Test Report

For

Applicant	**:**	**ZyXEL Communications Corporation**
Equipment Type	**:**	**LAN Hub Router**
Model	**:**	**PRESTIGE 314**
FCC ID	**:**	**I88PRESTIGE 314**

Report No.: 006H057FI

Test Report Certification

QuieTek Corporation

No.75-1, Wang-Yeh Valley, Yung-Hsing, Chiung-Lin,
Hsin-Chu County, Taiwan, R.O.C.
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E-Mail : quietek@ms24.hinet.net

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

Applicant	: ZyXEL Communications Corporation
Address	: No.6, Innovation Rd II, Science-Based Industrial Park, Hsin-Chu, Taiwan, R.O.C.
Equipment Type	: LAN Hub Router
Model	: PRESTIGE 314
FCC ID.	: I88PRESTIGE 314
Measurement Standard	: CISPR 22/1985
Measurement Procedure	: ANSI C63.4 /1992
Operation Voltage	: 120VAC/60Hz
Classification	: Class B
Test Result	: Complied
Test Date	: July 11, 2000
Report No.	: 006H057FI

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: Zoe Lee	Test Engineer: Calien Kang	Approved: Kevin Wang

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1. General Information

1.1 EUT Description

Applicant	:	ZyXEL Communications Corporation
Address	:	No.6, Innovation Rd II, Science-Based Industrial Park, Hsin-Chu, Taiwan, R.O.C.
Equipment Type	:	LAN Hub Router
Model	:	PRESTIGE 314
FCC ID	:	I88PRESTIGE 314
Operation Voltage	:	120VAC/60Hz
LAN Cable (CROSSOVER)	:	Shielded, 1.8m, 1pc
LAN Cable (STRAIGHT)	:	Shielded, 1.8m, 1pc
RS 232 Cable	:	Non-Shielded, 1.8m, 1pc
Power Adapter	:	ZyXEL, JAD-121200E
		Non-Shielded, 1.8m

Remark :

1.This device a LAN Hub Router with 10/100Mbps transmission speed.
2.100Mbps transmission speed was selected as test mode.
3. QuieTek had verified the construction and function, 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 LAN Hub Router (EUT)

Model Number	: PRESTIGE 314
Serial Number	: N/A
FCC ID	:I88PRESTIGE314
Manufacturer	: ZyXEL
LAN Cable (CROSSOVER)	: Shielded, 1.8m, 1pc
LAN Cable (STRAIGHT)	: Shielded, 1.8m, 1pc
RS 232 Cable	: Non-Shielded, 1.8m, 1pc
Power Adapter	: ZyXEL, JAD-121200E
	Non-Shielded, 1.8m

1.2.2 Host Personal Computer

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

1.2.3 Monitor

Model Number	: CM752ET-311
Serial Number	: T8E004443
FCC ID	: DoC
Manufacturer	: HITACHI
Data Cable	: Shielded, 1.5m
Power Cord	: Shielded, 1.8m

1.2.4 Modem

Model Number	: 1414
Serial Number	: 980033035
FCC ID	: IFAXDM1414
Manufacturer	: ACEEX
Data Cable	: Shielded, 1.5m
Power Adapter	: ACCEX, SCP41-91000A
	Cable Output : Shielded, 1.5m

1.2.5 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

1.2.6 Mouse

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

1.2.7 Keyboard

Model Number	: SK-2502
Serial Number	: M971237059
FCC ID	: GYUR41SK
Manufacturer	: HP

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

1.2.11 LAN Cable: Shielded, 1.8m, 3pcs

1.2.12 LAN Cable: Shielded, 10m, 1pc

1.2.13 WAN Cable: Shielded, 10m, 1pc

Partner PC System

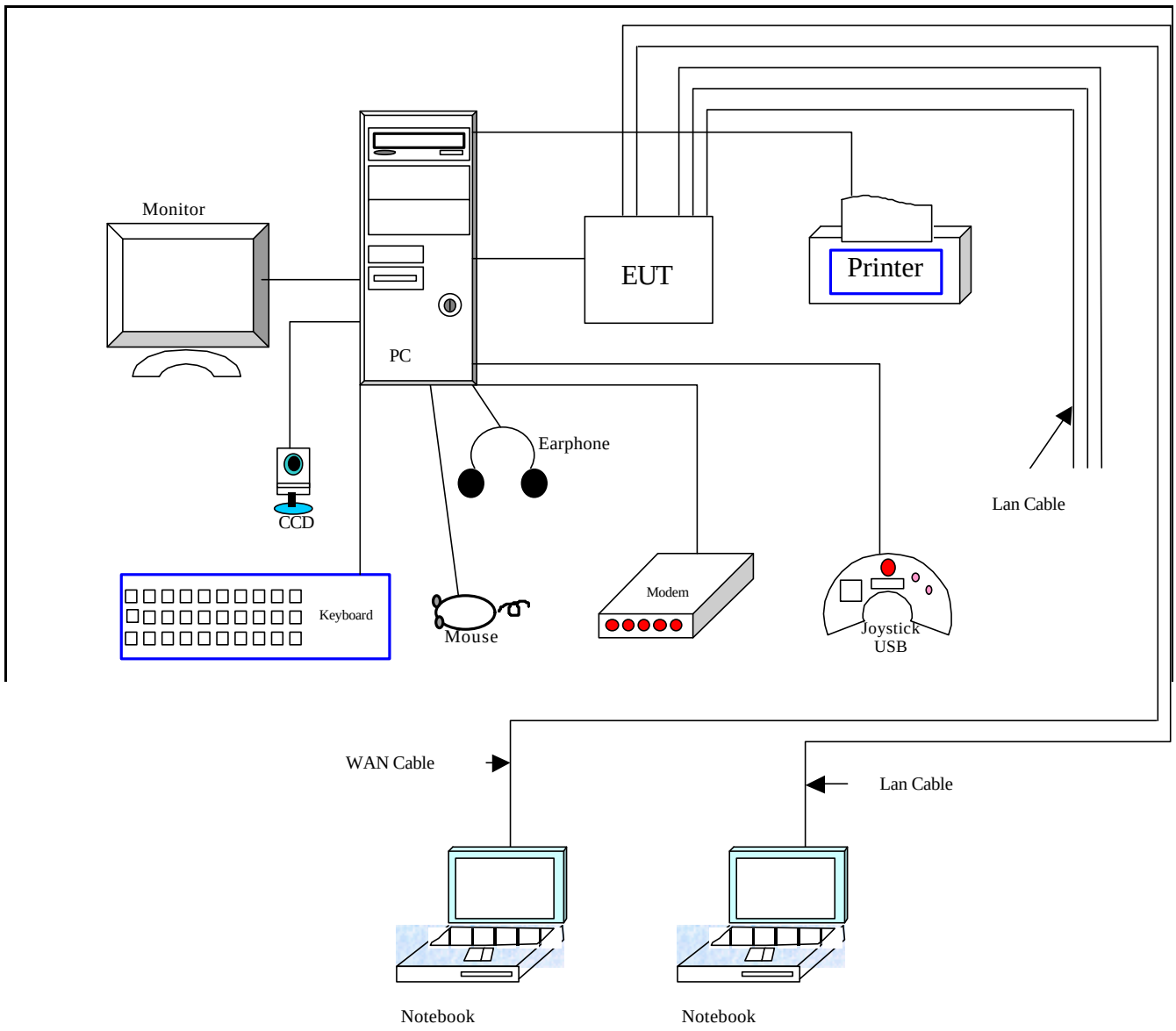
1.2.14 Notebook PC

Model Number	: 500
Serial Number	: 9145B0160C9100170EM
Manufacturer	: ACER
FCC ID	: DoC
Power Adapter	: DELTA, ADP-45GB
	Cable In: Non-shielded, 1.6m
	Cable Out: Non-shielded, 1.8m

1.2.15 Notebook PC

Model Number	: 500
Serial Number	: 9145B0160C91000CF2M
Manufacturer	: ACER
FCC ID	: DoC
Power Adapter	: DELTA, ADP-45GB
	Cable In: Non-shielded, 1.6m
	Cable Out: Non-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 personal computer and partner notebook personal notebook through LAN Hub Router (EUT).

1.4.5 The personal computer's and partner notebook personal notebook monitor will show the transmitting and receiving characteristics when the communication is success.

1.4.6 Repeat the above procedure 1.4.4 to 1.4.7

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 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

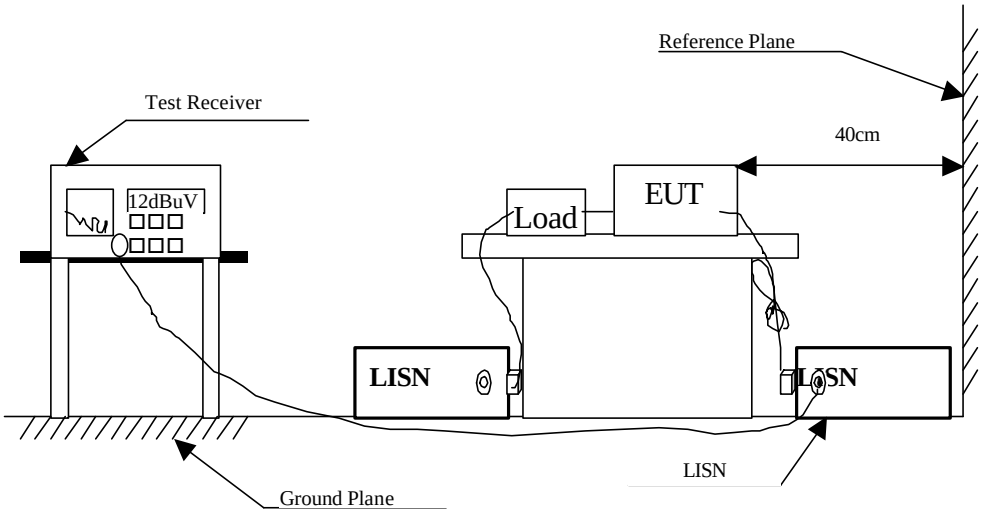
2.1 Test Equipment List

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	QP	AV	MHz	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

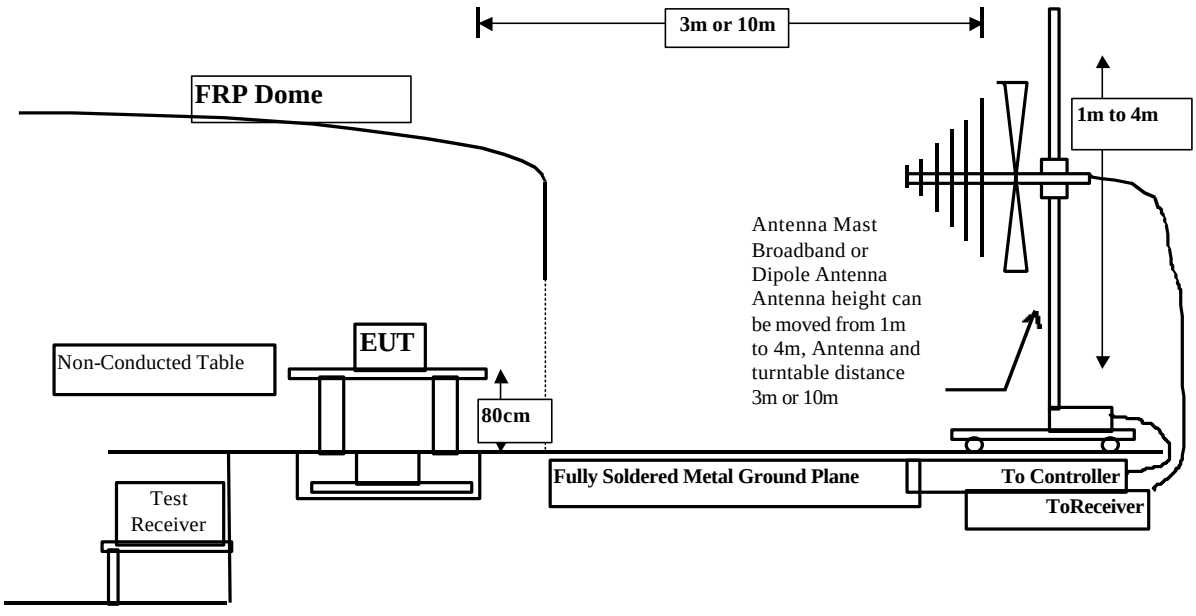
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2000
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2000
		Pre-Amplifier	HP	8447D/3307A01812	May, 2000
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 1999
	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., 1999
	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 Limits

CISPR 22					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: 5
Attachment 2: EUT Test Photographs	Number of Pages: 2
Attachment 3: EUT Detailed Photographs	Number of Pages: 9

Attachment 1 : Summary of Test Results

The test results in the emission and immunity 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: 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: < ± 2.0 dB
  - Uncertainty in the field strength measured: < ± 4.0 dB

CONDUCTED EMISSION DATA

Date of Test	:	July 11, 2000	EUT	:	LAN Hub Router
Test Mode	:	Mode 1	Detect Mode	:	Quasi-Peak & Average

Frequency	Cable Loss	LISN Factor	Reading Level Line1	Measurement Level Line1	Limits
MHz	dB	dB	dBuV	dBuV	dBuV
0.228	0.02	0.10	44.36	44.48	62.52
0.271	0.03	0.10	42.50	42.63	61.08
0.341	0.04	0.10	38.97	39.11	59.17
0.384	0.05	0.10	37.54	37.69	58.18
17.694	0.34	0.41	40.39	41.14	60.00
*21.662	0.36	0.48	42.64	43.49	60.00

Average:

0.228	0.02	0.10	15.50	15.62	52.52
0.271	0.03	0.10	11.70	11.83	51.08
0.341	0.04	0.10	8.80	8.94	49.17
0.384	0.05	0.10	7.60	7.75	48.18
17.694	0.34	0.41	36.20	36.95	50.00
21.662	0.36	0.48	40.20	41.05	50.00

Remarks :

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

CONDUCTED EMISSION DATA

Date of Test	:	July 11, 2000	EUT	:	LAN Hub Router
Test Mode	:	Mode 1	Detect Mode	:	Quasi-Peak & Average

Frequency	Cable Loss	LISN Factor	Reading Level Line2	Measurement Level Line2	Limits
MHz	dB	dB	dBuV	dBuV	dBuV
0.166	0.01	0.10	48.81	48.92	65.18
0.197	0.01	0.10	47.78	47.89	63.74
0.255	0.03	0.10	46.08	46.21	61.58
*0.408	0.05	0.10	43.22	43.37	57.69
0.615	0.07	0.10	38.13	38.30	56.00
21.663	0.36	0.48	40.08	40.93	60.00

Average:

0.166	0.01	0.10	17.70	17.81	55.18
0.197	0.01	0.10	16.80	16.91	53.74
0.255	0.03	0.10	15.60	15.73	51.58
0.408	0.05	0.10	12.80	12.95	47.69
0.615	0.07	0.10	8.00	8.17	46.00
21.663	0.36	0.48	37.30	38.15	50.00

Remarks :

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

RADIATED EMISSION DATA

Date of Test	:	July 11, 2000	EUT	:	LAN Hub Router
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
50.000	1.35	7.93	0.00	5.39	14.67	15.33	30.00	401	110
64.000	1.48	5.73	0.00	0.80	8.00	22.00	30.00	401	62
*200.000	2.78	9.30	0.00	7.75	19.83	10.17	30.00	401	131
240.000	3.17	11.32	0.00	0.54	15.03	21.97	37.00	401	24
350.000	4.01	14.25	0.00	0.52	18.78	18.22	37.00	401	59
384.073	4.19	15.11	0.00	1.61	20.91	16.09	37.00	401	97
675.000	5.71	19.11	0.00	-0.92	23.89	13.11	37.00	127	202

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	:	July 11, 2000	EUT	:	LAN Hub Router
Test Mode	:	Mode 1	Test Site	:	No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit	Ant	Turn
				Vertical					
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
64.000	1.48	6.58	0.00	8.03	16.09	13.91	30.00	100	202
80.000	1.64	7.12	0.00	6.65	15.41	14.59	30.00	100	130
150.000	2.31	10.43	0.00	8.26	21.00	9.00	30.00	100	92
160.000	2.40	10.28	0.00	3.30	15.98	14.02	30.00	100	27
*200.000	2.78	9.07	0.00	9.47	21.33	8.67	30.00	100	185
225.000	3.03	9.68	0.00	6.94	19.64	10.36	30.00	100	125
250.000	3.27	12.26	0.00	6.76	22.29	14.71	37.00	100	15

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