MEASUREMENT/TECHNICAL REPORT

APPLICTNT: NERONIX, INC.

MODEL NO.: EA1210R

FCC ID: NOI9900-11210-001

This report concerns (check one) : **Original Grant** ✓
Class II Change _____

Equipment type: LAN Card

Deferred grant requested per 47CFR 0.457(d)(1)(ii)?
Yes _____ No ✓ If yes, defer until: _____ (date)
We, the undersigned, agree to notify the Commission by (date) _____ / _____ / _____ of the intended date of announce ment of the product so that the grant can be issued on that date.

Transiyion Rules Request per 15.37? Yes _____ No ✓
If no, assumed Part 15, Subpart B for unintentional radiator the new 47 CFR (10-1-90 Edition) provision.

Report Prepared

by Testing House : **Neutron Engineering Inc.**

for Company Name: NETRONIX, INC.

Address: 5F-5, No. 55, Dong-Kuwang Rd., Hsinchu, Taiwan, R.O.C.

Applicant Signature : Armin Tseng
Armin Tseng/R&D Dept.

CERTIFICATION

We hereby certify that:

The test data , data evaluation , test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (1992)/ CISPR22(1996) and the energy emitted by the sample EUT tested as described in this report is in compliance with CLASS B conducted and radiated emission limits of FCC Rules Part 15 , Subpart B/ CISPR22(1996).

Prepared by :	Carol Chen	
Reviewed by :	Andy Chiu	
Approved by :	George Yao	
Issued Date :	July 30, 1998	
Report No. :	NEI-FCCB-98088	
Company Stamp :		

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1. GENERAL INFORMATION

1-1. Product Description

The NETRONIX, INC. Model: EA1210R (referred to as the EUT in this report) is a PCI base Fast Ethernet Adapter. It is a 32-bit 10/100 Mbps Ethernet Network interface adapter.

The EUT which supports 10Base T, 10Base-2 and 100 Base-TX modes and integrates easily with Fast Ethernet hub/switch.

The summarized feature of EUT are described as following:

- IEEE 802.3 standard 10BASE-T and 100BASE-TX standards
- Full-duplex operation at both 10 Mbps and 100Mbps
- Auto-sensing interface to 10 and 100 Mbps networks
- Three status LED mounted on bracket for easy viewing and troubleshooting
- Single shield RJ-45 connector for use at either speed(Category 3,4 or 5 UTP cable for 100Mbp operation, and Category 5 UTP cable for 100 Mbps operation)

A more detailed and/or technical description of EUT is attached in **User's Manual**.

1-2. Related Submittal(s) / Grant (s)

1-2-1. Models Covered

Models covering in this test report is : EA1210R

1-2-2. Models Difference

N/A

1-3. Tested System Details

The FCC IDs for all equipments, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model No.	FCC ID	Equipment	Cable
EA1210R	NOI9900-11210-001	LAN Card	Add-On Card , Cableless
PRESARIO7222	EJH3326	PC	Un-Shielded Power Cord.
NE64	KFBNE64	Monitor	Shielded Data Cable(2) Un-Shielded Power Cord
SERIES 2-7S	DZL6QBS2	Mouse	Shielded Data Cable
HP2225C+	DSI6XU2225	Printer	Shielded Serial Data Cable Un-Shielded Power Cord
AT-1200CK	E2O5OV1200CK	Modem	Shielded Parallel Data Cable Un-Shielded Power Cord
FDA-102A	F4Z4K3FDA-102A	Keyboard	Shielded Data Cable

Notes:

(1) EUT submitted for grant.
(2) Monitor's attached video cable without ferrite core.

1-4. Test Methodology

Both conducted and rediated testing were performed according to the procedures in ANSI C63.4 (1992)/CISPR 22(1996). Radiated testing was performed at an antenna to EUT distance 10 meters.

1-5. Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of No. 5, All 2, Lane 220, Kang Lo St., Nei Hwu, Taipei, Taiwan, R.O.C. of NEUTRON ENGINEERING INC. This site has been fully described in report dated Feb.4,1998 Submitted to your office, and accepted in a letter dated March 28, 1998 (31040/SIT-1300F2).

3. System Test Configuration

3-1. Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). The Lan Card was inserted to support equipment-personal computer. Peripherals of PC, such as monitor, keyboard, modem and printer were contained in this system in order to comply with the ANSI C63.4/CISPR22(1996) Rules requirement. A second PC workstation located at faraway side from test site was used as a support equipment to exercise the EUT to simulate data transmitting during the test. Both PC workstations operated in the default 640X480/31.5Khz VGA Graphic mode. This operating Condition was tested and used to collect the included data.

The RJ45 port (100Base-TX,category 5 UTP) was tested as the Rules requirement. The final qualification testing data were included in Table 5-1 and Table 5-2 shown.

3-2. EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disk, was inserted into driver A and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read(write) from(to) mass storage device(Disk).
2. Read(write) from(to) remote station by EUT(Lan Card).
3. Send "H" pattern to video port device(Monitor).
4. Send " H " pattern to parallel port device(Printer).
5. Send " H " pattern to serial port device (Modem).
6. Repeated from 2 to 5 continuously.

As the Keyboard and mouse are strictly input devices, no data is transmitted to (from) them during test. They are, however, continuously scanned for data input activity.

3-3. Special Accessories

As shown in Figure 3-1, all interface cables used for compliance testing are shielded type except the power cord which marked as shielded. All cable connectors are integrated by metal hoods for shielding. This equipment is required to use a shielded video interface cable without a ferrite attached in order to comply with FCC requirements.

3-4. Equipment Modifications

In order to achieve in compliance with Class B levels, the following change(s) were made by NEUTRON test house during the compliance testing:

Please refer to the next page as the modifications described and cross reference of photos of tested EUT.

The above modifications will be implemented in all product models of this equipment.

Applicant Signature :	Armin Tseng	Date :	July 30, 1998
Type/Printed Name :	Armin Tseng	Position :	R&D/ Dept.

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A. Add Capacitors (C=22pf) on the output of 45.

All the above modification will be implemented and relayout in the mass production to meer the FCC Class B requirements.

NETRONIX, INC.

Armin Tseng

R&D/ Dept.

3.5 Configuration of Tested System

The configuration of tested system is described as the block diagram shown in next page Figure 3.1 and details information of I/O cable an power cord connection are tabulated as Table A and B. The monitor is powered from a floor mounted receptacle (referred to as the wall outlet in the previous described)was tested.

TABLE A - Test Equipment

Item	Equipment	Mfr.	Model/Type No.	I/O Port	FCC ID	Remark
E-1	LAN Card	NETRONIX	EA1210R	PCI Slot	NOI9900-11210-001	EUT
E-2	PC	COMPAQ	PRESARIO7222		EJH3326	
E-3	Monitor	CHern-Yih	NE64	VGA Port	KFBNE64	
E-4	Mouse	Logitech	SERIES 2-7S	P/S 2 Port	DZL6QBS2	
E-5	Printer	HP	HP2225C+	Print Port	DSI6XU2225	
E-6	Modem	Datatronics	AT-1200CK	COM Port	E2O5OV1200CK	
E-7	Keyboard	Forward	FDA-102A	KB DIN Port	F4Z4K3FDA-102A	

Remark:

(1) Unless otherwise denoted as EUT in 「Remark」 column , device(s) used in tested system is a support equipment.

(2) Unless otherwise marked as ※ in 「Remark」 column, Neutron consigns the supporting equipment(s) to the tested system.

Table B. - Informations Cable Information

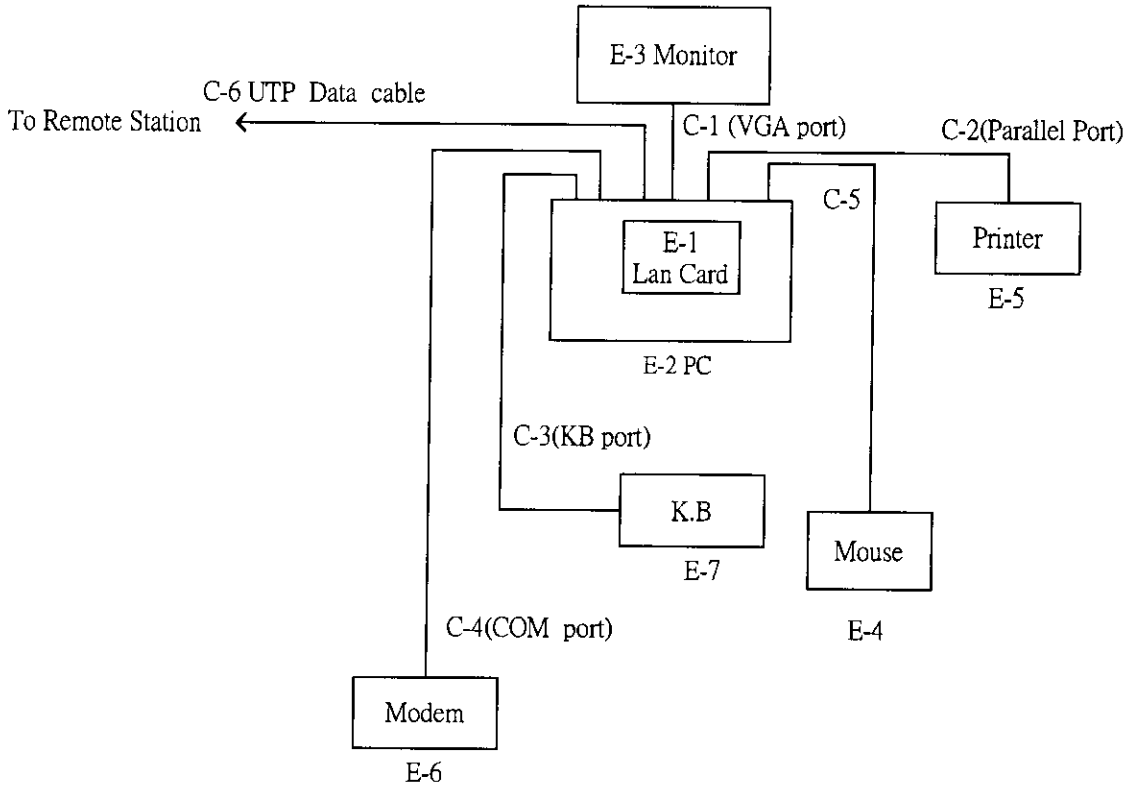
Item	I/O Cable	Device Connected	Shiedled	Ferrite Core	Detachable/Permanently	Note
C-1	Video Cable	PC-Monitor	Yes	No	Permanently attached	
C-2	Centronics Cable	PC-Printer	Yes	No	Detachable type	
C-3	Keyboard Cable	PC-Keyboard	Yes	No	Permanently attached	
C-4	RS-232 Cable	PC-Modem	Yes	No	Detachable type	
C-5	Mouse Cable	PC-Mouse	Yes	No	Permanently attached	
C-6	UTP DataCable	PC-Remote Station	No	No	Detachable type.	※

Note:

(1) Unless otherwise marked as ※ in 「Remark」 colum, Neutron consigns the supporting equipment(s) to the tested system.

Figure 3.1 Configuration of Tested System

Fig. 3-1 Configuration of Tested System



6. Conducted Emission Datas

6.1 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-13.79** **dB** in mode of **Neutral** terminal **4.93** **MHz**

Freq.	Terminal	Measured(dBuV)		Limits(dBuV)		Safe Margins	
(MHz)	L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dBuV)	Note
0.20	Line	44.47	*	63.82	53.82	-19.35	(QP)
0.23	Line	41.89	*	62.45	52.45	-20.56	(QP)
0.56	Line	32.38	*	56.00	46.00	-23.62	(QP)
5.01	Line	42.16	*	60.00	50.00	-17.84	(QP)
9.97	Line	44.39	*	60.00	50.00	-15.61	(QP)
0.23	Neutral	45.21	*	62.45	52.45	-17.24	(QP)
0.98	Neutral	31.11	*	56.00	46.00	-24.89	(QP)
4.93	Neutral	42.21	*	56.00	46.00	-13.79	(QP)
8.68	Neutral	42.61	*	60.00	50.00	-17.39	(QP)
10.85	Neutral	43.71	*	60.00	50.00	-16.29	(QP)

Remark :

(1) Reading inwhich marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=100KHz,VBW =100KHz, Swp. Time = 0.3 sec./MHz ◦ Reading inwhich marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz ◦

(2) All readings are QP Mode value unless otherwise stated AVG in colum of 『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemd to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform ◦ In this case, a " * " marked in AVG Mode colum of Interference Voltage Measured ◦

(3) Measuring frequency range from 150KHz to 30MHz ◦

Review : Test Personnel. : Date: June 16, 1998

7. Radiated Emission Datas

7.1 The following data lists the significant emission frequencise, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

Judgement: Passed by **-2.99** **dB** in polarity of **Vertical** 48.44 **MHz**

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
38.05	V	14.30	11.29	25.59	30.00	- 4.41	
48.44	V	14.90	12.11	27.01	30.00	- 2.99	
55.20	H	12.50	10.48	22.98	30.00	- 7.02	
127.60	V	11.40	13.17	24.57	30.00	- 5.43	
142.90	H	11.70	12.37	24.07	30.00	- 5.93	
147.50	H	12.10	12.75	24.85	30.00	- 5.15	
215.20	V	11.90	11.91	23.81	30.00	- 6.19	
215.20	H	11.50	11.91	23.41	30.00	- 6.59	
236.00	H	18.50	12.52	31.02	37.00	- 5.98	
399.20	V	13.50	17.79	31.29	37.00	- 5.71	
484.80	V	12.70	20.72	33.42	37.00	- 3.58	
505.60	H	11.30	21.34	32.64	37.00	- 4.36	

Remark :

(1) Test Receiver or Spectrum Analyzer measurement condition setting are Res. BW=1 MHz ,Video BW =1MHz , Sweep. Time = 0.2 sec./MHz

(2) All readings are Peak unless otherwise stated QP in colum of 『Note』

(3) Measuring frequency range from 30MHz to 1000MHz.

(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

(5) If the peak scan value lower limit less than 20dB, then this signal data will be listed. But if these signal datas more than 10 frequencies, then only the Top 10 be listed.

Review : Test Personnel. : Date: July 21, 1998

7-2. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading.The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor (1)

CL = Cable Attenuation Factor (1)

AG = Amplifier Gain (1) (2)

Remark :

(1) The Correction Factor = AF + CL - AG, as shown in the data tables' Correction Factor column.

(2) AG is not available for Neutron's Open Site Facility

Example of Calculation:

Assume a Receiver Reading of 23.7 dBuV is obtained with an Antenna Factor of 7.2 dB and a Cable Factor of 1.1 dB. Then:

1. The Correction Factor will be caculated by

Correction Factor = AF + CL - AG = 7.2 + 1.1 - 0 = 8.3 (dB)

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

FS = RA + Correction Factor = 23.7 + 8.3 = 32 (dBuV/m).

FS is the value shown in the data tables' Corrected Reading column and RA is the value shown in the data tables' Receiver Reading column.The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m as:

$$\mathbf{Log^{-1}\ [(32.0dBuV/m)/20\ ] = 39.8\ (uV/m)}$$

7-3. Correction Factor VS Frequency

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30.00	11.10	0.20
35.00	10.80	0.00
40.00	11.20	0.40
45.00	11.50	0.40
50.00	11.30	0.90
55.00	10.50	0.00
60.00	9.90	0.00
65.00	8.70	0.20
70.00	7.60	0.00
75.00	6.40	0.50
80.00	6.10	0.10
85.00	7.00	0.80
90.00	8.00	0.30
95.00	10.00	0.40
100.00	11.20	0.60
110.00	12.60	0.60
120.00	13.00	0.60
130.00	12.50	0.50
140.00	12.00	0.20
150.00	12.00	1.00
160.00	13.20	1.20
170.00	14.80	1.60
180.00	16.30	1.90
190.00	17.00	1.90
200.00	17.30	1.40
225.00	10.50	1.10
250.00	11.70	2.00
275.00	12.80	2.40
300.00	14.50	2.40
325.00	14.00	1.90
350.00	14.20	2.40
375.00	14.60	2.90
400.00	15.10	2.70
450.00	16.20	3.20
500.00	17.60	3.70
550.00	17.80	3.90
600.00	18.40	4.30
650.00	19.50	4.00
700.00	20.80	4.10
750.00	20.50	5.30
800.00	21.10	5.90
850.00	22.40	5.80
900.00	23.50	5.50
950.00	24.00	6.30
1000.00	24.80	5.20

8. Photos of Tested EUT:

1. **Photo # 1.** **Front View**
2. **Photo # 2.** **Rear View**
3. **Photo # 3.** **Side View**