



Test Report

For

Applicant : AboCom Systems, Inc.
Equipment Type : 10/100 Fast Ethernet PC Card
Model : FE1KD1
FCC ID : MQ4FE1KD1

Report No. : 004H042F



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 Fast Ethernet PC Card
 Model : FE1KD1
 FCC ID. : MQ4FE1KD1
 Measurement Standard : CISPR 22/1994
 Measurement Procedure : ANSI C63.4 /1992
 Operation Voltage : DC 3.3V
 Classification : Class B
 Test Result : Complied
 Test Date : April 22, 2000
 Report No. : 004H042F



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: Shelly Fan

Test Engineer: Jack Wu

Approved: Kevin Wang



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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 Fast Ethernet PC Card

Model : FE1KD1

FCC ID : MQ4FE1KD1

Operation Voltage : DC 3.3V

Data Cable (MAU) : Non-Shielded, 0.2m

Remark :

1. The EUT is a Ethernet PC Card which can transmitter 10Mbps and 100Mbps..
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
Ethernet PC Card (EUT) : AboCom, FE1KD1
FCC ID: MQ4FE1KD1
Data Cable: Non-Shielded, 0.2m
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 : T8E004443
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 : LZB75078465
FCC ID : DZL211029
Manufacturer : HP
Data Cable : Shielded, 1.8m

1.2.6 Microphone

Model Number : CD-8000
Serial Number : N/A
FCC ID : DoC
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 Speaker

Model Number : J-009
Serial Number : 97-C-019799-T
FCC ID : DoC
Manufacturer : JS
Data Cable : Shielded, 1.2m

Partner PC

1.2.10 Host Personal Computer

Model Number : P2L97
Serial Number : 92M1Y00768
FCC ID : DoC
Manufacturer : ASUS
Power Cord : Non-Shielded, 1.8m

1.2.11 LAN Card

Model Number : DFE-500TX
Serial Number : 0080C8 958320
FCC ID : KA2APC500X3
Manufacturer : D-LINK
LAN Cable : Non-Shielded, 12m

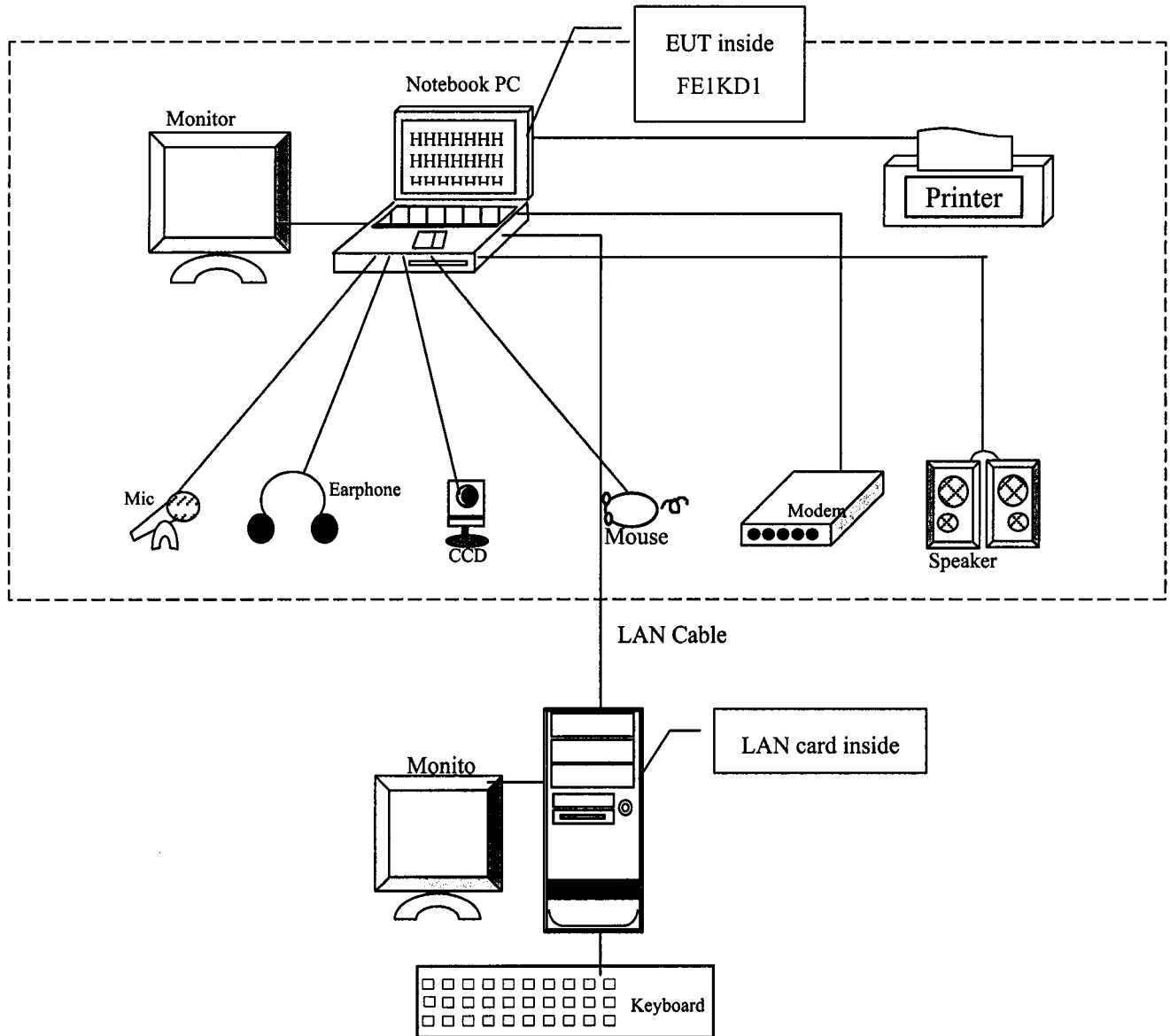
1.2.12 Monitor

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

1.2.13 Keyboard

Model Number : 6311-TW4C
Serial Number : 916590704C91F24436
FCC ID : DoC
Manufacturer : ACER
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 Boot the PC from Hard Disk .
- 1.4.4 Data will communicate between notebook personal computer and partner personal computer through 10/100 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.
- 1.4.7 Printer and modem will keep at standby mode EUT operation.
- 1.4.8 Repeat the above procedure 1.4.4 to 1.4.7

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 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

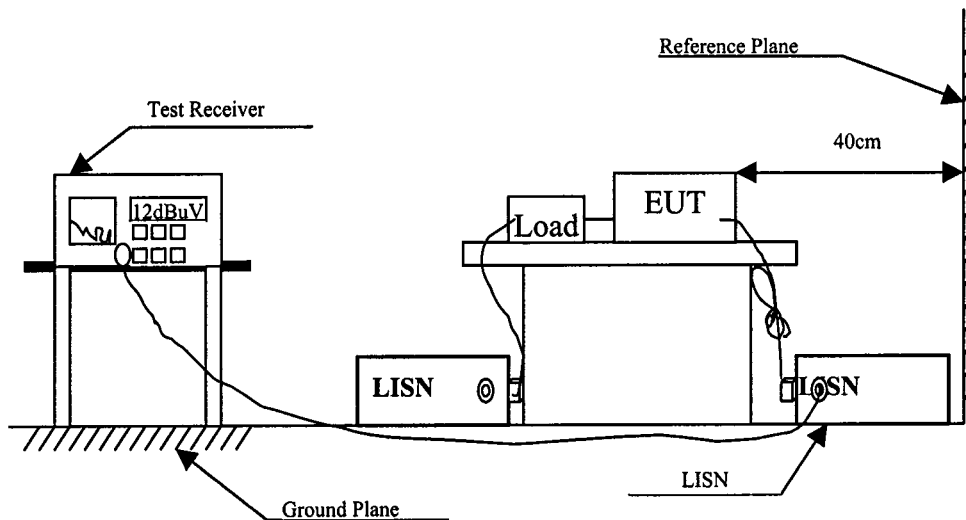
2.1 Test Equipment List

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	QP	AV		uv/m	dBuV/m	uV/m	dBuV/m
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

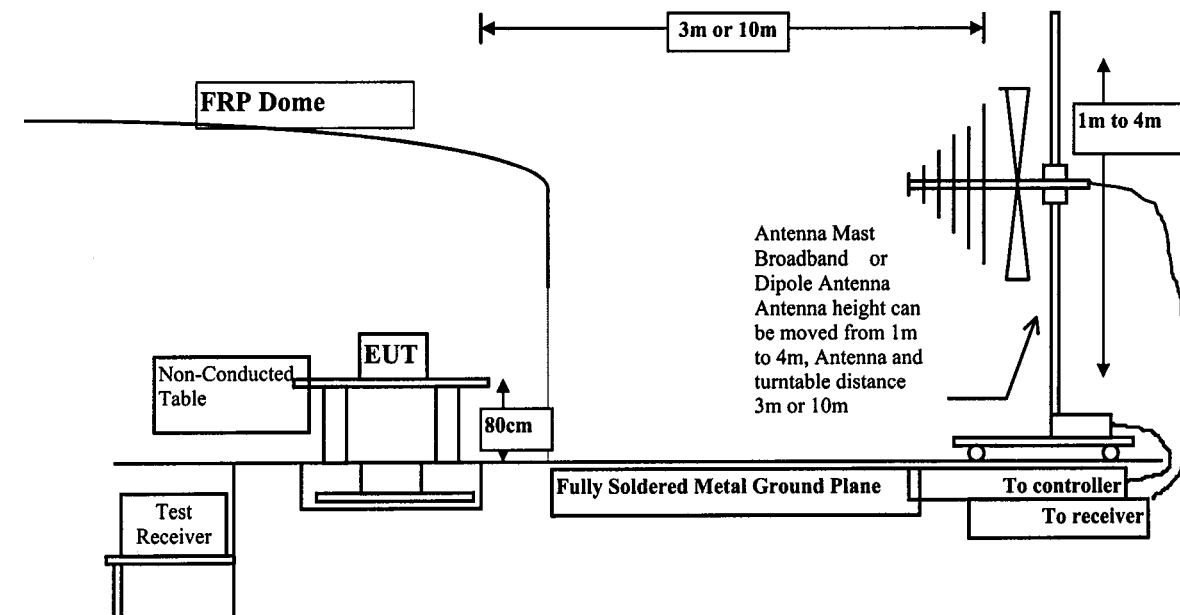
3.1 Test Equipment

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					FCC Part 15 Subpart B				
Frequency MHz	Class A		Class B		Frequency	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m		uV/m	dBuV/m	uV/m	dBuV/m
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/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.

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: 5

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 and immunity are listed as the attached data.

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

Mode 1: 10Mbps

Mode 2: 100Mbps

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 : Apr. 22, 2000 EUT : FE1KD1
 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
0.201	0.02	0.10	45.54	45.66	63.58
0.267	0.03	0.10	35.77	35.90	61.20
0.330	0.04	0.10	34.96	35.10	59.46
0.463	0.06	0.10	29.68	29.84	56.65
4.435	0.19	0.16	29.34	29.70	56.00
* 18.244	0.34	0.42	43.25	44.01	60.00
Average:					
0.200	0.02	0.10	36.10	36.22	53.61
0.267	0.03	0.10	30.50	30.63	51.21
0.329	0.04	0.10	31.40	31.54	49.48
0.462	0.06	0.10	27.70	27.86	46.66
4.430	0.19	0.16	20.60	20.96	46.00
18.240	0.34	0.42	39.40	40.16	50.00

Remarks :

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

CONDUCTED EMISSION DATA

Date of Test : Apr. 22, 2000 EUT : FE1KD1
 Test Mode : Mode 1 Detect Mode : Quasi-Peak & Average

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line2	Line2	dBuV
	dB	dB	dBuV	dBuV	
* 0.201	0.02	0.10	45.79	45.91	63.58
0.263	0.03	0.10	39.96	40.09	61.33
0.330	0.04	0.10	36.80	36.94	59.46
0.396	0.05	0.10	29.05	29.20	57.93
4.431	0.19	0.16	35.86	36.22	56.00
18.244	0.34	0.42	40.77	41.53	60.00
Average:					
0.200	0.02	0.10	35.30	35.42	53.61
0.263	0.03	0.10	29.80	29.93	51.34
0.329	0.04	0.10	28.80	28.94	49.48
0.396	0.05	0.10	21.00	21.15	47.94
4.430	0.19	0.16	25.30	25.66	46.00
18.240	0.34	0.42	36.90	37.66	50.00

Remarks :

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

CONDUCTED EMISSION DATA

Date of Test : Apr. 22, 2000 EUT : FE1KD1
 Test Mode : Mode 2 Detect Mode : Quasi-Peak & Average

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line1	Line1	
	dB	dB	dBuV	dBuV	dBuV
* 0.197	0.01	0.10	46.24	46.35	63.74
0.263	0.03	0.10	39.89	40.02	61.33
0.396	0.05	0.10	31.09	31.24	57.93
0.662	0.08	0.10	28.30	28.48	56.00
4.302	0.19	0.16	34.16	34.51	56.00
18.240	0.34	0.42	41.41	42.17	60.00
Average:					
0.196	0.01	0.10	37.60	37.71	53.78
0.263	0.03	0.10	31.90	32.03	51.34
0.396	0.05	0.10	26.40	26.55	47.94
0.661	0.08	0.10	26.70	26.88	46.00
4.300	0.19	0.16	25.50	25.85	46.00
18.230	0.34	0.42	37.70	38.46	50.00

Remarks :

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

CONDUCTED EMISSION DATA

Date of Test : Apr. 22, 2000 EUT : FE1KD1
 Test Mode : Mode 2 Detect Mode : Quasi-Peak & Average

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line2	Line2	
	dB	dB	dBuV	dBuV	dBuV
* 0.197	0.01	0.10	47.63	47.74	63.74
0.263	0.03	0.10	40.46	40.59	61.33
0.326	0.04	0.10	30.42	30.56	59.56
0.396	0.05	0.10	29.32	29.47	57.93
4.369	0.19	0.16	36.90	37.26	56.00
18.365	0.34	0.42	38.67	39.43	60.00
Average:					
0.196	0.01	0.10	37.20	37.31	53.78
0.263	0.03	0.10	30.20	30.33	51.34
0.325	0.04	0.10	22.40	22.54	49.58
0.396	0.05	0.10	21.00	21.15	47.94
4.370	0.19	0.16	26.20	26.56	46.00
18.360	0.34	0.42	35.00	35.76	50.00

Remarks :

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

RADIATED EMISSION DATA

Date of Test : Apr. 22, 2000 EUT : FE1KD1
 Test Mode : Mode 1 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
200.000	2.78	9.30	0.00	12.79	24.87	5.13	30.00	395	78
225.000	3.03	9.83	0.00	9.31	22.17	7.83	30.00	395	75
300.000	3.76	13.36	0.00	14.02	31.13	5.87	37.00	311	160
350.000	4.01	14.25	0.00	12.94	31.20	5.80	37.00	301	61
400.000	4.28	15.85	0.00	10.93	31.06	5.94	37.00	301	177
550.000	5.06	19.16	0.00	9.43	33.65	3.35	37.00	174	30
600.000	5.31	18.85	0.00	6.39	30.55	6.45	37.00	174	112
* 800.000	6.35	20.19	0.00	7.71	34.25	2.75	37.00	130	149
850.000	6.62	20.70	0.00	5.98	33.30	3.70	37.00	112	76
900.000	6.88	20.89	0.00	5.18	32.96	4.04	37.00	99	64
950.005	7.13	21.20	0.00	2.57	30.90	6.10	37.00	99	69

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. 22, 2000 EUT : FE1KD1
 Test Mode : Mode 1 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
* 150.000	2.31	10.43	0.00	15.00	27.74	2.26	30.00	99	148
200.000	2.78	9.07	0.00	14.30	26.16	3.84	30.00	99	203
225.000	3.03	9.68	0.00	11.22	23.92	6.08	30.00	99	174
350.000	4.01	14.80	0.00	11.55	30.36	6.64	37.00	99	68
400.000	4.28	16.05	0.00	10.78	31.11	5.89	37.00	99	203
550.000	5.06	18.76	0.00	6.67	30.49	6.51	37.00	252	114
850.000	6.62	19.70	0.00	5.94	32.26	4.74	37.00	188	183
950.010	7.13	20.30	0.00	3.09	30.52	6.48	37.00	172	164

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. 22, 2000 EUT : FE1KD1
 Test Mode : Mode 2 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
200.000	2.78	9.30	0.00	14.22	26.30	3.70	30.00	395	73
225.000	3.03	9.83	0.00	11.90	24.76	5.24	30.00	395	73
300.000	3.76	13.36	0.00	13.43	30.54	6.46	37.00	307	203
* 325.000	3.88	13.64	0.00	16.84	34.37	2.63	37.00	245	69
400.000	4.28	15.85	0.00	12.42	32.55	4.45	37.00	256	184
550.000	5.06	19.16	0.00	7.61	31.83	5.17	37.00	141	192
600.000	5.31	18.85	0.00	7.73	31.89	5.11	37.00	161	15
700.000	5.83	19.19	0.00	5.12	30.14	6.86	37.00	162	113
800.000	6.35	20.19	0.00	6.99	33.53	3.47	37.00	136	146
850.000	6.62	20.70	0.00	5.02	32.34	4.66	37.00	121	203
900.000	6.88	20.89	0.00	3.44	31.22	5.78	37.00	99	57
950.008	7.13	21.20	0.00	2.15	30.48	6.52	37.00	99	77

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. 22, 2000 EUT : FE1KD1
 Test Mode : Mode 2 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
150.000	2.31	10.43	0.00	13.61	26.35	3.65	30.00	99	130
175.000	2.55	9.32	0.00	11.77	23.64	6.36	30.00	99	162
* 200.000	2.78	9.07	0.00	16.72	28.58	1.42	30.00	99	145
225.000	3.03	9.68	0.00	13.92	26.62	3.38	30.00	99	189
350.000	4.01	14.80	0.00	11.05	29.86	7.14	37.00	99	61
400.000	4.28	16.05	0.00	12.56	32.89	4.11	37.00	99	203
550.000	5.06	18.76	0.00	7.59	31.41	5.59	37.00	250	114
600.000	5.31	18.42	0.00	7.69	31.43	5.57	37.00	250	77
750.000	6.10	19.04	0.00	3.91	29.05	7.95	37.00	216	118
800.003	6.35	19.25	0.00	4.89	30.49	6.51	37.00	209	165
850.003	6.62	19.70	0.00	5.06	31.38	5.62	37.00	194	166

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.