



Test Report

Product Name : 10/100M Fast Ethernet CardBus PC Card
Model No. : FE2000VX, FL-FE2500MX, LCS-8539TX, TE100-PCBUSR,
DFE-680TXD, PN672TX
FCC ID.: MQ4FE2KVX

Applicant : AboCom Systems, Inc.

Address : 1F, No. 21, R & D Road II, Science-Based
Industrial Park, Hsin-Chu, Taiwan, R.O.C.

Date of Receipt : July 11, 2001

Date of Test : July 25, 2001

Report No. : 017H032FI

The Test Results relate only to the samples tested.

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Test Report Certification

Test Date : July 25, 2001

Report No. : 017H032FI



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200347-0

Product Name : 10/100M Fast Ethernet CardBus PC Card
 Applicant : AboCom Systems, Inc.
 Address : 1F, No. 21, R & D Road II, Science-Based Industrial Park, Hsin-Chu, Taiwan, R.O.C.
 Manufacturer : AboCom Systems, Inc.
 Model No. : FE2000VX, FL-FE2500MX, LCS-8539TX, TE100-PCBUSR, DFE-680TXD, PN672TX
 FCC ID. : MQ4FE2K VX
 Rated Voltage : DC 3.3V
 Trade Name : AboCom
 Measurement Standard : CISPR 22:1997
 Measurement Procedure : ANSI C63.4:1992
 Classification : Class B
 Test Result : Complied



NVLAP Lab Code : 200347-0

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Documented By : *Lisa Chen*
 (Lisa Chen)

Tested By : *Calien Kang*
 (Calien Kang)

Approved By : *Gene Chang*
 (Gene Chang)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name : 10/100M Fast Ethernet CardBus PC Card
 Trade Name : AboCom
 FCC ID. : MQ4FE2KVX
 Model No. : FE2000VX, FL-FE2500MX, LCS-8539TX, TE100-PCBUSR,
 DFE-680TXD, PN672TX
 Transfer Speed : 10Mbps/100Mbps

Note:

1. This EUT is a 10/100M Fast Ethernet CardBus PC Card.
1. Regards to the of the different construction EUT. The model name were shown in the table following:

Model Number	Company
FE2000VX	AboCom Systems, Inc.
FL-FE2500MX	ABC COMPUTER HANDELS GMBH
LCS-8539TX	LONGSHINE THCHNOLOGIE EUROPE GMBH
TE100-PCBUSR	TRENDWare International
DFE-680TXD	D-Link Corporation
PN672TX	Hawking Technology

2. Quietek has verified all construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Conducted Test Mode 1: 10Mbps
 Mode 2: 100Mbps
 Radiated Test Mode 1: 10Mbps
 Mode 2: 100Mbps

1.2. Tested System Details

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

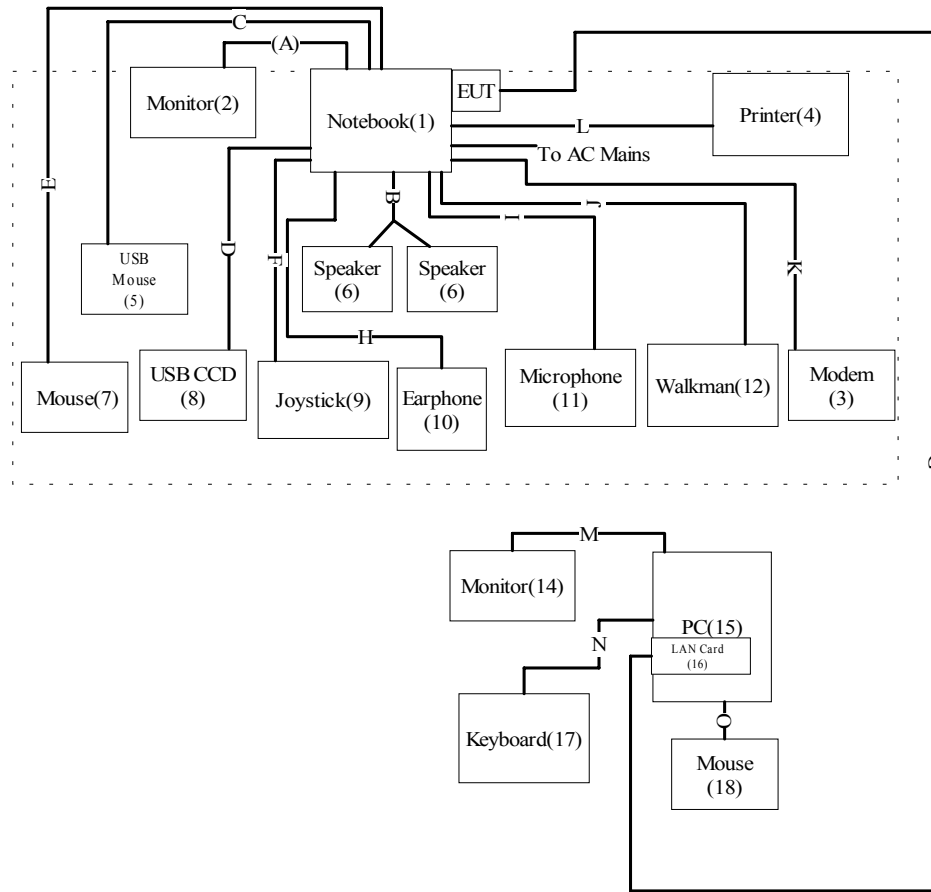
	Product	Manufacturer	Model No.	Serial No.	FCC ID
(1)	Notebook	IBM	Think Pad 570	27L8835	DoC
(2)	Monitor	HITACHI	CM752ET-311	T8E004439	DoC
(3)	Printer	HP	C2642A	MY75L1D2XN	B94C2642X
(4)	USB Mouse	Logitech	M-UE55	LTC93813273	DoC
(5)	Speaker	JS	J-009	97-C-019799-T	DoC
(6)	Mouse	IBM	M-SAU-IBM6	23-022675	JNZ211220
(7)	USB Video Camera	Mustek	Vcam 3X	N/A	DoC
(8)	Joystick	Logitech	863132-0000	AE83700069	DZLBATMAN
(9)	Earphone	BSD	N/A	N/A	DoC
(10)	Microphone	AIWA	CD-8000	N/A	DoC
(11)	Walkman	TOBISHI	TB-21984	N/A	DoC
(12)	Modem	ACEEX	1414	980033034	IFAXDM1414
(13)	Modem	ACEEX	1414	980033032	IFAXDM1414
(14)	PC	ASUS	P2L97	92M4Y00777	DoC
(15)	LAN Card	D-LINK	DFE-500TX	0080C8 958320	KA2APC500X3
(16)	Keyboard	MITSUMI	KFKEA4SA	KFKEA4SA94Q20474	CMYKFK7835
(17)	Mouse	Logitech	M-S34	LZA82760570	DZL211029

Note:

1. The power cord of The device. (1) 、 (3) 、 (13) are Non-shielded power cord.
2. The power cord of The device. (2) is Shielded power cord.

	Signal Cable Type	Signal cable Description
A.	VGA Cable	Shielded, 1.8m, two ferrite cores bonded
B.	Speaker Cable	Non-shielded, 1.2m
C.	USB Mouse Cable	Shielded, 1.0m
D.	USB CCD Cable	Shielded, 1.5m
E.	Mouse Cable	Shielded, 1.8m
F.	Joystick Cable	Shielded, 2.0m
G.	LAN Cable	Non-shielded, 3.0m
H.	Earphone Cable	Non-shielded, 1.2m
I.	Microphone Cable	Non-shielded, 1.2m
J.	Walk man Cable	Non-shielded, 1.6m
K.	Modem Cable	Shielded, 1.5m
L.	Printer Cable	Shielded, 1.2m
M.	VGA Cable	Shielded, 1.6m
N.	Keyboard Cable	Shielded, 1.8m
O.	Mouse Cable	Shielded, 1.8m

1.3. Configuration of tested System



1.4. EUT Exercise Software

- (1) Setup the EUT and simulators as shown on 1.3
- (2) Turn on the power of all equipment.
- (3) Boot the PC from Hard Disk.
- (4) Data will communicate between partner personal computer and partner personal computer through EUT.
- (5) The partner personal computer and partner personal computer monitors' will show the transmitting and receiving characteristics when the communication is success.
- (6) Repeat the above procedure 1.4.4 to 1.4.5

1.5. 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



Site Name: Quietek Corporation

Site Address: N0.75-1, Wang-Yeh Valley, Yung-Hsing,
 Chiung-Lin, Hsin-Chu County,
 Taiwa, R.O.C.
 TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
 E-Mail : service@quietek.com

2. Conducted Emission

2.1. Test Equipment List

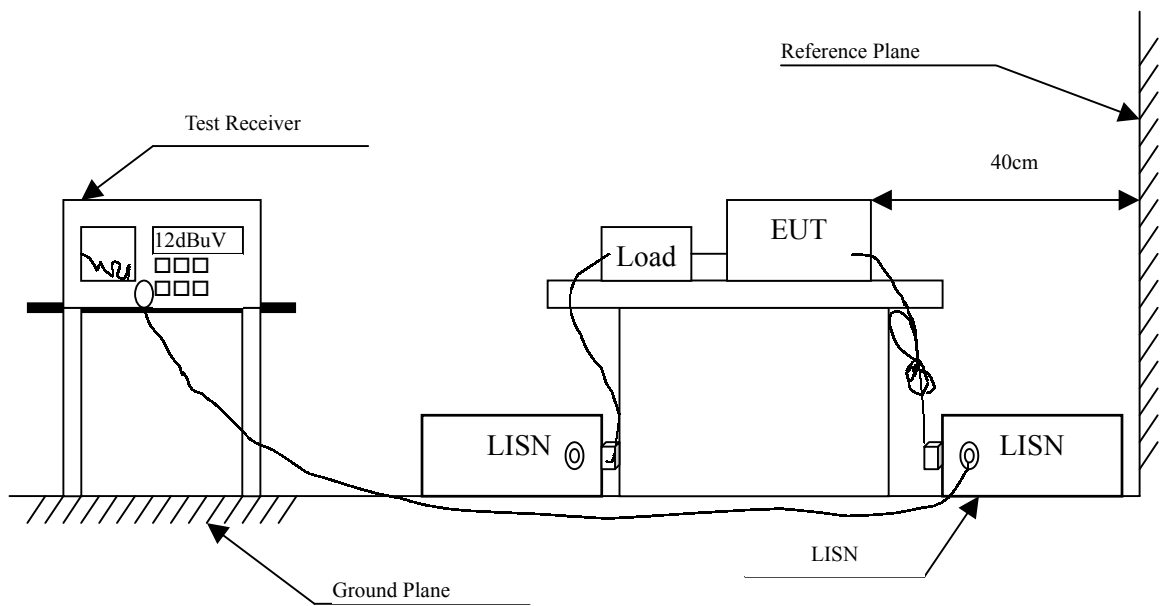
The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal..	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2001	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2001	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2001	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

S



2.3. Limits

CISPR 22 Limits (dBuV)				
Frequency MHz	Class A		Class B	
	QP	AV	QP	AV
0.15 - 0.50	79	66	66-56	56-46
0.50-5.0	73	60	56	46
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.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Result

The emission from the EUT was below the specified limits. The worst-case emissions are shown in section 5. The acceptance criterion was met and the EUT passed the test.

3. Radiated Emission

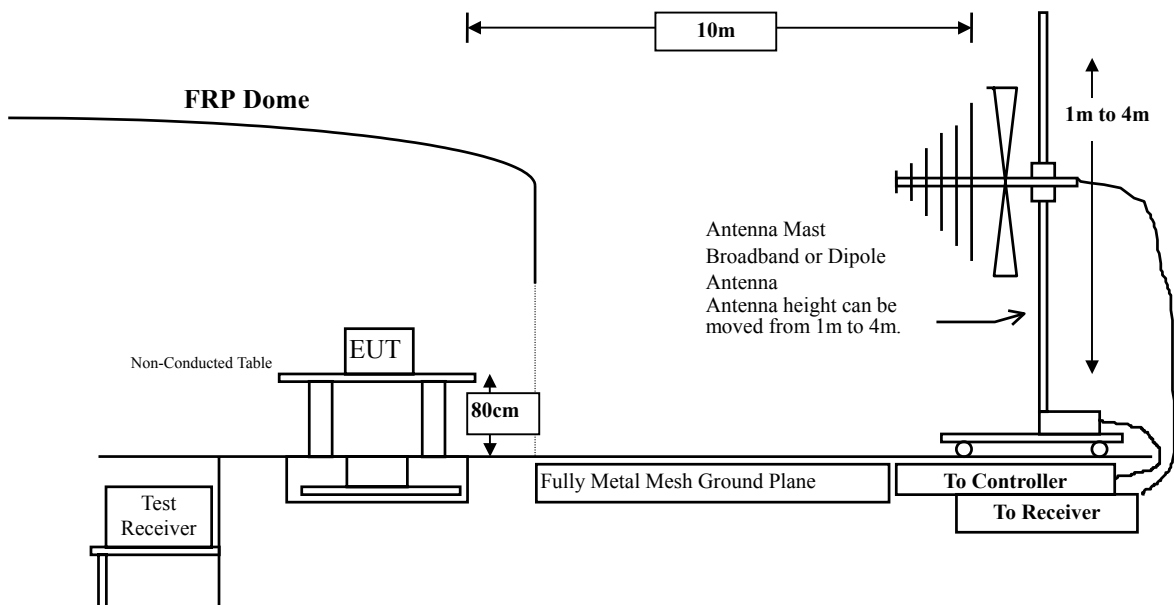
3.1. Test Equipment

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, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2001
		Pre-Amplifier	HP	8447D/3307A01812	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2001
		Pre-Amplifier	HP	8447D/3307A01814	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001

- Note:
1. All equipments that need to calibrate 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)				
Frequency MHz	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m
30 – 230	10	40	10	30
230 – 1000	10	47	10	37

- 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/m) = 20 log RF Line Voltage (uV/m)

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.

Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 10 meters.

3.5. Test Result

The emission from the EUT was below the specified limits. The worst-case emissions are shown in section 5. The acceptance criterion was met and the EUT passed the test.

4. **EMI Reduction Method During Compliance Testing**

No modification was made during testing.

5. Summary of Test Datas

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 is listed as below.

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

Test Mode:

Conducted Test	Mode 1: 10Mbps
	Mode 2: 100Mbps
Radiated Test	Mode 1: 10Mbps
	Mode 2: 100Mbps

5.1. Test Data of Conducted Emission

Product : 10/100M Fast Ethernet CardBus PC Card
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: 10Mbps

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level dBuV	Measurement Level dBuV	Limits dBuV
------------------	---------------------	----------------------	--------------------------	------------------------------	----------------

Quasi-Peak

* 0.173	0.01	0.10	54.35	54.46	64.79
0.197	0.01	0.10	45.90	46.01	63.74
0.263	0.03	0.10	37.14	37.27	61.34
0.531	0.07	0.10	30.08	30.25	56.00
4.374	0.19	0.16	34.38	34.74	56.00
9.998	0.28	0.20	38.57	39.05	60.00

Average

0.173	0.01	0.10	30.10	30.21	54.82
0.197	0.01	0.10	36.50	36.61	53.74
0.263	0.03	0.10	35.00	35.13	51.34
0.531	0.07	0.10	27.90	28.07	46.00
4.374	0.19	0.16	26.70	27.06	46.00
9.998	0.28	0.20	32.80	33.28	50.00

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “*”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss.

Product : 10/100M Fast Ethernet CardBus PC Card
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: 10Mbps

Frequency	Cable	LISN	Reading	Measurement	Limits
MHz	Loss	Factor	Level	Level	
	dB	dB	dBuV	dBuV	dBuV

Quasi-Peak

* 0.201	0.02	0.10	46.87	46.99	63.58
0.267	0.03	0.10	42.51	42.64	61.20
0.330	0.04	0.10	37.40	37.54	59.46
4.505	0.19	0.17	34.08	34.44	56.00
8.744	0.26	0.19	34.54	35.00	60.00
10.005	0.28	0.20	38.91	39.39	60.00

Average

0.201	0.02	0.10	35.30	35.42	53.57
0.267	0.03	0.10	30.60	30.73	51.21
0.330	0.04	0.10	30.00	30.14	49.45
4.505	0.19	0.17	25.90	26.26	46.00
8.744	0.26	0.19	30.40	30.86	50.00
10.005	0.28	0.20	33.40	33.88	50.00

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss.

Product : 10/100M Fast Ethernet CardBus PC Card
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: 100Mbps

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level dBuV	Measurement Level dBuV	Lim its dBuV
Quasi-Peak					
0.201	0.02	0.10	46.18	46.30	63.58
0.267	0.03	0.10	37.81	37.94	61.20
0.330	0.04	0.10	38.39	38.53	59.46
4.377	0.19	0.16	34.90	35.26	56.00
17.693	0.34	0.41	41.62	42.37	60.00
* 23.130	0.37	0.50	45.15	46.03	60.00
Average					
0.201	0.02	0.10	36.40	36.52	53.57
0.267	0.03	0.10	29.10	29.23	51.21
0.330	0.04	0.10	32.30	32.44	49.45
4.388	0.19	0.16	27.50	27.86	46.00
17.693	0.34	0.41	27.40	28.15	50.00
23.130	0.37	0.50	40.90	41.78	50.00

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss.

Product : 10/100M Fast Ethernet CardBus PC Card
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: 100Mbps

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level dBuV	Measurement Level dBuV	Lim its dBuV
Quasi-Peak					
0.197	0.01	0.10	49.67	49.78	63.73
0.267	0.03	0.10	42.08	42.21	61.20
0.334	0.04	0.10	38.57	38.71	59.36
4.517	0.19	0.17	38.54	38.90	56.00
16.228	0.33	0.38	41.38	42.09	60.00
* 26.610	0.39	0.55	45.20	46.14	60.00
Average					
0.197	0.01	0.10	38.50	38.61	53.74
0.267	0.03	0.10	31.80	31.93	51.21
0.334	0.04	0.10	32.10	32.24	49.35
4.517	0.19	0.17	30.60	30.96	46.00
16.228	0.33	0.38	37.10	37.81	50.00
26.610	0.39	0.55	41.10	42.04	50.00

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss.

5.2. Test Data of Radiated Emission

Product : 10/100M Fast Ethernet CardBus PC Card
 Test Item : Radiated Emission
 Test Site : No.1 OATS
 Test Mode : Mode 1: 10Mbps

Freq. MHz	Cable Loss dB	Probe Factor dB/m	PreAMP dB	Reading Level dBuV	Emission Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal							
132.867	2.14	11.49	0.00	3.39	17.02	12.98	30.00
199.617	2.78	9.30	0.00	8.53	20.61	9.39	30.00
* 240.035	3.17	11.32	0.00	17.69	32.18	4.82	37.00
250.008	3.27	12.61	0.00	13.42	29.30	7.70	37.00
260.015	3.36	13.95	0.00	9.06	26.38	10.62	37.00
299.272	3.75	13.33	0.00	10.12	27.20	9.80	37.00
330.010	3.91	13.61	0.00	7.82	25.34	11.66	37.00
498.642	4.79	17.34	0.00	2.65	24.78	12.22	37.00
Vertical							
66.375	1.50	5.83	0.00	18.92	26.25	3.75	30.00
* 77.175	1.61	6.93	0.00	18.00	26.54	3.46	30.00
130.003	2.11	11.99	0.00	7.58	21.69	8.31	30.00
199.617	2.78	9.07	0.00	14.51	26.37	3.63	30.00
240.035	3.17	11.22	0.00	14.31	28.70	8.30	37.00
250.015	3.27	12.26	0.00	13.08	28.61	8.39	37.00
298.430	3.74	13.54	0.00	10.56	27.83	9.17	37.00
896.300	6.87	19.88	0.00	1.58	28.33	8.67	37.00

Note:

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

Product : 10/100M Fast Ethernet CardBus PC Card
 Test Item : Radiated Emission
 Test Site : No.1 OATS
 Test Mode : Mode 2: 100Mbps

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

199.460	2.78	9.30	0.00	8.45	20.53	9.47	30.00
240.038	3.17	11.32	0.00	10.17	24.66	12.34	37.00
*250.008	3.27	12.61	0.00	12.46	28.34	8.66	37.00
299.307	3.75	13.33	0.00	8.34	25.42	11.58	37.00
398.400	4.27	15.82	0.00	0.48	20.57	16.43	37.00
498.100	4.78	17.31	0.00	3.37	25.46	11.54	37.00

Vertical

31.433	1.16	17.79	0.00	5.94	24.89	5.11	30.00
66.370	1.50	5.83	0.00	19.30	26.63	3.37	30.00
* 77.175	1.61	6.93	0.00	19.66	28.20	1.80	30.00
108.772	1.91	11.15	0.00	12.25	25.30	4.70	30.00
132.678	2.14	11.35	0.00	12.81	26.30	3.70	30.00
199.402	2.78	9.07	0.00	14.73	26.59	3.41	30.00
250.008	3.27	12.26	0.00	11.30	26.83	10.17	37.00
299.302	3.75	13.54	0.00	13.78	31.07	5.93	37.00
697.600	5.82	18.68	0.00	0.94	25.44	11.56	37.00

Note:

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

Attachment 1 : EUT Test Photographs

Attachment 2 : EUT Detailed Photographs