

MPE Test Report

of

Product Name

Notebook Personal Computer
(with Intel PRO/Wireless 2200BG Network Connection inside)

Model

M220

(Brand:MITAC)

Applied by:

MITAC Technology Corporation
4F, No.1, R&D Road 2,
Hsinchu Science-Based industrial Park, Hsinchu 300
Taiwan, R. O. C.

Test Performed by:

International Standards Laboratory
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Report Number: ISL-04LR036MPE

Issue Date: 2005/01/18

HC LAB:NVLAP:200234-0;VCCI: R-341,C-354;NEMKO:ELA 113a,113c;BSMI:SL2-IN-E-0037;SL2-R1-E-0037;CNLA:1178

LT LAB:NVLAP:200234-0;VCCI: R-1435,C-1440;NEMKO:ELA 113b,113d;BSMI:SL2-IN-E-0013;CNLA:0997

ISL-T10-R29-1

Contents of Report

1.	General.....	1
1.1	Certification of Accuracy of Test Data.....	1
2.	Description of Equipment Under Test (EUT)	2
2.1	General Test Conditions	5
3.	RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)].....	6
3.1	Applied Standards.....	6
3.2	Test Procedure	6
3.3	Test Setup	6
3.4	Calculation for Maximum Permissible Exposure (MPE)	6
4.	Appendix : Test Equipment	8
4.1	Test Equipment List.....	8

1. General

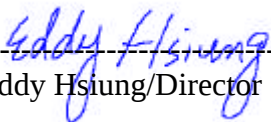
1.1 Certification of Accuracy of Test Data

Standards:	CFR 47 Part 15 Subpart B Class B CFR 47 Part 15 Subpart C (Section 15.247)
Test Procedure:	ANSI C63.4:2003 Notebook Personal Computer (with Intel PRO/Wireless 2200BG Network Connection inside)
Equipment Tested:	
Model:	M220
Applied by:	MITAC Technology Corporation
Sample received Date:	2004/11/09
Final test Date :	2005/01/18
Test Result	PASS
Test Site:	Chamber 02, Conduction 02
Temperature	Refer to each site test data
Humidity:	Refer to each site test data
Test Engineer:	Mailes Hsieh

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Approve & Signature



Eddy Hsiung/Director

Test results given in this report apply only to the specific sample(s) tested under stated test conditions.
This report shall not be reproduced other than in full without the explicit written consent of ISL.
This report totally 10 pages, including 1 cover page , 1 contents page, and 8 pages for the test description.
This report must not be use to claim product endorsement by NVLAP or any agency of the U.S. Government.

This test data shown below is traceable to NIST or national or international standard.
International Standards Laboratory certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

2. Description of Equipment Under Test (EUT)

Description:	Notebook Personal Computer (with Intel PRO/Wireless 2200BG Network Connection inside)
Model No.:	M220
FCC ID:	MAU012
Brand:	MITAC
Wireless LAN Module:	Intel, Model: WM3B2200BG
Frequency Range 802.11b/g:	2400 - 2483.5 MHz
Support channel: 802.11b/g	11 Channels
Modulation Skill: 802.11b	DBPSK(1Mbps), DQPSK(2Mbps), CCK(5.5/11Mbps)
802.11g	OFDM (6M - 54Mbps)
Antennas Type:	PIFA Type in Metal made by JOINSOON ELECTRONICS MFG. CO., LTD
Antenna Connected:	Connected to RF connector on the PCB of the 802.11b/g WLAN Adapter. The user is not possible to change the antenna without disassembling the notebook computer.
Antenna peak Gain:	
Main antenna	1.78 dBi (11b/g)
Power Type of LAN module:	3.3V DC from Notebook PC

The channel and the operation frequency of 802.11b and 802.11g is listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	11	2462
06	2437		

Adapter Type:	Delta (Model:ADP-90SB BB) or Delta (Model:ADP-90FB REV:F)
Hard Disk Driver:	Toshiba (Model: MK8025GAS)
DVD Dual:	Panasonic (Model:UJ-831B)
Modem Card:	Askey (Model: 1456 VQL4A(INT))
DDR :	Kingston (Model: KVR266X64SC25/1G)1G
PS/2:	one
USB Connector:	two 4 Pins
RJ11 Connector:	one 2 Pins
RJ45 Connector:	one 8 Pins(10/100Mbps)
VGA Connector:	one 15 Pins
PCMCIA Slot:	two
Line out Port:	one
Line-in Port:	one
Serial Port:	one
DC IN Port:	one
Battery:	Lithium-ion(Model: EMC 202S-20)
LCD:	AU(Model:B141XG08)
Power Cord:	Non-shielded, Detachable
Display:	LCD & CRT (1024*768)
Maximum Resolution :	LCD & CRT (1024*768)
Speed & CPU	
Speed	CPU
100MHz	Pentium M 1.4 GHz

The following test configurations were scanned during the preliminary test

Test Confi gurati on	CPU	LANSpeed	Adapter	Resolution
1	Pentium M 1.4 GHz	100M bps	Delta (Model:ADP-90SB BB)	1024*768 V:60Hz
2	Pentium M 1.4 GHz	10Mbps	Delta (Model:ADP-90FB REV:F)	800*600 V:60Hz

We found the test configurations producing the highest emission level is Configuration 1 and we shown the data in this report

EMI Noise Source:

Crystal: 12MHz (X1),25MHz(X2), 14.318MHz (X3),14.318MHz (X4), 16MHz (X5), 14.318MHz(X6),27MHz(X501),32.768KHz(X500)

Clock Generator: U19

EMI Solution:

1. Add one gasket on the upper case.
2. Add two springs on the Motherboard
3. Add one gasket on the Motherboard USB port
4. Add one spring on the I/O board
5. Add one gasket on the I/O board
6. Add one gasket on the I/O board Lan port
7. Add one ferrite core on the Line out Port
8. Add one ferrite core on the Line-in Port.

2.1 General Test Conditions

1. During the test, the EUT was set in continuously transmitting mode with a duty cycle of 94%.for 802.11b.
2. The EUT was set in continuously transmitting mode with a duty cycle of 93%.for 802.11g.
3. The channel 1, 6, 11 of 802.11b/g of EUT were all tested.

3. RF Exposure Measurement [Section 15.247(b)(4) & 1.1307(b)]

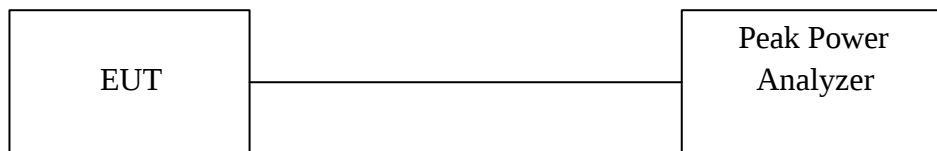
3.1 Applied Standards

FCC PART 1.1307, 1.1310, 2.1091, 2.1093 RF EXPOSURE

3.2 Test Procedure

The Transmitter output of EUT was connected to the Peak Power Analyzer

3.3 Test Setup



3.4 Calculation for Maximum Permissible Exposure (MPE)

From FCC 1.1310 Table 1B, the maximum permissible RF exposure for an uncontrolled environment is 1 mW/cm². The actual power density for the EUT with the antenna is calculated as shown below.

$$S = (P \times G) / (4 \times \pi \times d^2)$$

where:

S = power density

P = transmitter conducted power in (W)

G = antenna numeric gain

d = distance to radiation center (m)

802.11b:

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m ²)	Power Density (mW/cm ²)
Joinsoon Electronics MFG. CO., LTD P/N:IQ-040791	PIFA	1.78	1.51	2412	16.131	41.03	20	0.1230	0.01230
				2437	15.381	34.52	20	0.1035	0.01035
				2462	14.912	30.99	20	0.0929	0.00929

802.11g:

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m ²)	Power Density (mW/cm ²)
Joinsoon Electronics MFG. CO., LTD P/N:IQ-040791	PIFA	1.78	1.51	2412	16.537	45.05	20	0.1350	0.01350
				2437	15.974	39.57	20	0.1186	0.01186
				2462	15.586	36.19	20	0.1085	0.01085

WARNING:

It is the responsibility of the installer to ensure that the EUT is a WLAN module and a specified antenna inside. Only the specified antennas listed above may be used. The use of any other antenna is expressly forbidden in accordance with FCC rules CFR 47 part 15.204.

NOTICE:**FCC Radiation Exposure Statement**

This equipment complies with FCC radiation exposure limits for an uncontrolled environment when installed as directed. This equipment should be installed and operated with the specified antenna listed in this report.

4. Appendix : Test Equipment

4.1 Test Equipment List

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Rad. Above 1Ghz	Peak Power Analyzer	HP	8990A	3621A01269	01/02/2005	01/02/2006

Note: Calibration traceable to NIST or national or international standards.