



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 |
|--|-----------|
| 1. GENERAL INFORMATION..... | 4 |
| 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 |
| 2. CONDUCTED EMISSION..... | 11 |
| 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 |
| 3. RADIATED EMISSION | 13 |
| 3.1 Test Equipment | 13 |
| 3.2 Test Setup | 13 |
| 3.3 Limits | 14 |
| 3.4 Test Procedure..... | 14 |
| 3.5 Test Results..... | 14 |
| 4. EMI REDUCTION METHOD DURING COMPLIANCE TESTING | 15 |
| 5. ATTACHMENT | 16 |
| 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

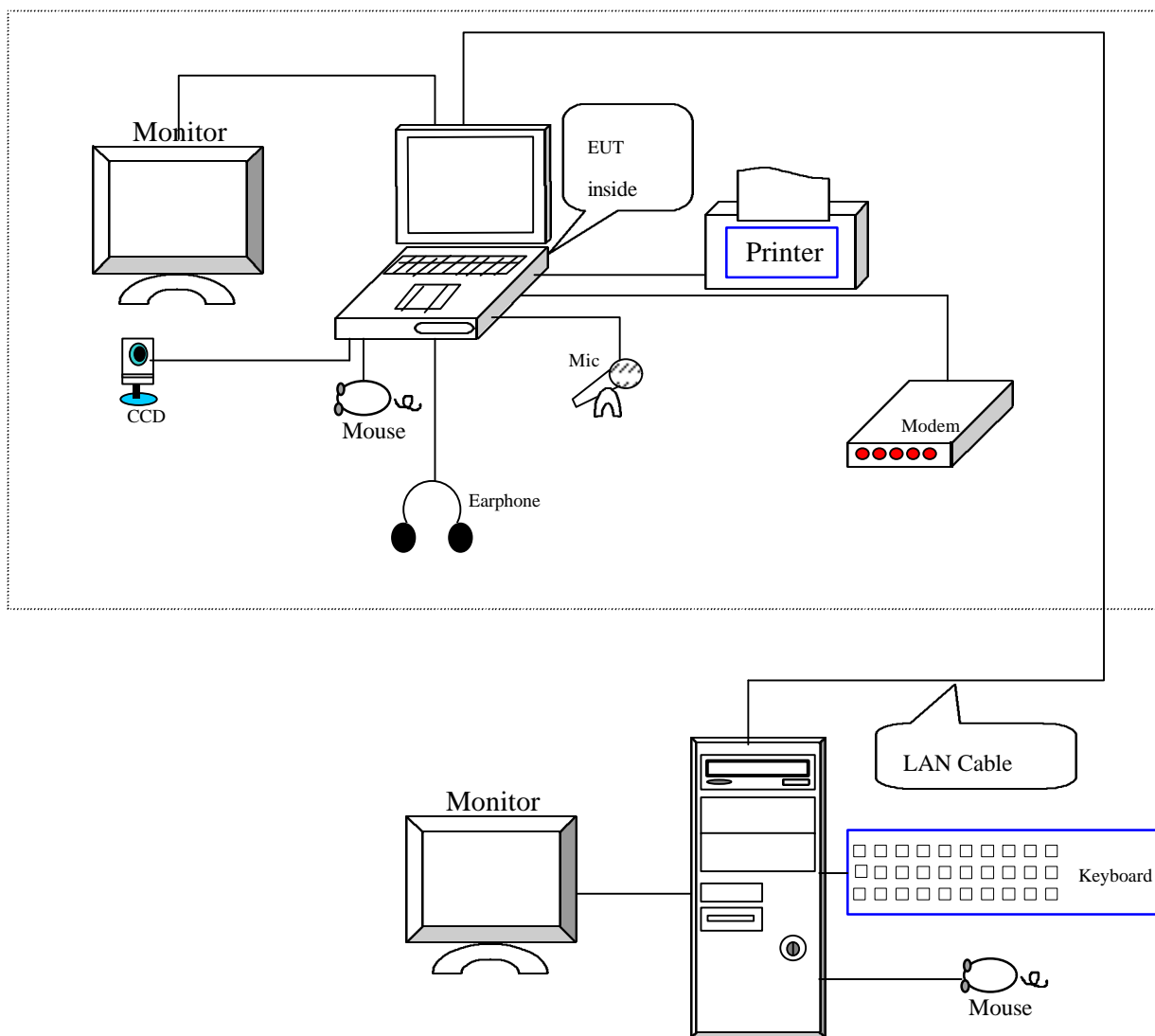
Model Number : SCORPIUS 980N plus/980
Serial Number : 808000124
FCC ID : F2Q4NE980
Manufacturer : QTRONIX
Data Cable : Shielded, 1.8m

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

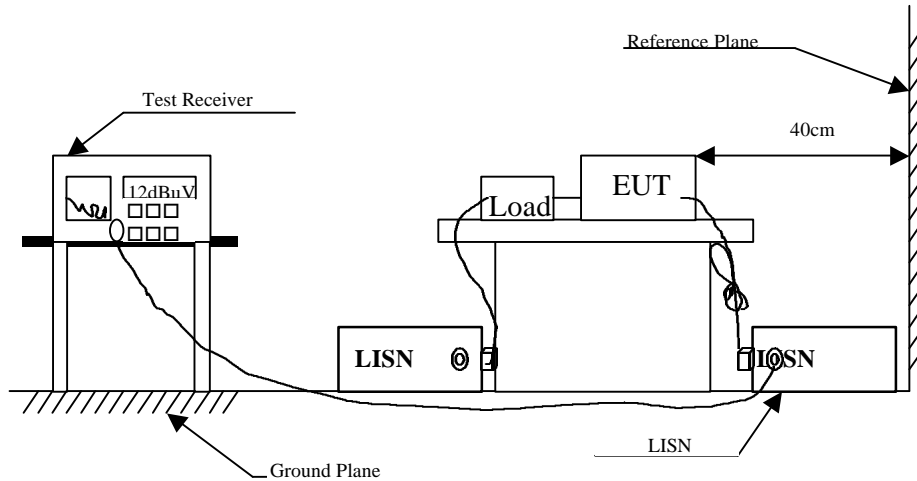
2.1 Test Equipment List

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

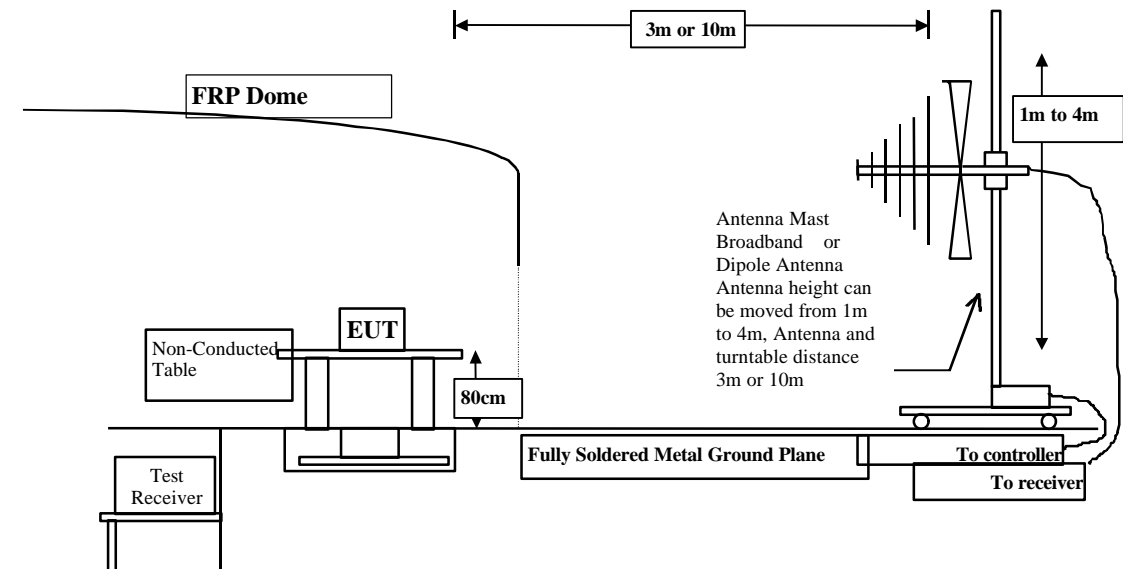
3.1 Test Equipment

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 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 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 |

