

# **FC**

# **Test Report**

For

**Applicant** : AboCom System , Inc.

**Equipment Type** : 10/100 Fast Ethernet+56K FAX  
Modem PC Card

**Model** : LF560MX

**FCC ID** : MQ4PLM56

**Report No. : 994007FI**



## Test Report Certification

### QuieTek Corporation

No.75-1, Wang-Yeh Valley, Yung-Hsing, Chiung-Lin,  
Hsin-Chu County, Taiwan, R.O.C.  
Tel : 886-3-592-8858, Fax: 886-3-592-8859  
E-Mail : quietek@ms24.hinet.net

Accredited by NIST(NVLAP), VCCI, BSMI, DNV, TUV

Applicant : AboCom System , Inc.  
Address : 12F-3 , No 333 , Sec 1 , Guan-Fu Road , Hsin-chu , Taiwan ,  
R.O.C.  
Equipment Type : 10/100 Fast Ethernet+56K FAX Modem PC Card  
Model : LF560MX  
FCC ID. : MQ4PLM56  
Measurement Standard : FCC Part 15 Subpart B  
Measurement Procedure : ANSI C63.4 /1992  
Operation Voltage : 120Vac/60Hz  
Classification : Class B  
Test Result : Complied  
Test Date : April 12, 1999  
Report No. : 994007FI

The Test Results relate only to the samples tested.

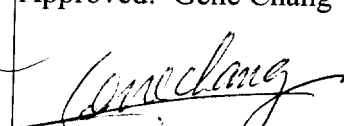
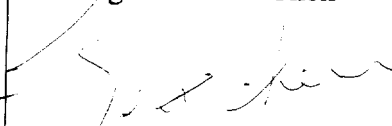
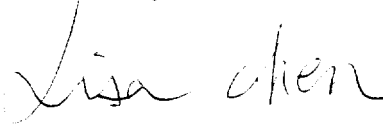
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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented by: Lisa Chen

Test Engineer: Jeff Chen

Approved: Gene Chang



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## 1. General Information

### 1.1 EUT Description

Applicant	: AboCom System , Inc.
Address	12F-3 , No 333 , Sec 1 , Guan-Fu Road , Hsin-chu , Taiwan , R.O.C.
Equipment Type	: 10/100 Fast Ethernet+56K FAX Modem PC Card
Model	: LF560MX
FCC ID	: MQ4PLM56
Operation Voltage	: 120Vac/60Hz

Remark: The data shown in this report reflects the worst-case data for each operation mode.



## 1.2 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards ) are:

☒ Notebook

Model Name : PC-5NU01-YA7LA  
Model Number : 389  
Manufacturer : Hitachi  
External FDD : Hitachi, 3.5Inches FDD  
FDD Cable: Shielded, 0.2m+1Cord  
Power Adaptor : Hitachi, PC-AP4800  
Cable IN: Non Shielded, 2m  
CableOUT: Shielded, 1.5m

☒ Monitor

Model Number : CM752ET-311  
Serial Number : T8F005799  
FCC ID : DoC  
Manufacturer : HITACHI  
Data Cable : Shielded, 1.5m  
Power Cord : Shielded, 1.8m

☒ 10/100 Fast Ethernet+56K FAX Modem PC Card (EUT)

Model Number : LF560MX  
Serial Number : N/A  
FCC ID : MQ4PLM56  
Manufacturer : AboCom System , Inc.  
Power Cord : Non-Shielded, 1.8m

☒ Keyboard

Model Number : 6311-TW2C  
Serial Number : N/A  
FCC ID : DoC  
Manufacturer : ACER  
Data Cable : Shielded, 1.5m

☒ Modem

Model Number : 1414  
Serial Number : 980033041  
FCC ID : IFAXDM1414  
Manufacturer : ACEEX  
Data Cable : Shielded,, 1.5m  
Power Adapter : ACCEX, M/N: SCP41-91000A  
Cable Output : Shielded, 1.5m

☒ **Printer**  
Model Number : C2642A  
Serial Number : MY75L1D2XN  
FCC ID : B94C2642X  
Manufacturer : HP  
Data Cable : Shielded,, 1.2m  
Power Adapter : NMB, M/N: C2175A  
Cable for AC IN: Non-Shielded, 0.7m  
Cable for AC Out: Non-Shielded, 1.5m

☒ **Earphone**  
Model Number : PH136  
Manufacturer : BSD  
Data Cable : Shielded, 1.2m

☒ **Joystick**  
Model Number : JPD110  
Serial Number : 9814A15646  
Manufacturer : Maxxtro  
FCC ID : DoC  
Data Cable : Shielded, 1.7m

☒ **Speaker**  
Model Number : J-009  
Serial Number : 97-C-019790-T  
Manufacturer : JS  
FCC ID : DoC  
Data Cable : Shielded, 1.5m

**Partner PC System1**

☒ **Host Personal Computer**  
Model Number : VE 5/200 SERIES 4  
Manufacturer : HP  
Serial Number : SG80700310  
FCC ID : DoC  
Power Cord : Non-Shielded, 1.8m

☒ **Monitor**  
Model Number : CM752ET-311  
Serial Number : T8F006364  
FCC ID : DoC  
Manufacturer : HITACHI  
Data Cable : Shielded, 1.5m  
Power Cord : Shielded, 1.8m

☒ Keyboard  
Model Number : 6311-TW2C  
Serial Number : N/A  
FCC ID : DoC  
Manufacturer : ACER  
Data Cable : Shielded, 1.5m

☒ Mouse  
Model Number : M-S34  
Serial Number : LZB75078428  
FCC ID : DZL211029  
Manufacturer : HP  
Data Cable : Shielded, 1.8m

☒ Modem  
Model Number : 1414  
Serial Number : 980033040  
FCC ID : IFAXDM1414  
Manufacturer : ACEEX  
Data Cable : Shielded,, 1.5m  
Power Adapter : ACCEX, M/N: SCP41-91000A  
Cable Output : Shielded, 1.5m

Partner PC System2

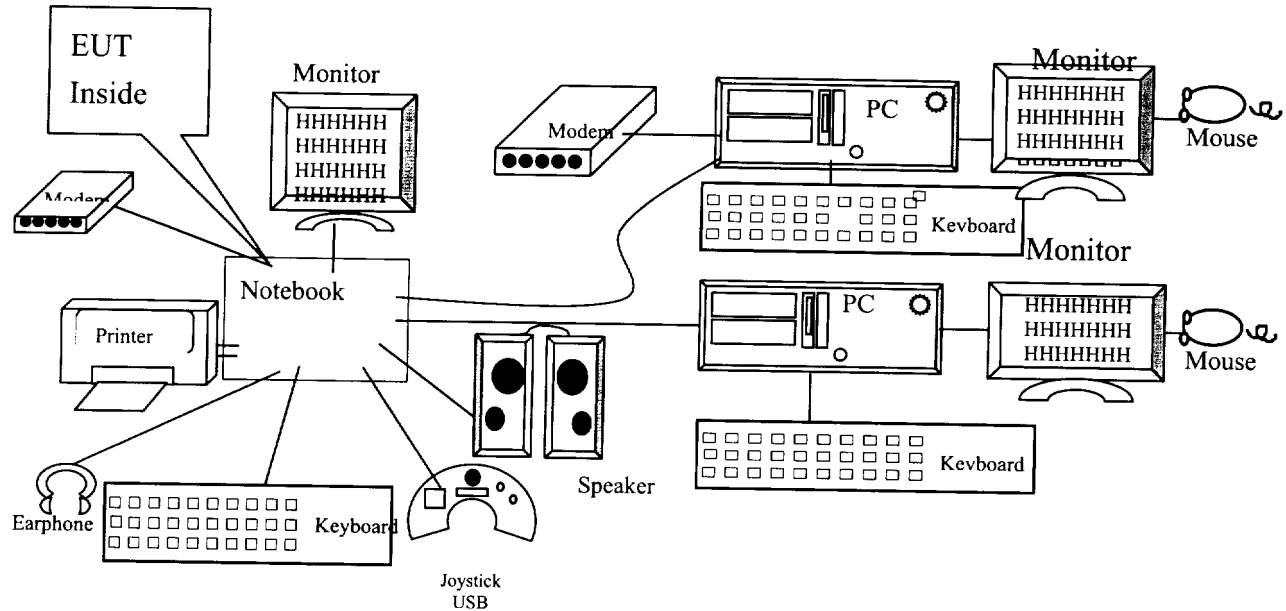
☒ Host Personal Computer  
Model Number : PIIL97  
Manufacturer : ASUS  
Serial Number : AS10228  
FCC ID : DoC  
Power Cord : Non-Shielded, 1.8m

☒ Monitor  
Model Number : CM752ET-311  
Serial Number : T8F006364  
FCC ID : DoC  
Manufacturer : HITACHI  
Data Cable : Shielded, 1.5m  
Power Cord : Shielded, 1.8m

☒ Keyboard  
Model Number : 6311-TW2C  
Serial Number : N/A  
FCC ID : DoC  
Manufacturer : ACER  
Data Cable : Shielded, 1.5m



### 1.3 EUT Configuration



### 1.4 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

- 1.4.1 Setup the EUT and simulators as shown on 1.3
- 1.4.2 Turn on the power of all equipment.
- 1.4.3 Boot the PC from Hard Disk .
- 1.4.4 Data will communicate between notebook personal computer and partner personal computer(1) through Cardbus Fast Ethernet PC card (EUT) that is within Notebook PC.
- 1.4.5 The notebook personal computer's and partner computer's monitor will show the transmitting and receiving characteristics when the communication is success.
- 1.4.6 Telex signal also communicate between notebook personal computer and partner personal computer(2) through Cardbus Fast Ethernet PC card (EUT) that is within Notebook PC at same time.
- 1.4.7 Printer and modem will keep at standby mode during Scanner operation.
- 1.4.8 Repeat the above procedure 1.4.4 to 1.4.7



## **1.5 Test performed**

Conducted emissions were investigated over the frequency range from **0.15MHz to 30MHz** using a receiver bandwidth of 9KHz.

Radiated emissions were investigated over the frequency range from **30MHz to 1000Mhz** using a receiver bandwidth of 120KHz. Radiated testing was performed at an antenna to EUT distance of 10 meters .



## 1.6 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on  
Federal Communications Commission  
FCC Engineering Laboratory  
7435 Oakland Mills Road  
Columbia, MD 21046  
Reference 31040/SIT1300F2



September 30, 1998 Accreditation on NVLAP  
NVLAP Lab Code: 200347-0



February 23, 1999 Accreditation on DNV  
Statement No. : 413-99-LAB11

December 8, 1998 Registration on VCCI  
Registration No. for No.2 Shielded Room C-858  
Registration No. for No.1 Open Area Test Site R-823  
Registration No. for No.2 Open Area Test Site R-835



January 04, 1999 Accreditation on TÜV Rheinland  
Certificate No.: I9865712-9901



Name of firm : QuieTek Corporation

Site location : No.75-1, Wang-Yeh Valley, Yung-Hsing Tsuen,  
Chiung-Lin, Hsin-Chu County, Taiwan, R.O.C.



## 2. Conducted Emission

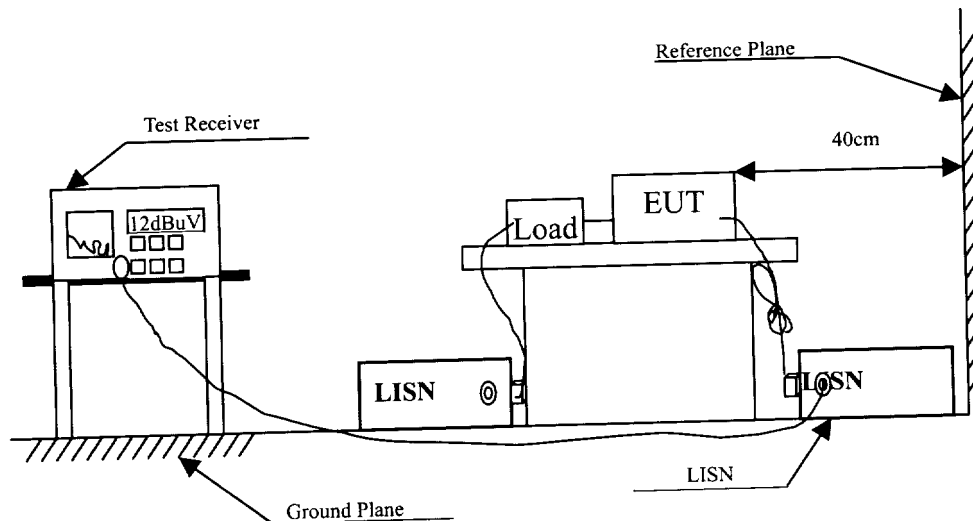
### 2.1 Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal..	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 1998	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 1998	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 1998	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

### 2.2 Test Setup



### 2.3 Limits

CISPR 22 Limits (dBuV)					FCC Part 15 Subpart B (dBuV)				
Frequency MHz	Class A		Class B		Frequency MHz	Class A		Class B	
	QP	AV	MHz	AV		uV	dBuV	uV	dBuV
0.15 - 0.50	79	66	66-56	56-46	0.45-1.705	1000	60.0	250	48.0
0.50-5.0	73	60	56	46	1.705-30	3000	69.5	250	48.0
5.0 - 30	73	60	60	50					

Remarks : In the Above Table, the tighter limit applies at the band edges.

## **2.4 Test Procedure**

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 /1992 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9Khz.

## **2.5 Test Results**

The emission from the EUT was below the specified limits. The worst case emissions are shown in Chapter 4. The acceptance criterion was met and the EUT passed the test.



### 3. Radiated Emission

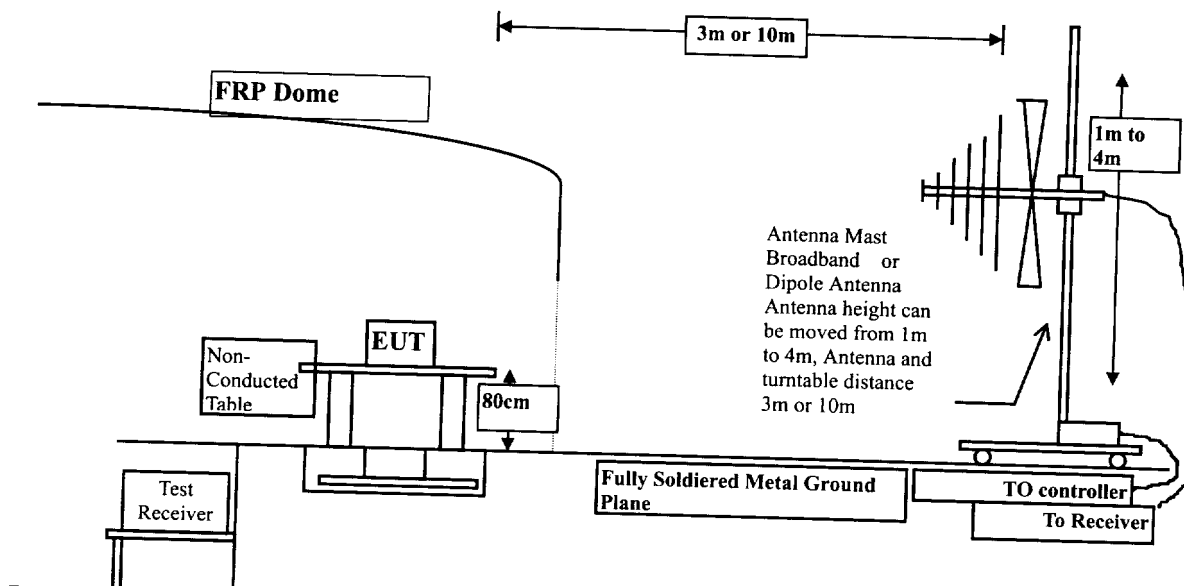
#### 3.1 Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 1998
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 1998
		Pre-Amplifier	HP	8447D/3307A01812	May, 1998
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 1998
	X	Horn Antenna	EM	EM6917 / 103325	May, 1998
SITE # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 1998
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 1998
		Pre-Amplifier	HP	8447D/3307A01814	May, 1998
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 1998
	X	Horn Antenna	EM	EM6917 / 103325	May, 1998

- Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.  
2.. Mark "X" test instruments are used to measure the final test results.

#### 3.2 Test Setup



### 3.3 Limits

CISPR 22 Limits (dBuV)					FCC Part 15 Subpart B (dBuV)				
Frequency MHz	Class A		Class B		Frequency	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m		uV	dBuV	uV	dBuV
30 – 230	10	40	10	30	30 – 88	90	39	100	40.0
230 – 1000	10	47	10	37	88 – 216	150	43.5	150	43.5
					216 – 960	210	46.5	200	46.0
					960 – 2000	300	49.5	500	54.0

Remark: 1. The tighter limit shall apply at the edge between two frequency bands.

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3. RF Line Voltage (dBuV) =  $20 \log \text{RF Line Voltage (uV)}$

### 3.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 10 meters .

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 /1992 on radiated measurement.

The bandwidth below 1Ghz setting on the field strength meter (R&S Test Receiver ESCS 30 ) is 120 KHz.

### 3.5 Test Results

The emission from the EUT was below the specified limits. The worst case emissions are shown in Chapter 4. The acceptance criterion was met and the EUT passed the test.

#### 4. **Summary of Test Results**

The test results in the emission was performed according to the requirements of measurement standard and process. QuieTek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission and immunity are listed as the attached data.

All the tests were carried out with the EUT in normal operation, which was defined as:

Model: 10/100 Fast Ethernet + 56K FAX Modem PC Card

**The EUT passed all the tests.**

The uncertainty is calculated in accordance with NAMAS NIS 81, The total uncertainty for this test is as follows:

➤ **Emission Test**

- Uncertainty in the Conducted Emission Test:  $< \pm 2.0 \text{ dB}$
- Uncertainty in the field strength measured:  $< \pm 4.0 \text{ dB}$

## Conducted mission Data

Date of Test : Apr .12, 1999 EUT : 10/100 Fast Ethernet+56K  
 FAX Modem PC Card  
 Test Mode : Mode 1 Detect Mode : Quasi-Peak & Average

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level Line1 dBuV	Measurement Level Line1 dBuV	Limits dBuV
0.185	0.01	0.10	47.53	47.64	64.25
0.273	0.03	0.10	42.16	42.29	61.04
0.550	0.07	0.10	39.06	39.23	56.00
0.733	0.08	0.10	38.93	39.11	56.00
0.918	0.10	0.10	38.62	38.82	56.00
*2.661	0.16	0.14	39.92	40.22	56.00

### Average:

0.185	0.01	0.10	38.50	38.61	54.25
0.273	0.03	0.10	37.10	37.23	51.04
0.550	0.07	0.10	38.40	38.57	46.00
0.733	0.08	0.10	38.30	38.48	46.00
0.918	0.10	0.10	37.40	37.60	46.00
2.661	0.16	0.14	34.80	35.10	46.00

### Remarks :

1. " \* " means that this data is the worst emission level.





## Conducted mission Data

Date of Test : Apr .12, 1999 EUT : 10/100 Fast Ethernet+56K  
 FAX Modem PC Card  
 Test Mode : Mode 1 Detect Mode : Quasi-Peak & Average

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line2	Line2	
	dB	dB	dBuV	dBuV	dBuV
0.181	0.01	0.10	46.03	46.14	64.43
0.271	0.03	0.10	40.66	40.79	61.08
0.551	0.07	0.10	39.79	39.96	56.00
0.734	0.08	0.10	40.00	40.18	56.00
0.919	0.10	0.10	39.61	39.81	56.00
*4.863	0.20	0.17	41.21	41.58	56.00

### Average:

0.181	0.01	0.10	36.70	36.81	54.43
0.271	0.03	0.10	35.30	35.43	51.08
0.551	0.07	0.10	39.00	39.17	46.00
0.734	0.08	0.10	39.40	39.58	46.00
0.919	0.10	0.10	38.50	38.70	46.00
4.400	0.19	0.16	33.60	33.96	46.00

### Remarks :

1. " \* " means that this data is the worst emission level.



## Radiated Emission Data

Date of Test : Apr.12, 1999 EUT : 10/100 Fast Ethernet+56K  
FAX Modem PC Card  
Test Mode : Mode 1 Detect Mode : Quasi-Peak

Frequency	Cable	Ant	Reading Level	Emission Level	Limits	Ant	Table
MHz	Loss	Factor	Horizontal	Horizontal		Pos	Pos
	dB	dB/m	dBuV/m	dBuV/m	dBuV/m	cm	deg
147.452	2.28	10.94	0.00	5.74	18.96	11.04	30.00 401 32
174.995	2.55	9.76	0.00	8.16	20.47	9.53	30.00 401 44
200.000	2.78	9.30	0.00	4.99	17.07	12.93	30.00 401 203
*250.000	3.27	12.61	0.00	12.70	28.58	8.42	37.00 401 43
275.000	3.51	12.91	0.00	7.64	24.07	12.93	37.00 401 120
300.000	3.76	13.36	0.00	9.93	27.04	9.96	37.00 401 33
350.000	4.01	14.25	0.00	7.28	25.54	11.46	37.00 296 50
400.000	4.28	15.85	0.00	2.96	23.09	13.91	37.00 296 182

### Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " \* ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss



## Radiated Emission Data

Date of Test : Apr.12, 1999 EUT : 10/100 Fast Ethernet+56K  
FAX Modem PC Card  
Test Mode : Mode 1 Detect Mode : Quasi-Peak

Frequency	Cable	Ant	Reading Level	Emission Level	Limits	Ant	Table
MHz	Loss	Factor	Vertical	Vertical		Pos	Pos
	dB	dB/m	dBuV/m	dBuV/m	dBuV/m	cm	deg
74.590	1.58	6.83	0.00	13.31	21.72	8.28	30.00 99 128
118.900	2.01	11.49	0.00	6.11	19.61	10.39	30.00 99 73
132.658	2.14	11.35	0.00	5.17	18.66	11.34	30.00 99 203
*147.453	2.28	10.68	0.00	13.12	26.08	3.92	30.00 99 203
150.000	2.31	10.43	0.00	13.27	26.01	3.99	30.00 99 145
200.000	2.78	9.07	0.00	13.75	25.61	4.39	30.00 99 79
225.001	3.03	9.68	0.00	12.37	25.07	4.93	30.00 99 125
300.000	3.76	13.56	0.00	9.55	26.86	10.14	37.00 99 98
350.000	4.01	14.80	0.00	7.44	26.25	10.75	37.00 99 173

### Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " \* ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss



## **5. EMI Reduction Method During Compliance Testing**

No modification was made during testing.

