MPE Test Report

for

Product Name

Noterbook Personal Computer;
Noterbook Personal Computer with Office Docking;
Noterbook Personal Computer with Vehicle docking

Model

ML900;
ML900 Office Docking;
ML900 Vehicle docking

(Brand:Motorola)

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

No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325
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Report Number: ISL-05LR022MPE **Issue Date: 2005/09/20**

Contents of Report

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
Equipment Tested:	Noterbook Personal Computer; Noterbook Personal Computer with Office Docking; Noterbook Personal Computer with Vehicle docking
Model:	ML900;ML900 Office Docking;ML900 Vehicle docking
Applied by:	MITAC Technology Corporation
Sample received Date:	2005/07/26
Final test Date :	2005/08/08-2005/09/05
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:	Jerry Chiou

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 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 contains 15 pages, including 1 cover page , 1 contents page, and 13 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)

EUT 1:

Description:	Noterbook Personal Computer (with Intel PRO/Wireless 2200BG Network Connection & RainSun Bluetooth Module BT-20 inside)
Model:	ML900
Brand:	MOTOROLA
FCC ID:	MAU017
Wireless LAN Module:	Intel, Model: WM3B2200BG
Bluetooth Wireless Card:	RainSun, Model: BT-20
Frequency Range 802.11b/g:	2412 - 2462 MHz
Frequency Range of bluetooth:	2402 - 2480 MHz
Support channel:	
802.11b/g:	11 Channels
bluetooth:	79 Channels
Modulation Skill:	
802.11b:	DBPSK(1Mbps), DQPSK(2Mbps), CCK(5.5/11Mbps)
802.11g:	OFDM (6M - 54Mbps)
bluetooth:	GFSK
Antennas Type:	
WLAN Left antenna:	DualBand PIFA Antenna(44*7.8*4.85 mm), made by JOINSOON ELECTRONICS MFG. CO., LTD.
WLAN Right antenna:	DualBand PIFA Antenna(44*7.8*4.85 mm), made by JOINSOON ELECTRONICS MFG. CO., LTD.
Bluetooth antenna:	Ceramic Patch Antenna(CABPB0715A(7×7×1.5mm Type)), made by TDK
Antenna Connected:	Connected to RF connector on the PCB of the 802.11b/g WLAN Adapter and bluetooth card. The user is not possible to change the antenna without disassembling the notebook computer.
Antenna peak Gain:	
WLAN Left antenna:	1.83 dBi (11b,11g)
WLAN Right antenna:	1.77 dBi (11b,11g)
Bluetooth antenna:	-3 dBi
Power Type of WLAN module:	3.3V DC from Notebook PC
Power Type of Bluetooth 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		

The channel and the operation frequency of bluetooth is listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	01	2403
02	2404	03	2405
……..			
……			
77	2479	78	2480

Adapter Type:	EPS AC Adapter (Model: F10903-A) INPUT:100-240V~1.2A 50/60Hz DC OUTPUT:19V---4.75A or DELTA AC Adapter(Model:ADP-90SB) INPUT:100-240V~1.5A 50/60Hz DC OUTPUT:19V---4.74A
Hard Disk Driver:	Toshiba(Model: MK8025GAS) 80GB or Toshiba(Model: MK6025GAS) 60GB or Toshiba(Model: MK4025GAS) 40GB or
DVD Combo Driver:	Panasonic (Model:UJDA770 or Panasonic (Model:UJ840)
Modem Module:	ASKEY(Model:1456V4A)
Wireless Modem Module:	Motorola(Model:PRM240)
Memory:	Apacer (Model:UNB PC 2700 CL2.5) 1G or Kingston 1G Apacer (Model:UNB PC 2700 CL2.5) 512MB or Micron 512MB or Kingston 256MB or Micron 256MB
RJ11 Port:	one
USB Port:	two
RJ45 Port:	one
DVI Port:	one
COM Port:	one
Docking Connector:	one
Video capture:	one
DC IN Port:	one
Battery:	Mitac Computer (Model: EMC 202S-20)
LCD:	TOSHIBA (Model: LTD121EA41)
Touch Screen:	GUNZE Electronics (Model:MTA-11-1D)

EUT2:

Description:	Noterbook Personal Computer with Office Docking;
Condition:	Pre-Production
Model:	ML900 Office Docking
Serial Number:	N/A
BNC Port:	one
VGA Port:	one
COM Port:	two
Parallel Port:	one
RJ45 Port:	one
USB Port:	two
All Purpose Connector:	one
Power Input:	one
Docking Connector:	one

EUT3:

Description:	Noterbook Personal Computer with Vehicle Docking
Condition:	Pre-Production
Model:	ML900 Vehicle Docking
Serial Number:	N/A
BNC Port:	one
VGA Port:	one
COM Port:	two
Parallel Port:	one
RJ45 Port:	one
USB Port:	two
All Purpose Connector:	one
Power Input:	one
Docking Connector:	one

Display:	LCD (1024X 768) or CRT (1024X 768) or LCD12”(1024X 768) or 12”(800X 600) or 8”(800X600)

CPU
Intel Dothan(745) 1.8GHz

All types of LCD and Power Type have been tested. We present the worst case test data in the report. The test configuration is listed below:

Configuration	CPU	Resolution	External LCD	Power Type
1.NB Only	Intel Dothan(745) 1.8GHz	NB LCD 1024x768	none	EPS AC Adapter (Model: F10903-A)
2.NB+Office Docking	Intel Dothan(745) 1.8GHz	NB LCD 1024x768	none	EPS AC Adapter (Model: F10903-A)
3.NB+ Vehicle docking	Intel Dothan(745) 1.8GHz	NB LCD 1024x768	MOTOROLA12.1" LCD display (Model:3135A)SXGA	ACDelco Battery(Model:S55B24L)
4.NB+ Vehicle docking	Intel Dothan(745) 1.8GHz	NB LCD 800x600	MOTOROLA12.1" LCD display (Model:3134A)SXGA	ACDelco Battery(Model:S55B24L)
5 NB+ Vehicle docking	Intel Dothan(745) 1.8GHz	NB LCD 800x600	MOTOROLA8.4" LCD display (Model:3318A)SVGA	ACDelco Battery(Model:S55B24L)

EMI Noise Source:

Crystal:
EUT1:
24.576MHz(X6),24MHz(Y2),32.768KHz(X801),28.63636MHz(X800),25MHz(X5)
14.318MHZ(X4), 14.318MHZ(Y1),16MHZ(X1)
Clock Generator:
U27

EUT2:
25MHZ(X2),30MHz(X1)

EUT3:
25MHZ(X2),30MHz(X1)

EMI Solution:
Adding Spring on the Charger board
Adding Gasket on the Charger board
Adding shielding cap for Docking port & DVI + COM
Adding Gasket on HDD Case
Adding cover Antenna prm240+GPS+WLAN in A, B part
Adding Six Spring on Mother board
Adding Spring onUSB port and LAN port
Adding Gasket on Modem port
Adding Gasket on Vehicle Docking PCB I/O connector

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.
4. The EUT was set in continuously transmitting mode with a duty cycle of 40%.for Bluetooth.
5. The channel 00, 39, 78 of Bluetooth of EUT were all tested.

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

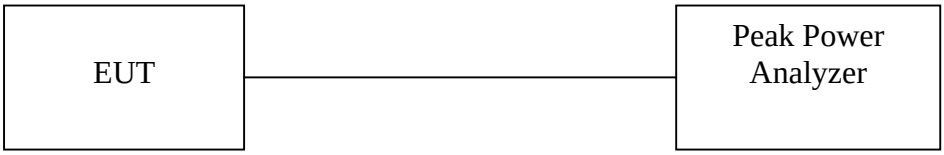
3.1 Applied Standards

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)

3.5 Test Data: Configuration 1

802.11b

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	18.006	63.18	20	0.1916	0.01916
				2437	17.068	50.91	20	0.1544	0.01544
				2462	16.631	46.04	20	0.1396	0.01396

802.11g

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	15.506	35.53	20	0.1077	0.01077
				2437	16.943	49.47	20	0.1500	0.01500
				2462	15.912	39.01	20	0.1183	0.01183

Bluetooth

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
TDK Model:CABPB0715A	Ceramic Patch Antenna	-3	0.5012	2402	4.65	2.9174	20	0.0029	0.00029
				2441	4.11	2.5763	20	0.0026	0.00026
				2480	3.83	2.4155	20	0.0024	0.00024

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.

3.6 Test Data: Configuration 2

802.11b

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	17.256	53.16	20	0.1612	0.01612
				2437	16.6	45.71	20	0.1386	0.01386
				2462	16.568	45.37	20	0.1376	0.01376

802.11g

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	16.787	47.72	20	0.1447	0.01447
				2437	16.849	48.41	20	0.1468	0.01468
				2462	16.662	46.37	20	0.1406	0.01406

Bluetooth

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
TDK Model:CABPB0715A	Ceramic Patch Antenna	-3	0.5012	2402	4.65	2.9174	20	0.0029	0.00029
				2441	4.07	2.5527	20	0.0025	0.00025
				2480	3.79	2.3933	20	0.0024	0.00024

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.

3.7 Test Data: Configuration 3

802.11b

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	17.724	59.21	20	0.1795	0.01795
				2437	17.099	51.27	20	0.1555	0.01555
				2462	16.818	48.06	20	0.1457	0.01457

802.11g

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	16.943	49.47	20	0.1500	0.01500
				2437	16.568	45.37	20	0.1376	0.01376
				2462	17.006	50.19	20	0.1522	0.01522

Bluetooth

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
TDK Model:CABPB0715A	Ceramic Patch Antenna	-3	0.5012	2402	4.62	2.8973	20	0.0029	0.00029
				2441	4.11	2.5763	20	0.0026	0.00026
				2480	3.79	2.3933	20	0.0024	0.00024

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.

3.8 Test Data: Configuration 4

802.11b

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	17.475	55.91	20	0.1695	0.01695
				2437	17.006	50.19	20	0.1522	0.01522
				2462	16.787	47.72	20	0.1447	0.01447

802.11g

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	16.568	45.37	20	0.1376	0.01376
				2437	16.85	48.42	20	0.1468	0.01468
				2462	16.443	44.09	20	0.1337	0.01337

Bluetooth

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
TDK Model:CABPB0715A	Ceramic Patch Antenna	-3	0.5012	2402	4.39	2.7479	20	0.0027	0.00027
				2441	3.86	2.4322	20	0.0024	0.00024
				2480	3.59	2.2856	20	0.0023	0.00023

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.

3.9 Test Data: Configuration 5

802.11b

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	17.318	53.93	20	0.1635	0.01635
				2437	16.787	47.72	20	0.1447	0.01447
				2462	16.475	44.41	20	0.1347	0.01347

802.11g

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
JOINSOON (44*7.8*4.85 mm)	DualBand PIFA Antenna	1.83	1.52	2412	16.85	48.42	20	0.1468	0.01468
				2437	16.662	46.37	20	0.1406	0.01406
				2462	16.256	42.23	20	0.1280	0.01280

Bluetooth

Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Frequency (MHz)	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m2)	Power Density (mW/cm2)
TDK Model:CABPB0715A	Ceramic Patch Antenna	-3	0.5012	2402	4.4	2.7542	20	0.0027	0.00027
				2441	3.87	2.4378	20	0.0024	0.00024
				2480	3.6	2.2909	20	0.0023	0.00023

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.