

MPE Test Report
FOR
FCC Part 15 Subpart C & E

of

WLAN a+b+g Mini-PCI Module

Model

EM-500AG

(Brand: Wistron NeWeb)

Applied by:

Wistron NeWeb Corporation
No. 10-1, Li-hsin Road I,
Science-based Industrial Park Hsinchu 300,
Taiwan, R. O. C.



Test Performed by:

International Standards Laboratory

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Report Number: 03LR029MPE

Test Date: 2003/12/16

NVLAP Lab. Code: 200234-0; VCCI: R-1435, C-1440; NEMKO Aut. No: ELA 113; BSMI Lab. Code: SL2-IN-E-0013

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1. . General

1.1 Certification of Accuracy of Test Data

The electromagnetic interference tests which this report describes were conducted by an independent electromagnetic compatibility consultant, International Standards Laboratory in accordance with the test procedure specified in CFR 47 Part 15 Subpart C (Section 15.247) , and ANSI C63.4 Rules.

The test results contained in this report accurately represent the measurements of the EMC characteristics and the energy generated by sample equipment under test at the time of the test.

Equipment Tested: WLAN a+b+g Mini-PCI module
Model: EM-500AG
Applied by Wistron NeWeb Corp.

Sample received Date: 2003/11/10

Final test Date : 2003/12/16

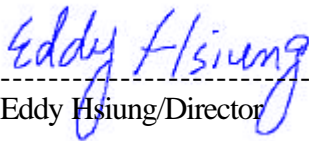
Test Site: Chamber 02, Conduction 02

Temperature 20°C(Conduction Test); 20°C (Radiation Test)
Humidity: 48% (Conduction Test); 46% (Radiation Test)

Test Engineer: Jerry Chiou

The results show that the sample equipment tested as described in this report is in compliance with the Class B conducted and radiated emission limits of FCC Rules Part 15 Subpart B, and the limit of Part Subpart C Sec. 15.247.

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 9 pages, including 1 cover page , 1 contents page, and 7 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. Test Results Summary

3. Description of Equipment Under Test (EUT)

Description:	WLAN a+b+g Mini-PCI module
Model No.:	EM-500AG
FCC ID:	NKREM500AG
Brand:	Wistron NeWeb
Frequency Range 802.11a:	5180 - 5320 MHz, 5745 - 5805 MHz
Frequency Range 802.11b/g:	2412 - 2462 MHz
Support channel:	
802.11a Normal mode	12 Channels
802.11a Turbo mode	5 Channels
802.11b	11 Channels
802.11g	11 Channels
Modulation Skill:	
802.11a Normal mode	OFDM (6 Mbps – 54 Mbps)
802.11a Turbo mode	OFDM (12 Mbps – 108 MBps)
802.11b	DBPSK(1Mbps), DQPSK(2Mbps), CCK(5.5/11Mbps)
802.11g	OFDM (6M - 54Mbps)
Antennas Type:	PIFA Type in Meta made by FOXCONN NWInG
Antenna Connected:	Connected to RF connector on the PCB of the 802.11a/b/g WLAN Adapter.
Antenna peak Gain:	
Main antenna	1.40 dBi (11b/g),0.52 dBi(11a)
Aux antenna	1.36dBi (11b/g), 1.35 dBi(11a)
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		

The channel and the operation frequency of 802.11a Normal Mode is listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	5180	07	5300
02	5200	08	5320
03	5220	09	5745
04	5240	10	5765
05	5260	11	5785
06	5280	12	5805

The channel and the operation frequency of 802.11a Turbo Mode is listed below:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	5210	04	5760
02	5250	05	5800
03	5290		

During the test, the EUT was tested as a modular device of a notebook PC using a PCMCIA extender board to extend the EUT outside the notebook PC enclosure. The EUT was then connected to a set of antennas via its transmit and receive connectors.

3.1 General Test Conditions

1. During the test, the EUT was set in continuously transmitting mode with a duty cycle of 100%.
2. The channel 1, 6, 11 of 802.11b/g of EUT were all tested.
3. The channel 1, 4, 5, 8,9,12 of Normal Mode of 802.11a and Channel 1, 2, 3,4,5 of Turbo Mode of 802.11a were also all tested.
4. “Normal mode” of 802.11a and 802.11g allows data rates up to 54 Mbps. The EUT was tested in the data rate that produced the highest output power (6 Mbps)
5. “Turbo mode” of 802.11a allows data rates up to 108 Mbps. The EUT was tested in the data rate that produced the highest output power (12 Mbps).

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

4.1 Applied Standards

FCC PART 1.1307, 1.1310, 2.1091, 2.1093 RF EXPOSURE

4.2 Test Procedure

The Transmitter output of EUT was connected to the peak power analyzer .

4.3 Test Setup



4.4 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)

	Antenna Manufacturer	Antenna Type	Gain (dBi)	Numeric Gain	Power (dBm)	Power (mW)	Separation Distance (cm)	Power Density (W/m ²)	Power Density (mW/cm ²)
11b	FOXCONN NWInG	PIFA	1.4	1.38	18.275	67.22	20	0.184	0.0184
11g					18.306	67.70	20	0.186	0.0186
11a			1.35	1.36	18.568	71.91	20	0.194	0.0194

WARNING:

It is the responsibility of the professional installer to ensure that when using the outdoor antenna kits in the United States (or where FCC rules apply), only the antenna specified 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 FOXCONN NWInG PIFA antenna in a fixed-mount configuration, installed with a maximum of 18.568 dBm of radiated output power during normal operation

5. Appendix : Test Equipment

5.1 Test Equipment List Support Unit 1.

Description:	Acer USB Keyboard
Model Number:	6511-UV
Serial Number:	N/A
Power Supply Type:	N/A
Power Cord:	N/A
FCC ID:	N/A (comply with FCC DOC)

Support Unit 2.

Description:	Acer Monitor
Model:	G781
Serial Number:	999007101214400445T7AA31T
Power Cord:	Non-shielded, Detachable
FCC ID:	(Comply with FCC Standards)

Support Unit 3.

Description:	Notebook Personal Computer
Model No.:	DT3
Adapter Type:	Auto Switch/ Lite-On (Model: PA-1181-08QA) 3 Pins
Hard Disk Driver:	Seagate HDD(ALPINE 120G)ST3120022A
LCD:	QDI 17" SXGA (QDI/ QD17EL07)
DVD ROM Driver:	QSI 8X DVD-ROM, Slim, SDR-083
CD-RW/DVD Driver:	QSI 8X DVD- Combo, Slim, SBW-242
DVD Dual Driver:	Pioneer DVD Dual DVR-K12D
DDR SDRAM:	Infineon 512MB/ HYS64D64320GU-5-B Infineon 256MB/ HYS64D32300GU-5-B Nanya 512MB/ NT512D64S8HB1G-5T Nanya 256MB/ NT256D64S88B1G-5T
Parallel Connector:	one 25-pins
VGA Connector:	one 15-pins
TV Out:	one 4-pins
USB Connector:	Four 4-pins
1394 Connector:	Two 4-pins
RJ11 Connector:	one 2-pins
RJ45 Connector:	one 8-pins
Mic-in Port:	one
Headphone-out Port:	one
PCMCIA Slot:	one
MS/SD/MMC Slot:	one
DC IN Port:	one
Battery:	Simplo/ BATT PACK LI 916-2600(DT1,4S3P,6.6A)
Power Cord:	Nonshielded, Detachable
Speed & CPU:	
Speed	CPU
133MHz	Pentium IV 2.66GHz

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