



Test Report

For

Applicant : AboCom Systems, Inc.
Equipment Type : IEEE 1394 Cardbus PC Card
Model : FW200
FCC ID : MQ4FW200

Report No. : 00BH006FI

Test Report Certification

QuieTek Corporation

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

Applicant : AboCom Systems, Inc.
Address : No.77, Yu-Yih Rd., Chu-Nan Chen, Miao-Lih Hsuan, Taiwan,
R.O.C
Equipment Type : IEEE 1394 Cardbus PC Card
Model : FW200
FCC ID. : MQ4FW200
Measurement Standard : CISPR 22/1985
Measurement Procedure : ANSI C63.4 /1992
Operation Voltage : DC 3.3V
Classification : Class B
Test Result : Complied
Test Date : November 2, 2000
Report No. : 00BH006FI

NVLAP®

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

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Kevin Wang

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ATTACHMENT 1: SUMMARY OF TEST RESULTS

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1. General Information

1.1 EUT Description

Applicant : AboCom Systems, Inc.
Address : No.77, Yu-Yih Rd., Chu-Nan Chen, Miao-Lih Hsuan,
Taiwan, R.O.C
Equipment Type : IEEE 1394 Cardbus PC Card
Model : FW200
FCC ID : MQ4FW200
Operation Voltage : DC 3.3V

Remark :

1. The EUT is an IEEE 1394 Cardbus PC Card.
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

Model Number	: Think Pad 570
Manufacturer	: IBM
Serial Number	: 27L8835
FCC ID	: DoC
IEEE 1394 Cardbus(EUT)	: Abocom, FW200
PC Card	FCC ID: MQ4FW200
	1394 Data Cable : Shielded, 1.6m
Power Adapter	: IBM, 02K6543
	Cable In : Non-shielded, 1.5m
	Cable Output : Non-shielded, 1.8m

1.2.2 Monitor

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

1.2.3 Modem

Model Number	: 1414
Serial Number	: 980033039
FCC ID	: IFAXDM1414
Manufacturer	: ACEEX
Data Cable	: Shielded, 1.5m
Power Adapter	: ACCEX, SCP41-91000A
	Cable Output : Shielded, 1.5m

1.2.4 Printer

Model Number	: C2642A
Serial Number	: MY75J1D1D2
FCC ID	: B94C2642X
Manufacturer	: HP
Data Cable	: Shielded, 1.2m
Power Adapter	: NMB, 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	: LZA71178588
FCC ID	: DZL211029
Manufacturer	: HP
Data Cable	: Shielded, 1.8m

1.2.6 Mouse

Model Number	: M-UB48
Serial Number	: LTC74800118
FCC ID	: DZL211137
Manufacturer	: Logitech
Data Cable	: Shielded, 1.8m

1.2.7 Microphone

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

1.2.8 Earphone

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

1.2.9 Joystick

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

1.2.10 Video Camera

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

1.2.11 Speaker

Model Number	: J-009
Serial Number	: 97-C-019790-T
FCC ID	: DoC
Manufacturer	: JS
Data Cable	: Non-shielded, 1.2m

1.2.12 Walkman

Model Number	: TB-21984
Serial Number	: N/A
FCC ID	: DoC
Manufacturer	: TOBISHI
Data Cable	: Non-shielded, 1.6m

1.2.13 Telephone

Model Number	: ST-206
Serial Number	: N/A
Manufacturer	: SENAO
Data Cable	: Non-shielded, 2m

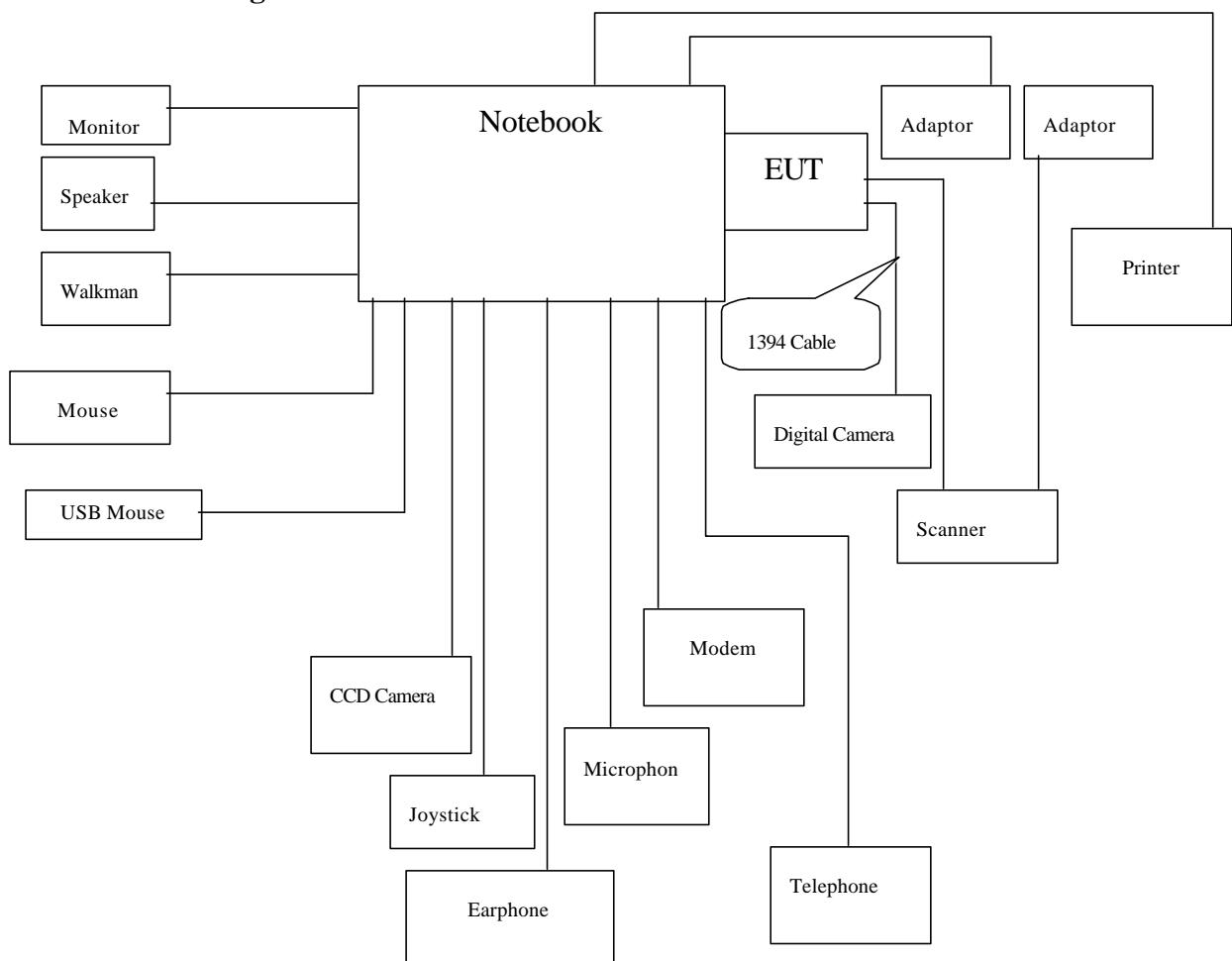
1.2.14 Digital 8 (D8)

Model Number	: DCR-TRV310
Serial Number	: 1252344
FCC ID	: DoC
Manufacturer	: SONY

1.2.15 ScanMaker

Model Number	: 5700
Serial Number	: N/A
FCC ID	: DOC
Manufacturer	: MICROTEK
Power Adapter	: FAIRWAY, VE 50-150A Cable for AC IN: Non-shielded, 1.8m Cable for AC Out: Non-shielded, 1.6m

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 Notebook from Hard Disk.
- 1.4.4 Data will communicate between personal computer and partner personal computer through EUT that is within Notebook.
- 1.4.5 The personal computer's and partner computer's monitor will show the transmitting and receiving characteristics when the communication is success.
- 1.4.6 Repeat the above procedure 1.4.4 to 1.4.5

1.5 Test performed

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

Radiated emissions were invested 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 TUV 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

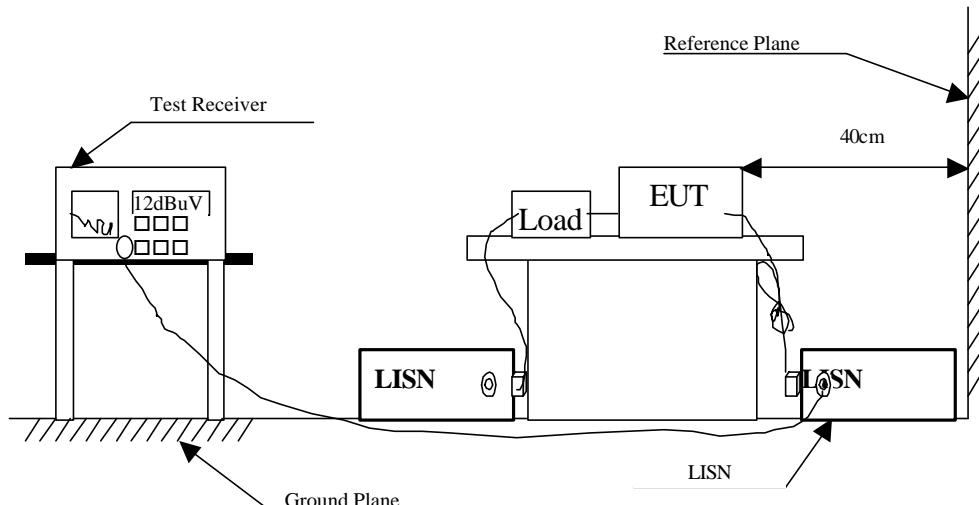
2.1 Test Equipment List

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, 2000	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2000	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2000	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	Class A		Class B		Frequency	Class A		Class B	
	MHz	QP	AV	MHz	AV	MHz	uV	dBuV	uV
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

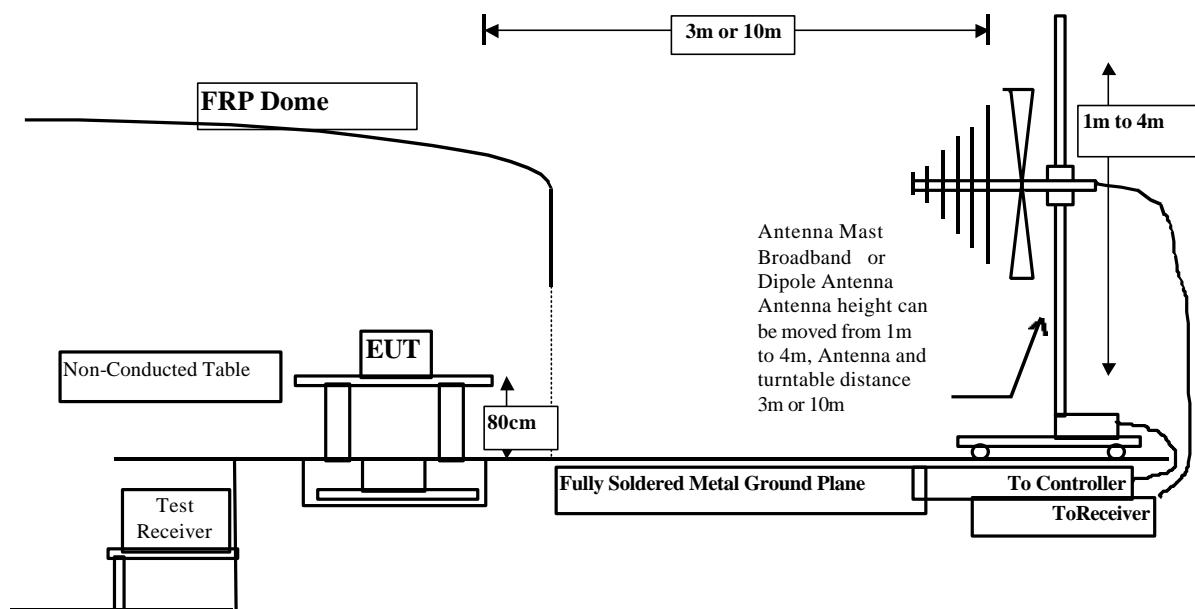
3.1 Test Equipment

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

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

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) = $20 \log_{10}$ 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: 5
Attachment 2: EUT Test Photographs	Number of Pages: 2
Attachment 3: EUT Detailed Photographs	Number of Pages: 4

Attachment 1 : Summary of Test Results

The test results in the emission were 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 are listed as the attached data.

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

Mode 1 : 400Mbps

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: $< \pm 2.0$ dB
- Uncertainty in the field strength measured: $< \pm 4.0$ dB

CONDUCTED EMISSION DATA

Date of Test	:	November 2, 2000		EUT	:	IEEE 1394 Cardbus PC Card	
Test Mode	:	Mode 1		Detect Mode	:	Quasi-Peak & Average	
Frequency	Cable	LISN	Reading Level	Measurement Level	Limits		
		Loss	Factor	Line1	Line1		
	MHz	dB	dB	dBuV	dBuV	dBuV	
<hr/>							
* 0.197	0.01	0.10	49.62	49.73	63.72		
0.267	0.03	0.10	41.10	41.23	61.20		
0.331	0.04	0.10	38.26	38.40	59.42		
0.463	0.06	0.10	30.97	31.13	56.63		
4.240	0.19	0.16	34.13	34.48	56.00		
16.887	0.34	0.39	28.89	29.62	60.00		

Average:

0.198	0.01	0.10	38.80	38.91	53.71
0.267	0.03	0.10	31.10	31.23	51.20
0.331	0.04	0.10	29.60	29.74	49.42
0.463	0.06	0.10	25.30	25.46	46.63
4.240	0.19	0.16	24.20	24.55	46.00
16.887	0.34	0.39	23.10	23.83	50.00

Remarks :

1. “*” means that this data is the worst emission level.

CONDUCTED EMISSION DATA

Date of Test	:	November 2, 2000		EUT	:	IEEE 1394 Cardbus PC Card	
Test Mode	:	Mode 1		Detect Mode	:	Quasi-Peak & Average	
Frequency	Cable	LISN	Reading Level	Measurement Level	Limits		
		Loss	Factor	Line2	Line2		
	MHz	dB	dB	dBuV	dBuV		dBuV
<hr/>							
* 0.200	0.02	0.10	48.27	48.39	63.62		
0.266	0.03	0.10	41.08	41.21	61.25		
0.331	0.04	0.10	36.43	36.57	59.44		
4.438	0.19	0.16	34.36	34.72	56.00		
8.343	0.26	0.19	28.95	29.40	60.00		
18.181	0.34	0.42	26.37	27.13	60.00		

Average:

0.200	0.02	0.10	38.80	38.92	53.62
0.266	0.03	0.10	32.60	32.73	51.25
0.331	0.04	0.10	31.30	31.44	49.44
4.438	0.19	0.16	24.80	25.16	46.00
8.343	0.26	0.19	23.60	24.05	50.00
18.181	0.34	0.42	19.70	20.46	50.00

Remarks :

1. “*” means that this data is the worst emission level.

RADIATED EMISSION DATA

Date of Test	:	November 2, 2000	EUT	IEEE 1394 Cardbus PC Card										
Test Mode	:	Mode 1	Test Site	No.2 Open Test Site										
Freq. Cable Probe PreAMP Reading Measurement Margin Limit Ant Turn														
Loss Factor Level Horizontal														
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg					
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====					
66.364	1.68	6.16	0.00	14.94	22.78	7.22	30.00	397	99					
196.607	3.04	9.10	0.00	14.24	26.38	3.62	30.00	397	157					
240.026	3.45	11.32	0.00	18.54	33.31	3.69	37.00	397	124					
269.996	3.67	13.00	0.00	3.64	20.31	16.69	37.00	300	203					
294.900	3.93	13.25	0.00	10.34	27.53	9.47	37.00	300	122					
344.057	4.42	13.97	0.00	11.86	30.25	6.75	37.00	268	203					
* 540.645	5.54	19.18	0.00	11.38	36.10	0.90	37.00	167	184					

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	:	November 2, 2000	EUT	IEEE 1394 Cardbus PC Card					
Test Mode	:	Mode 1	Test Site	No.2 Open Test Site					
Freq. Cable Probe PreAMP Reading Measurement Margin Limit Ant Turn									
		Loss Factor		Level	Vertical				
MHz		dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm deg
143.991	2.51	10.86	0.00	11.14	24.51	5.49	30.00	100	144
179.991	2.90	9.21	0.00	11.46	23.57	6.43	30.00	100	203
*196.600	3.04	8.94	0.00	14.98	26.96	3.04	30.00	100	180
215.993	3.24	9.13	0.00	13.30	25.67	4.33	30.00	100	34
296.996	3.96	13.44	0.00	8.20	25.59	11.41	37.00	100	97
344.027	4.42	14.72	0.00	6.16	25.30	11.70	37.00	100	71
442.366	4.97	16.77	0.00	10.40	32.14	4.86	37.00	100	127
540.660	5.54	18.47	0.00	7.72	31.73	5.27	37.00	282	60

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