	PK	63	1.0	#1 Fundamental
2312.015	46.3	H	54.0	-7.7	AVG	144	1.0	103MHz Offset Spur, Note 2
2312.015	53.2	H	74.0	-20.8	PK	144	1.0	103MHz Offset Spur, Note 2
2312.010	44.3	V	54.0	-9.7	AVG	122	1.0	103MHz Offset Spur, Note 2
2312.010	51.7	V	74.0	-22.4	PK	122	1.0	103MHz Offset Spur, Note 2
4824.005	43.8	V	54.0	-10.2	AVG	166	1.0	#1 2nd harmonic
4824.005	51.2	V	74.0	-22.8	PK	166	1.0	#1 2nd harmonic
9648.010	62.6	V	85.4	-22.8	PK	57	1.0	#1 4th harmonic-Unrestricted
12059.220	44.0	V	54.0	-10.0	AVG	0	1.0	#1 5th harmonic
12059.220	54.9	V	74.0	-19.1	PK	0	1.0	#1 5th harmonic
6432.005	57.5	V	85.4	-27.9	PK	163	1.0	#1 Unrestricted Spur
12864.065	57.5	V	85.4	-28.0	PK	145	1.0	#1 Unrestricted Spur
4823.945	40.3	H	54.0	-13.7	AVG	167	1.0	#1 2nd harmonic
4823.945	50.2	H	74.0	-23.8	PK	167	1.0	#1 2nd harmonic
9648.025	61.3	H	85.4	-24.1	PK	343	1.0	#1 4th harmonic-Unrestricted
12058.860	44.2	H	54.0	-9.8	AVG	54	1.0	#1 5th harmonic
12058.860	55.5	H	74.0	-18.5	PK	54	1.0	#1 5th harmonic
6432.060	53.5	H	85.4	-31.9	PK	121	1.0	#1 Unrestricted Spur
12863.965	56.5	H	85.4	-29.0	PK	305	1.0	#1 Unrestricted Spur

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.
Note 2:	103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

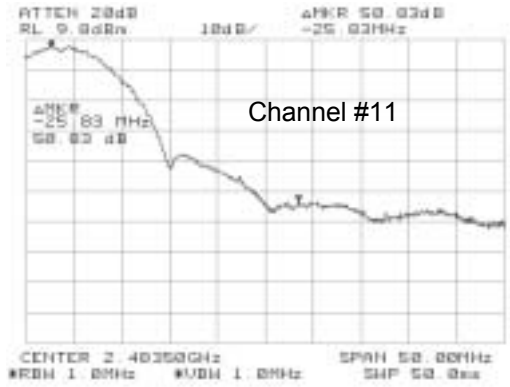
Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

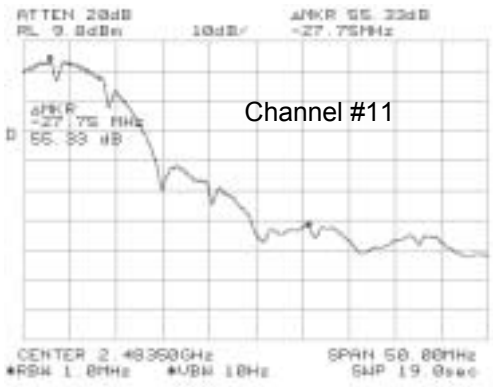
Run #1b: Radiated Spurious Emissions. Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2336.030	44.2	V	54.0	-9.9	AVG	119	1.0	103MHz Offset Spur, Note 2
2336.030	52.1	V	74.0	-21.9	PK	119	1.0	103MHz Offset Spur, Note 2
2336.050	46.7	H	54.0	-7.4	AVG	141	1.0	103MHz Offset Spur, Note 2
2336.050	53.9	H	74.0	-20.1	PK	141	1.0	103MHz Offset Spur, Note 2
4874.045	40.4	H	54.0	-13.6	AVG	172	1.0	#6 2nd harmonic
4874.045	49.6	H	74.0	-24.4	PK	172	1.0	#6 2nd harmonic
9748.020	58.9	H	Note 1		PK	149	1.0	#6 4th harmonic-Unrestricted
12186.250	43.2	H	54.0	-10.8	AVG	49	1.0	#6 5th harmonic
12186.250	54.0	H	74.0	-20.0	PK	49	1.0	#6 5th harmonic
6498.700	52.6	H	Note 1		PK	144	1.0	#6 Unrestricted Spur
12997.375	56.5	H	Note 1		PK	123	1.1	#6 Unrestricted Spur
4874.105	43.4	V	54.0	-10.6	AVG	176	1.0	#6 2nd harmonic
4874.105	50.6	V	74.0	-23.4	PK	176	1.0	#6 2nd harmonic
9748.015	59.0	V	Note 1		PK	52	1.0	#6 4th harmonic-Unrestricted
12185.720	43.7	V	54.0	-10.4	AVG	176	1.0	#6 5th harmonic
12185.720	54.5	V	74.0	-19.5	PK	176	1.0	#6 5th harmonic
6498.670	56.9	V	Note 1		PK	152	1.0	#6 Unrestricted Spur
12997.420	57.7	V	Note 1		PK	147	1.0	#6 Unrestricted Spur

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	103 MHz offsets were measured at 1 meter and extrapolated to 3 meters

Run #1c: Radiated Spurious Emissions. High Channel @ 2462 MHz





Client:	Intel Corporation	Job Number:	J53523
Model:	WM3B2200 b/g w/ New Antennas	T-Log Number:	T53563
		Account Manager:	Christine Vu
Contact:	Jim Baer		
Spec:	FCC 15.247 / RSS 210	Class:	N/A

Run #1c: Continued

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	105.03	103.4	Peak Measurement (RBW=VBW = 1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	102.02	100.4	Average Measurement (RBW=VBW = 10Hz)
Delta Marker - Peak	50.83 dB		
Delta Marker - Average	55.33 dB		
Calculated Band-Edge Measurement:	54.2 dBuV/m		Peak Measurement (RBW=VBW = 1MHz)
Calculated Band-Edge Measurement:	46.69 dBuV/m		Average Measurement (RBW=VBW = 10Hz)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2461.200	102.0	H	-	-	AVG	60	1.0	#11 Fundamental
2461.200	105.0	H	-	-	PK	60	1.0	#11 Fundamental
2461.333	100.4	V	-	-	AVG	117	1.0	#11 Fundamental
2461.333	103.4	V	-	-	PK	117	1.0	#11 Fundamental
2360.035	43.6	H	54.0	-10.4	AVG	145	1.0	103MHz Offset Spur, Note 2
2360.035	51.7	H	74.0	-22.3	PK	145	1.0	103MHz Offset Spur, Note 2
2360.115	41.6	V	54.0	-12.4	AVG	123	1.0	103MHz Offset Spur, Note 2
2360.115	51.7	V	74.0	-22.3	PK	123	1.0	103MHz Offset Spur, Note 2
4924.035	37.1	H	54.0	-16.9	AVG	289	1.0	#11 2nd harmonic
4924.035	47.6	H	74.0	-26.5	PK	289	1.0	#11 2nd harmonic
6565.385	51.8	H	85.0	-33.2	PK	67	1.1	#11 Unrestricted Spur
9848.040	64.0	H	85.0	-21.0	PK	171	1.0	#11 4th harmonic-Unrestricted
13130.675	54.9	H	85.0	-30.1	PK	60	1.0	#11 Unrestricted Spur
12311.333	41.7	H	54.0	-12.3	AVG	51	1.1	#11 5th harmonic
12311.333	52.7	H	74.0	-21.3	PK	51	1.1	#11 5th harmonic
4923.990	41.2	V	54.0	-12.8	AVG	140	1.3	#11 2nd harmonic
4923.990	50.0	V	74.0	-24.0	PK	140	1.3	#11 2nd harmonic
9847.995	63.1	V	85.0	-21.9	PK	145	1.0	#11 4th harmonic-Unrestricted
12309.050	41.6	V	54.0	-12.4	AVG	74	1.0	#11 5th harmonic
12309.050	52.9	V	74.0	-21.1	PK	74	1.0	#11 5th harmonic
6565.365	57.0	V	85.0	-28.0	PK	161	1.0	#11 Unrestricted Spur
13130.695	56.2	V	85.0	-28.8	PK	199	1.0	#11 Unrestricted Spur

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	103 MHz offsets were measured at 1 meter and extrapolated to 3 meters