



# Test Report

For

**Applicant** : AboCom Systems, Inc.  
**Equipment Type** : 10/100 Cardbus PC Card  
**Model** : FE2500  
**FCC ID** : MQ4FE2500A

**Report No. :** 99CH011FI



## 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 Systems, Inc.  
Address : 1F, No.21, R&D Road II, Science-Based Industrial Park,  
Hsin-Chu , Taiwan, R.O.C.  
Equipment Type : 10/100 Cardbus PC Card  
Model : FE2500  
FCC ID. : MQ4FE2500A  
Measurement Standard : CISPR 22/1994  
Measurement Procedure : ANSI C63.4 /1992  
Operation Voltage : DC 3.3V  
Classification : Class B  
Test Result : Complied  
Test Date : December 13, 1999  
Report No. : 99CH011FI



The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

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

Documented by: Kim Hung	Test Engineer: Jimmy Huang	Approved: Gene Chang
-------------------------	----------------------------	----------------------



# TABLE OF CONTENTS

Description	Page
<b>1. GENERAL INFORMATION.....</b>	<b>4</b>
1.1 EUT Description .....	4
1.2 Tested System Details.....	5
1.3 EUT Configuration.....	8
1.4 EUT Exercise Software .....	9
1.5 Test performed .....	9
1.6 Test Facility .....	10
<b>2. CONDUCTED EMISSION.....</b>	<b>11</b>
2.1 Test Equipment List.....	11
2.2 Test Setup .....	11
2.3 Limits .....	11
2.4 Test Procedure.....	12
2.5 Test Results.....	12
<b>3. RADIATED EMISSION .....</b>	<b>13</b>
3.1 Test Equipment .....	13
3.2 Test Setup .....	13
3.3 Limits .....	14
3.4 Test Procedure.....	14
3.5 Test Results.....	14
<b>4. EMI REDUCTION METHOD DURING COMPLIANCE TESTING .....</b>	<b>15</b>
<b>5. ATTACHMENT .....</b>	<b>16</b>
ATTACHMENT 1: SUMMARY OF TEST RESULTS	
ATTACHMENT 2: EUT TEST PHOTOGRAPHS	
ATTACHMENT 3: EUT DETAILED PHOTOGRAPHS	



## 1. General Information

### 1.1 EUT Description

Applicant : AboCom Systems, Inc.

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

Equipment Type : 10/100 Cardbus PC Card

Model : FE2500

FCC ID : MQ4FE2500A

Operation Voltage : DC 3.3V

Remark :

1. The EUT is a 10/100 Cardbus PC Card in 10/100Mbps transmission speed.  
Both the transmission speed were tested respectively.
2. QuieTek had verified both construction and function in typical operation,  
then shown in this test report.



## 1.2 Tested System Details

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

### 1.2.1 Notebook PC

Model Number :2640-70A  
Serial Number :97-6492R  
Manufacturer :IBM

#### **10/100 Cardbus PC Card (EUT)**

Model Number :FE2500  
Serial Number :N/A  
FCC ID :DoC  
Manufacturer :AboCom  
Power Adapter :IBM, M/N:83H6339  
S/N:J14HL4042F9  
Cable In: Non-shielded, 1.8m  
Cable Out: Non-shielded, 1.8m, a ferrite core bonded

### 1.2.2 Monitor

Model Number : CM752ET-311  
Serial Number : T8D003312  
FCC ID : DoC  
Manufacturer : HITACHI  
Data Cable : Shielded, 1.6m  
Power Cord : Shielded, 1.8m

### 1.2.3 Modem

Model Number : 1414  
Serial Number : 980033032  
FCC ID : IFAXDM1414  
Manufacturer : ACEEX  
Data Cable : Shielded, 1.5m  
Power Adapter : ACCEX, M/N: SCP41-91000A  
Cable Output : Shielded, 1.5m



#### 1.2.4 Printer

Model Number : C2642A  
Serial Number : MY75N1D2Y1  
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

#### 1.2.5 Mouse

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

#### 1.2.6 Microphone

Model Number : CD-8000  
Serial Number : N/A  
Manufacturer : AIWA  
Data Cable : Non-shielded, 1m

#### 1.2.7 Earphone

Model Number : PH136  
Serial Number : N/A  
Manufacturer : BSD  
Data Cable : Shielded, 1.2m

#### 1.2.8 Video Camera

Model Number : Wcam 3X  
Serial Number : N/A  
FCC ID : DoC  
Manufacturer : Mustek  
Data Cable (USB) : Shielded, 1.5m

#### 1.2.9 LAN Cable : Non-shielded, 15m

## **Partner PC System**

### **1.2.10 Host Personal Computer**

Model Number : VL SERIES 5 5/166  
Serial Number : SG72300332  
FCC ID : DoC  
Manufacturer : HP  
Power Cord : Non-Shielded, 1.8m

### **1.2.11 Monitor**

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

### **1.2.12 Keyboard**

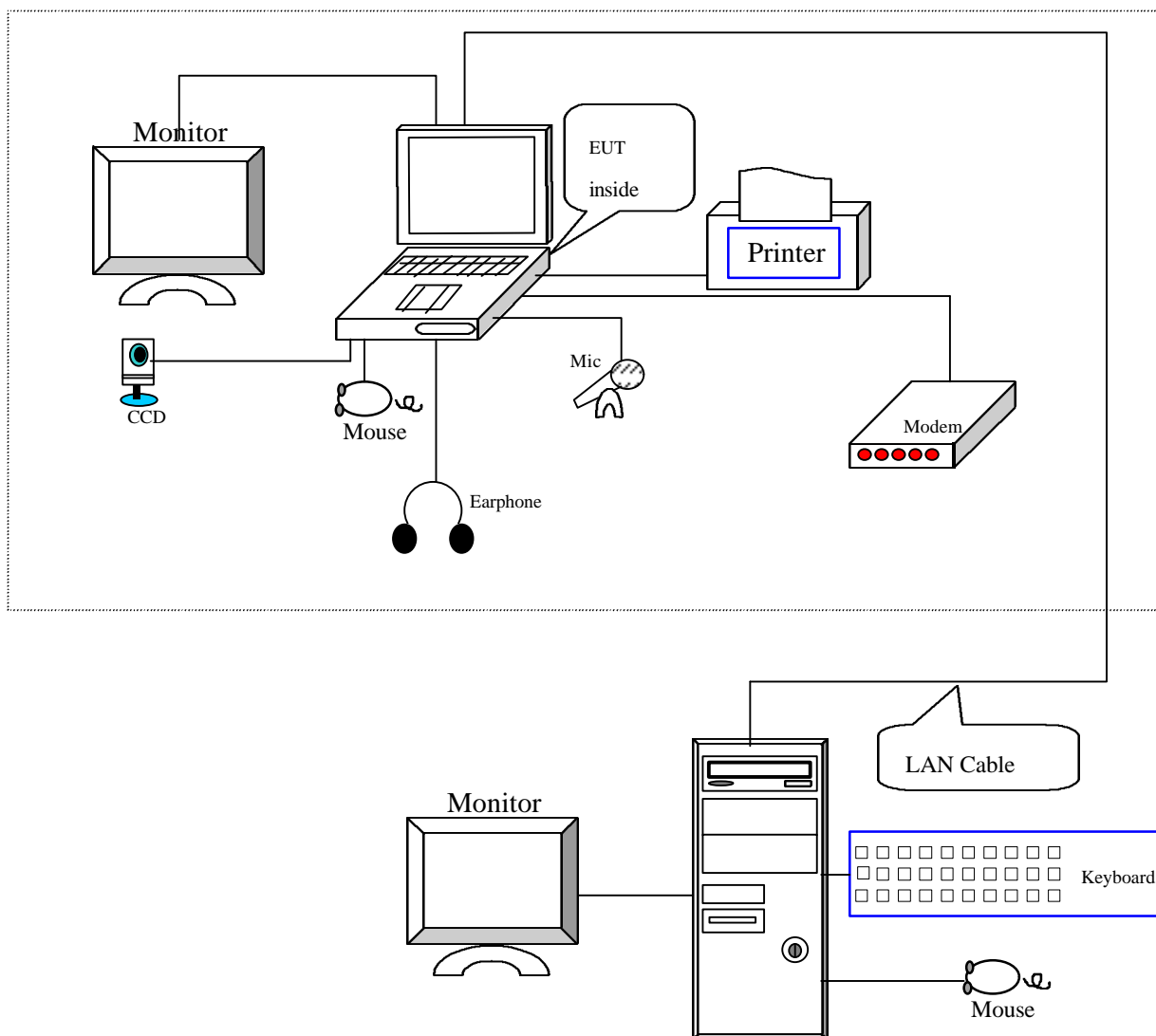
Model Number : SCORPIUS 980N plus/980  
Serial Number : 808000124  
FCC ID : F2Q4NE980  
Manufacturer : QTRONIX  
Data Cable : Shielded, 1.8m

### **1.2.13 Mouse**

Model Number : M-S34  
Serial Number : LZB75078478  
FCC ID : DZL211029  
Manufacturer : HP  
Data Cable : Shielded, 1.8m



### 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 Personal Computer reads data from disk.
- 1.4.4 Data will be transmitted between Notebook and partner PC through EUT.
- 1.4.5 The transmission status will be shown on the monitor.
- 1.4.6 Repeat the above procedure 1.4.4 to 1.4.5

#### **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

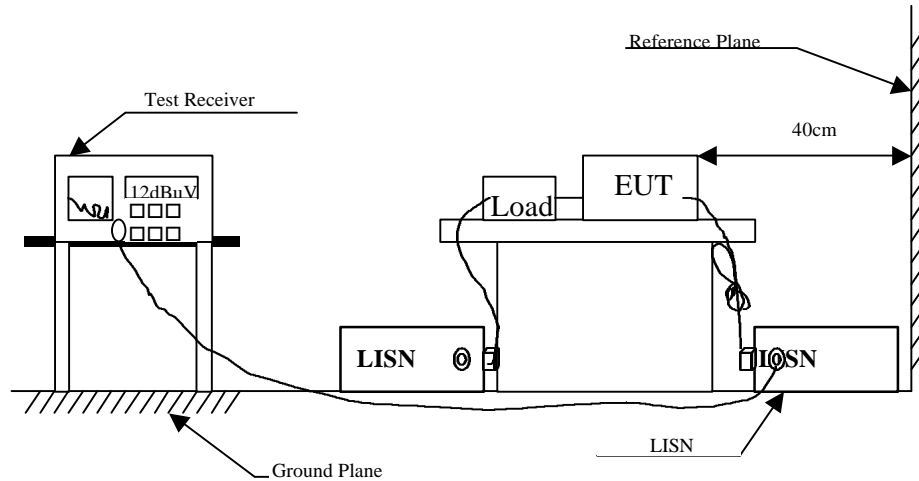
### 2.1 Test Equipment List

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, 1999	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 1999	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 1999	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 conducted emission from the EUT is measured and shown in attachment 1 of test report. The acceptance criterion was met and the EUT passed the test.



### 3. Radiated Emission

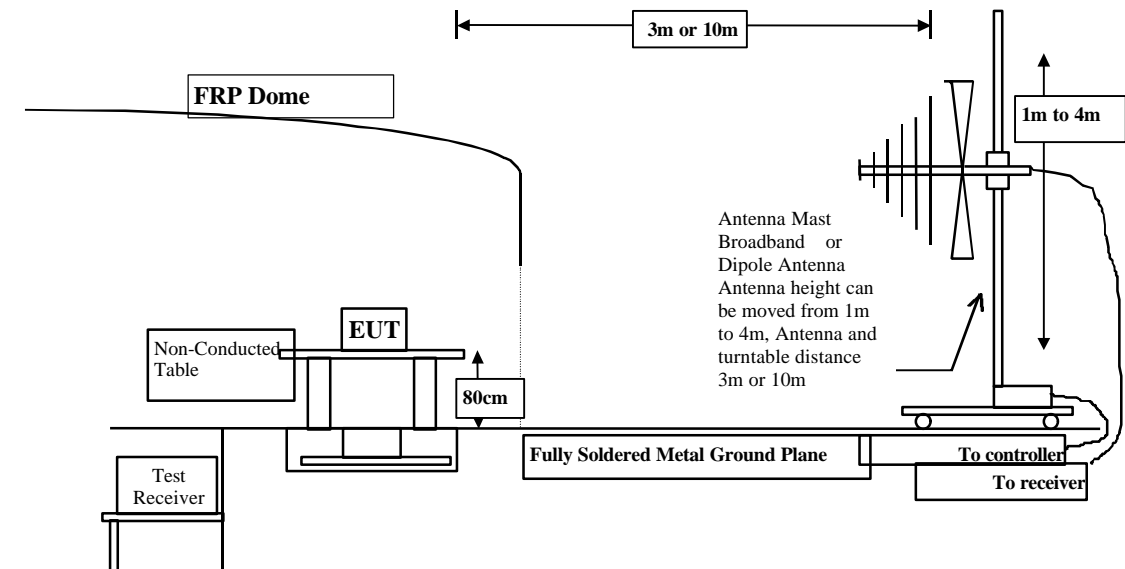
#### 3.1 Test Equipment

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, 1999
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 1999
		Pre-Amplifier	HP	8447D/3307A01812	May, 1999
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 1999
	X	Horn Antenna	EM	EM6917 / 103325	May, 1999
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 1999
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 1999
		Pre-Amplifier	HP	8447D/3307A01814	May, 1999
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 1999
	X	Horn Antenna	EM	EM6917 / 103325	May, 1999

- 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	Class A		Class B		Frequency	Class A		Class B	
MHz	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 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 radiated emission from the EUT is measured and shown in Attachment 1 of test report. 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. Attachment

Attachment 1: Summary of Test Results	Number of Pages: 9
Attachment 2: EUT Test Photographs	Number of Pages: 4
Attachment 3: EUT Detailed Photographs	Number of Pages: 4

