



**FCC CFR47 PART 15 SUBPART B
VERIFICATION TEST REPORT
DECLARATION OF CONFORMITY TEST REPORT**

FOR

802.11 a/b/g PCI EXPRESS CARD

MODEL NUMBER: WM3965ABG

FCC ID: PD9WM3965ABG

REPORT NUMBER: 06U10130-4

ISSUE DATE: APRIL 14, 2006

Prepared for
**INTEL CORPORATION
2111 N.E.25TH AVE.
HILLSBORO, OR 97124, USA**

Prepared by
**COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888**

NVLAP[®]
LAB CODE:200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	04/14/06	Initial Issue	D. Garcia

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: INTEL CORPORATION
2111 N.E. 25TH AVE.
HILLSBORO, OR 97124, USA

EUT DESCRIPTION: 802.11a/b/g PCI EXPRESS CARD

MODEL: WM3965ABG

SERIAL NUMBER: 000529096

DATE TESTED: MARCH 29 to APRIL 1, 2006

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART B	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



DAVID GARCIA
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES



THANH NGUYEN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

5. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	3/29/2007
RF Filter Section	HP	85420E	3705A00256	3/29/07
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	3/3/07
Preamplifier, 1 ~ 26.5 GHz	Agilent	8449B	3008A00561	10/3/07
Antenna, Horn 1 ~ 18 GHz	ETS	3117	29301	4/22/06
Antenna, Horn 18 ~ 26 GHz	ARA	MWH-1826/B	1049	9/12/06
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	8/30/06
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	8/30/06
EMI Test Receiver	R & S	ESHS 20	827129/006	6/3/06
AC Power Source, 10 kVA	ACS	AFC-10K-AFC-2	J1568	1/0/00
Peak / Average Power Sensor	Agilent	E9327A	US40440755	2/10/07
Peak Power Meter	Agilent	E4416A	GB41291160	2/9/07
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent	E4446A	US42510266	10/19/06

5.1. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing were CRTU rev. 4.0.22. KIRTLAND for b and g mode, GRTT version 1.1.1 for a mode.

The test utility software used during testing was CRTU.EXE and GRTT.EXE.

The EMI test software displayed H pattern scrolling on the monitor.

Pinging: Communication between the server and the test unit.

5.2. MODIFICATIONS

No modifications were made during testing.

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g wireless LAN transceiver Mini PCI type 3B card.

The radio module is manufactured by Intel Corporation.

6.2. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT & PERIPHERALS

Description	Manufacturer	Model	Serial Number	FCC ID
Desktop Computer	Intel	N/A	N/A	N/A
Mouse	HP	M042KC	30536213	DoC
Keyboard	HP	5183	BF32119779	E5XKB5183
Printer	EPSON	P630B	1F8E780728	BKMP630B
Modem	Hayes	4714US	A02247143261	BFJUSA-31719-M5-E
Monitor	NOKIA	920C	973	N/A

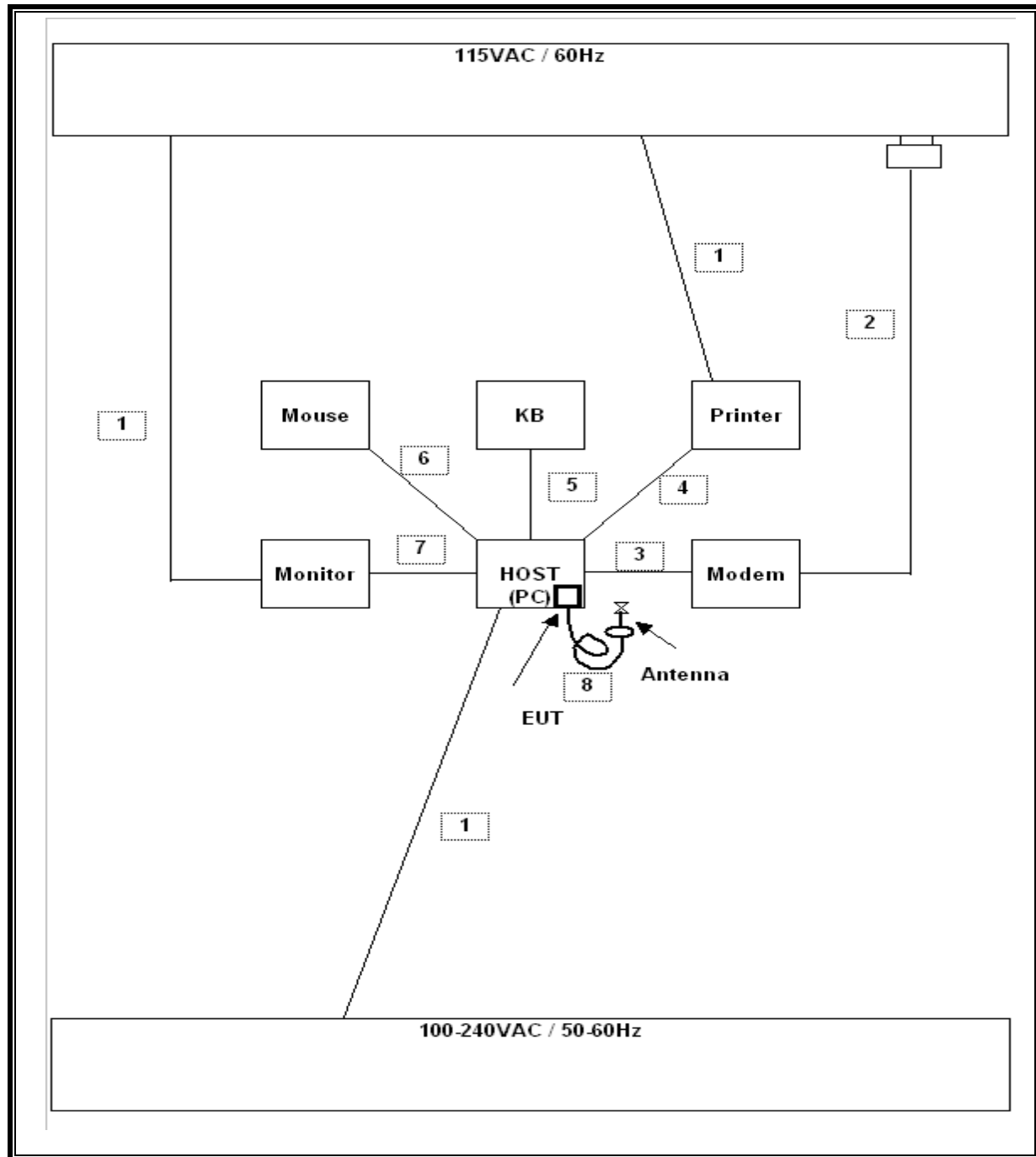
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US 115V	Un-shielded	2m	No
2	DC	1	DC Plug	Un-shielded	2m	No
3	Serial	1	DB9	Shielded	1m	Yes
4	Parallel	1	DB25	Shielded	2m	Yes
5	KB	1	PS/2	Shielded	2m	Yes
6	Mouse	1	PS/2	Un-shielded	2m	Yes
7	Video	1	DB15	Shielded	2m	Yes
8	Antenna	1	Antenna	Un-shielded	1m	Yes

TEST SETUP

The EUT is installed outside a host desktop computer via a PCI to PCI Express extension board during the tests. Test software exercised the radio card.

TEST SETUP DIAGRAM



7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated or used in the EUT is 3200 - 3800 MHz, therefore the frequency range was investigated from 30 MHz to 19 GHz.

LIMIT

§15.109 (g) As an alternative to the radiated emission limits shown in paragraphs (a) and (b) of this section, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment—Radio Disturbance Characteristics—Limits and Methods of Measurement" (incorporated by reference, see §15.38). In addition:

- (1) The test procedure and other requirements specified in this part shall continue to apply to digital devices.
- (2) If, in accordance with §15.33 of this part, measurements must be performed above 1000 MHz, compliance above 1000 MHz shall be demonstrated with the emission limit in paragraph (a) or (b) of this section, as appropriate. Measurements above 1000 MHz may be performed at the distance specified in the CISPR 22 publications for measurements below 1000 MHz provided the limits in paragraphs (a) and (b) of this section are extrapolated to the new measurement distance using an inverse linear distance extrapolation factor (20 dB/decade), e.g., the radiated limit above 1000 MHz for a Class B digital device is 150 uV/m, as measured at a distance of 10 meters.
- (3) The measurement distances shown in CISPR Pub. 22, including measurements made in accordance with this paragraph above 1000 MHz, are considered, for the purpose of §15.31(f)(4) of this part, to be the measurement distances specified in this part.
- (4) If the radiated emissions are measured to demonstrate compliance with the alternative standards in this paragraph, compliance must also be demonstrated with the conducted limits shown in §15.107(e).

Limits for radiated disturbance of Class B ITE at measuring distance of 10 m	
Frequency range (MHz)	Quasi-peak limits (dB μ V/m)
30 to 230	30
230 to 1000	37
Note: The lower limit shall apply at the transition frequency.	

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m		
Frequency range (MHz)	Peak limits (dB μ V/m)	Average limits (dB μ V/m)
Above 1000	74	54

RESULTS

No non-compliance noted:

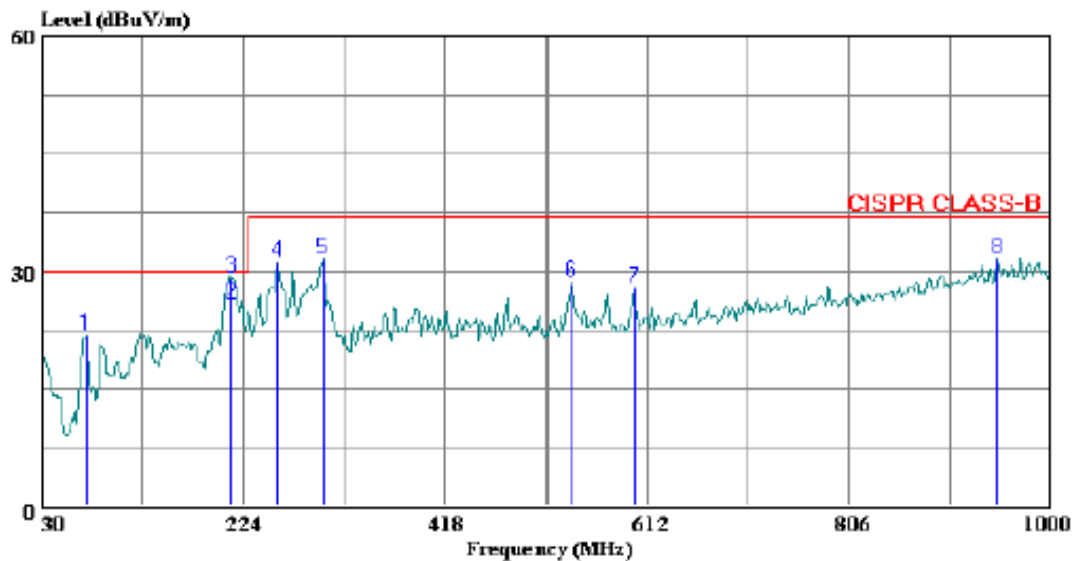
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 8 File#: EN22.EMI Date: 03-16-2006 Time: 11:37:02



(Auxiliary ATC)

Trace: 5

Ref Trace:

Condition: CISPR CLASS-B HORIZONTAL
Test Operator : Thanh Nguyen
Project # : 06U10130
Company : INTEL
EUT : 802.11 a/b/g Mini PCI type 3B card
Model No : KIRTLAND
Serial Number : 000547096
Configuration : EUT, PC, with the basic peripheral.
Mode of operation: Tx worst case, EMI software active.
Target of Test : EN55022 Class B, VCCI Class B

HORIZONTAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	72.680	12.51	9.23	21.74	30.00	-8.26	Peak
2	213.330	13.10	12.71	25.81	30.00	-4.19	QP
3	213.330	16.43	12.71	29.14	30.00	-0.86	Peak
4	256.980	16.86	14.21	31.07	37.00	-5.93	Peak
5	300.630	15.83	15.67	31.50	37.00	-5.50	Peak
6	538.280	7.86	20.70	28.56	37.00	-8.44	Peak
7	599.390	6.31	21.48	27.79	37.00	-9.21	Peak
8	948.590	5.12	26.45	31.57	37.00	-5.43	Peak

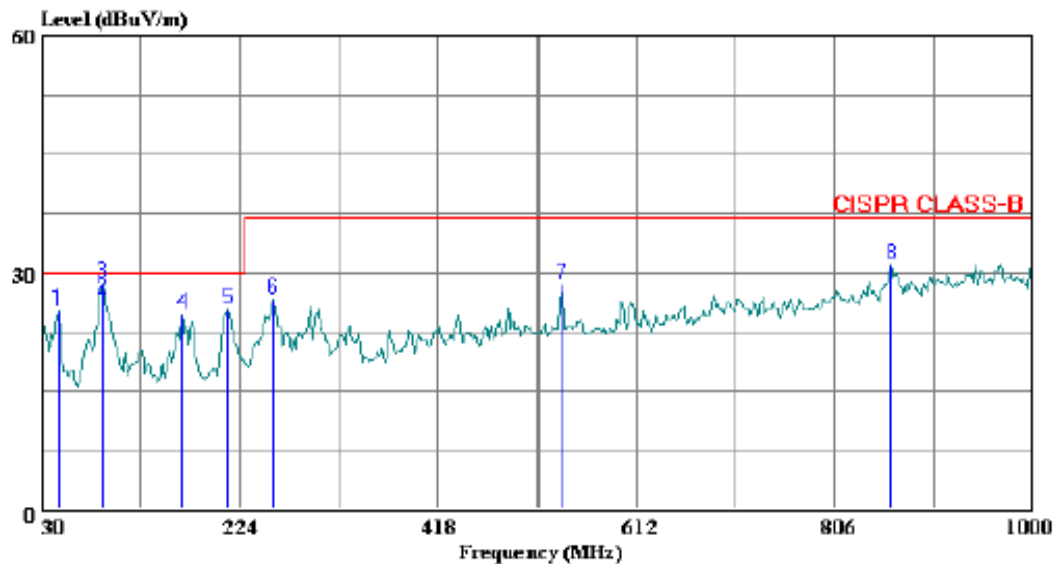
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 4 File#: EN22.EMI Date: 03-16-2006 Time: 11:13:10



(Auxiliary ATC)

Trace: 1

Ref Trace:

Condition: CISPR CLASS-B VERTICAL
Test Operator : Thanh Nguyen
Project # : 06U10130
Company : INTEL
EUT : 802.11 a/b/g Mini PCI type 3B card
Model No : KIRTLAND
Serial Number : 000547096
Configuration : EUT, PC, with the basic peripheral.
Mode of operation: Tx worst case, EMI software active.
Target of Test : EN55022 Class B, VCCI Class B

VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	46.490	13.44	11.79	25.23	30.00	-4.77	Peak
2	90.140	17.80	8.79	26.59	30.00	-3.41	QP
3	90.140	19.84	8.79	28.63	30.00	-1.37	Peak
4	167.740	11.11	13.51	24.62	30.00	-5.38	Peak
5	213.330	12.61	12.71	25.32	30.00	-4.68	Peak
6	256.980	12.43	14.21	26.64	37.00	-10.36	Peak
7	538.280	7.79	20.70	28.49	37.00	-8.51	Peak
8	861.290	5.64	25.38	31.02	37.00	-5.98	Peak

7.2. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.4

LIMIT

§15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Notes:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

RESULTS

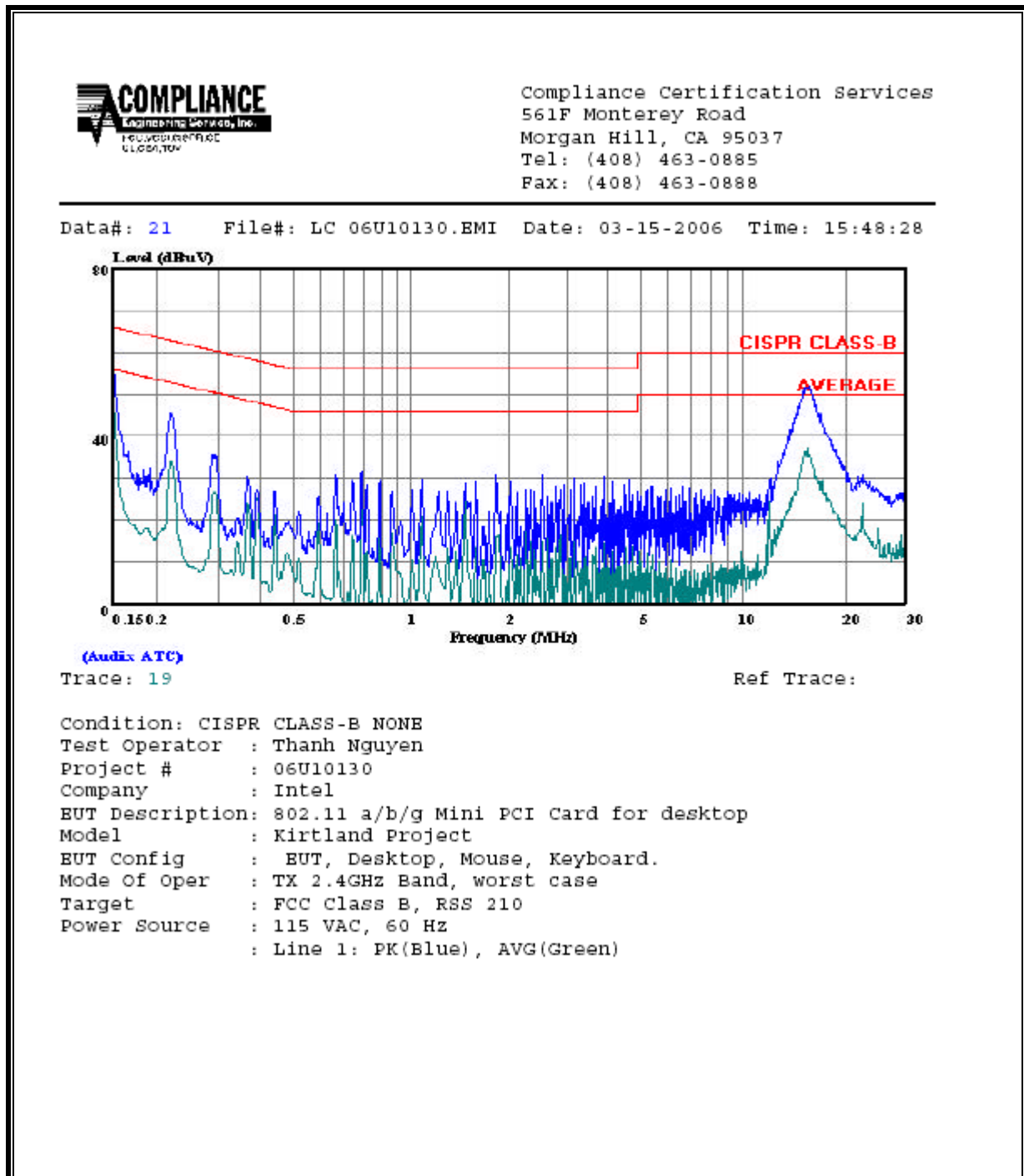
No non-compliance noted:

6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz) TX 2.4GHz									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	56.54	--	49.10	0.00	66.00	56.00	-9.46	-6.90	L1
0.22	45.30	--	33.84	0.00	62.74	52.74	-17.44	-18.90	L1
15.63	51.52	--	36.96	0.00	60.00	50.00	-8.48	-13.04	L1
0.15	59.44	--	51.36	0.00	66.00	56.00	-6.56	-4.64	L2
0.22	46.78	--	37.35	0.00	62.78	52.78	-16.00	-15.43	L2
15.55	50.74	--	36.93	0.00	60.00	50.00	-9.26	-13.07	L2
6 Worst Data									
CONDUCTED EMISSIONS DATA (115VAC 60Hz) TX 5GHz									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	59.44	--	51.36	0.00	66.00	56.00	-6.56	-4.64	L1
0.22	44.64	--	33.41	0.00	62.86	52.86	-18.22	-19.45	L1
15.47	51.86	--	36.37	0.00	60.00	50.00	-8.14	-13.63	L1
0.15	59.06	--	51.33	0.00	66.00	56.00	-6.94	-4.67	L2
0.22	46.96	--	37.35	0.00	62.78	52.78	-15.82	-15.43	L2
15.63	50.58	--	35.10	0.00	60.00	50.00	-9.42	-14.90	L2
6 Worst Data									

LINE 1 RESULTS

2.4GHz Band



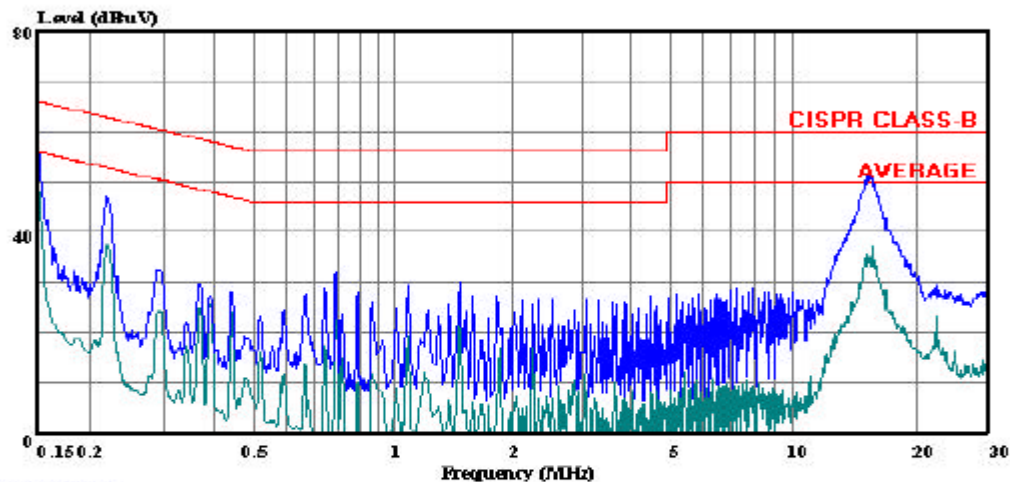
LINE 2 RESULTS

2.4GHz Band



Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 28 File#: LC 06U10130.EMI Date: 03-15-2006 Time: 16:09:24



(Audix ATC)

Trace: 26

Ref Trace:

Condition: CISPR CLASS-B NONE
Test Operator : Thanh Nguyen
Project # : 06U10130
Company : Intel
EUT Description: 802.11 a/b/g Mini PCI Card for desktop
Model : Kirtland Project
EUT Config : EUT, Desktop, Mouse, Keyboard.
Mode Of Oper : TX 2.4GHz Band worst case.
Target : FCC Class B, RSS 210
Power Source : 115 VAC, 60 Hz
Line 2: PK (Blue), AVG (Green)

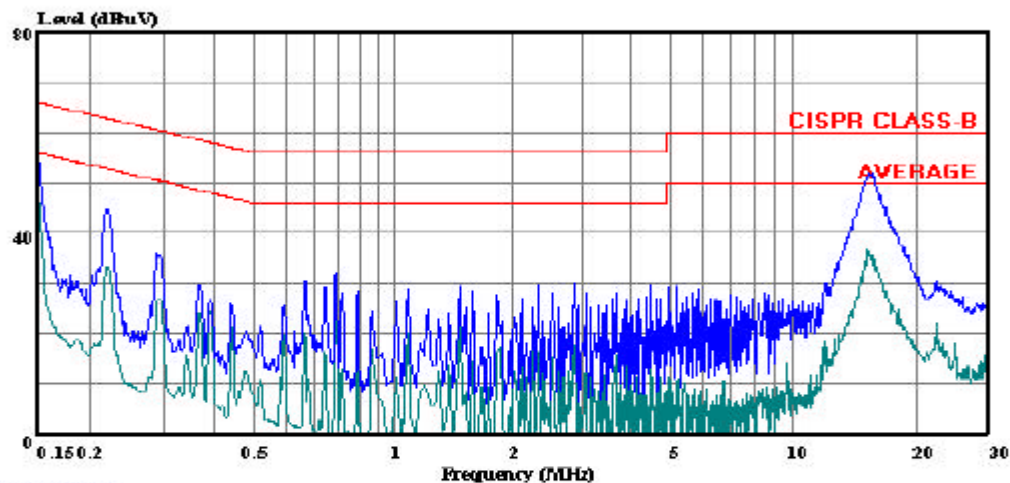
LINE 1 RESULTS

5GHz Band



Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 42 File#: LC 06U10130.EMI Date: 03-15-2006 Time: 17:00:33



(Audix ATC)

Trace: 40

Ref Trace:

Condition: CISPR CLASS-B NONE
Test Operator : Thanh Nguyen
Project # : 06U10130
Company : Intel
EUT Description: 802.11 a/b/g Mini PCI Card for desktop
Model : Kirtland Project
EUT Config : EUT, Desktop, Mouse, Keyboard.
Mode Of Oper : TX 5GHz band worst case
Target : FCC Class B, IC RSS 210
Power Source : 115 VAC, 60 Hz
: Line 1: PK(Blue), AVG(Green)

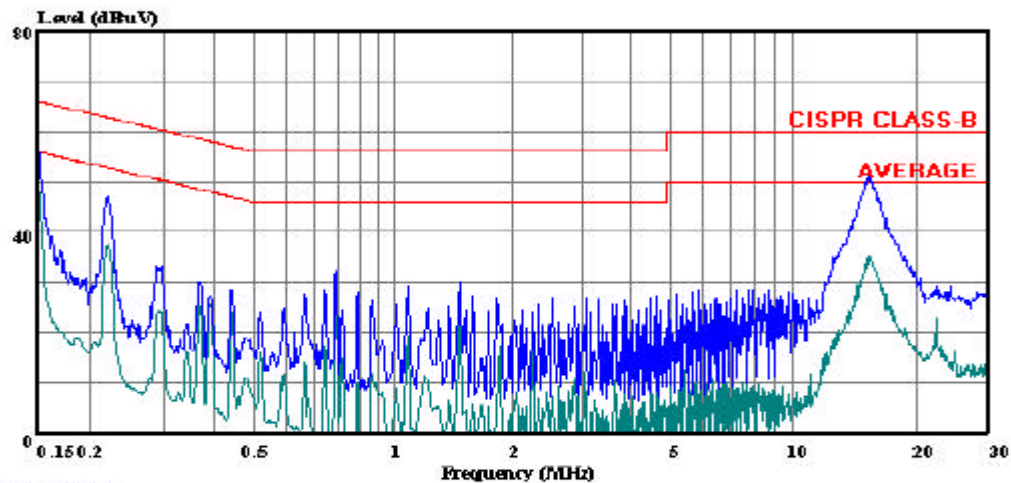
LINE 2 RESULTS

5GHz Band



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561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 35 File#: LC 06U10130.EMI Date: 03-15-2006 Time: 16:37:22



(Auxiliary ATC)

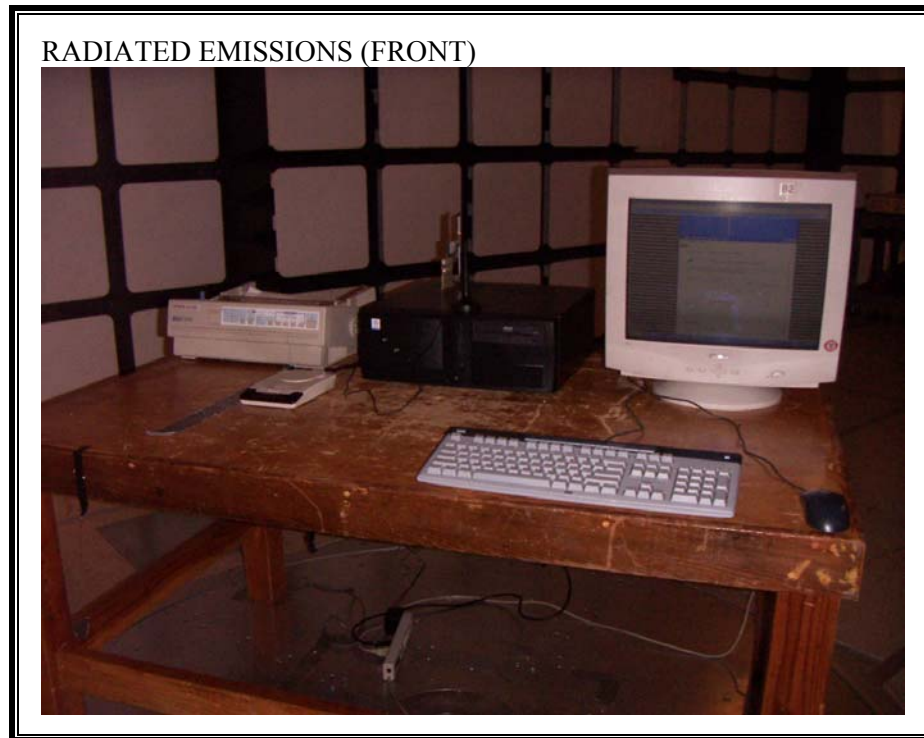
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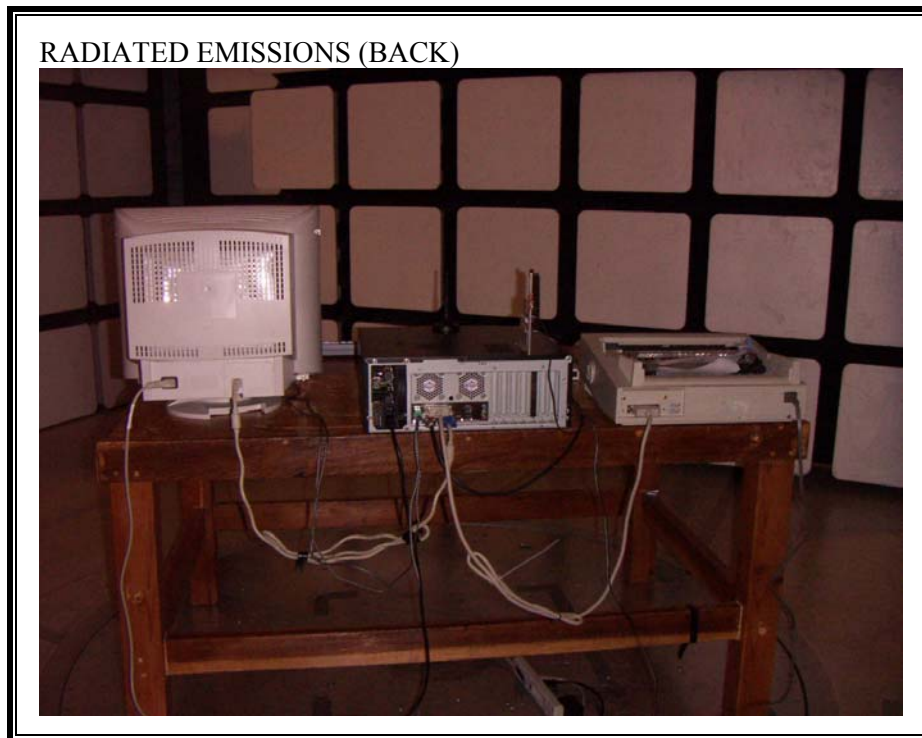
Ref Trace:

Condition: CISPR CLASS-B NONE
Test Operator : Thanh Nguyen
Project # : 06U10130
Company : Intel
EUT Description: 802.11 a/b/g Mini PCI Card for desktop
Model : Kirtland Project
EUT Config : EUT, Desktop, Mouse, Keyboard.
Mode of Oper : TX 5GHz band worst case
Target : FCC Class B, IC RSS 210
Power Source : 115 VAC, 60 Hz
Line 2: PK(Blue), AVG(Green)

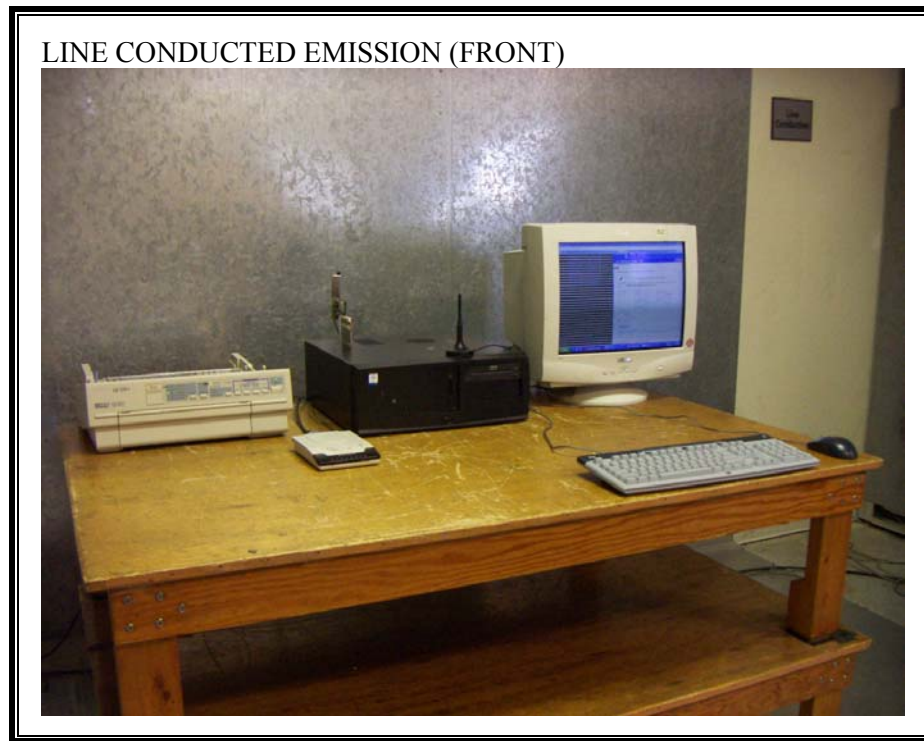
8. SETUP PHOTOS

RADIATED EMISSION





AC MAINS LINE CONDUCTED EMISSION



LINE CONDUCTED EMISSION (BACK)



END OF REPORT