



Test Report

Applicant : ZyXEL Communications Corporation

Equipment Type : ISDN Router

Model : PRESTIGE 200 , PRESTIGE 202 ,
PRESTIGE 201 , PRESTIGE 401 ,
PRESTIGE 402 , PRESTIGE 262 ,
PRESTIGE 421 , PRESTIGE 422 .

FCC ID : I88PRESTIGE202U

Report No. : 995006FI



Test Report Certification

Quietek Corporation

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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 : ISDN Router
Model : PRESTIGE 200 , PRESTIGE 202 , PRESTIGE 201 ,
PRESTIGE 401 , PRESTIGE 402 , PRESTIGE 262 ,
PRESTIGE 421 , PRESTIGE 422 .
FCC ID. : I88PRESTIGE202U
Measurement Standard : CISPR 22/1994
Measurement Procedure : ANSI C63.4 /1992
Operation Voltage : 120Vac/60Hz
Classification : Class B
Test Result : Complied
Test Date : June 23 , 1999
Report No. : 995006FI



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

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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 : ISDN Router

Model : PRESTIGE 200 , PRESTIGE 202 , PRESTIGE 201 ,
PRESTIGE 401 , PRESTIGE 402 , PRESTIGE 262 ,
PRESTIGE 421 , PRESTIGE 422 .

FCC ID : I88PRESTIGE202U

Operation Voltage : 120Vac/60Hz

AC Power Adaptor : Non-Shielded , 1.8m.
ZyXEL AC ADAPTOR MODEL JAD-121260T

Remark: 1.This EUT is an ISDN router included an Ethernet port, a serial port, an ISDN port and two telephone ports.

2.The different models of the EUT are the same electrical circuit and construction, but the driving software was different for each model.

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 Host Personal Computer

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

1.2.2 Monitor

Model Number : G585
Serial Number : FK8B39883
FCC ID : DoC
Manufacturer : GENUINE
Data Cable : Shielded, 1.5m
Power Cord : Non-Shielded, 1.8m

1.2.3 Keyboard

Model Number : 6311-TW2C
Serial Number : N/A
FCC ID : DoC
Manufacturer : ACER
Data Cable : Shielded, 1.8m

1.2.4 Mouse

Model Number : M-S34
Serial Number : LZB71178588
FCC ID : DZL211029
Manufacturer : HP
Data Cable : Shielded, 1.8m

1.2.5 Modem

Model Number : 1414
Serial Number : 980033038
FCC ID : IFAXDM1414
Manufacturer : ACEEX
Data Cable : Shielded, 1.5m
Power Adapter : ACCEX, M/N: SCP41-91000A
Cable Output : Shielded, 1.5m



1.2.6 Printer
Model Number : C2642A
Serial Number : MY75N1D2BC
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

1.2.7 Joystick (USB)
Model Number : JPD110
Serial Number : 9814A15646
FCC ID : DoC
Manufacturer : Maxxtro
Data Cable : Shielded, 1.7m

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

1.2.9 Telephone A
Model Number : K-903S
Serial Number : 103378
Manufacturer : TENTEL
Data Cable : Non-Shield , 2m

1.2.10 Telephone B
Model Number : K-903S
Serial Number : 131868
Manufacturer : TENTEL
Data Cable : Shield , 2m



Partner PC

1.2.11 Notebook A

Model Number : EXTENSA 503T
Serial Number : 9145B0160C91400CIDM
FCC ID : DoC
Manufacturer : Acer
Data Cable : Shield , 15m

1.2.12 ISDN Simulator

Model Number : ISDN 2000AF
Serial Number : AF96013076
Manufacturer : MERGE Technologies Group, Inc.
Data Cable :Non-Shield , 15m

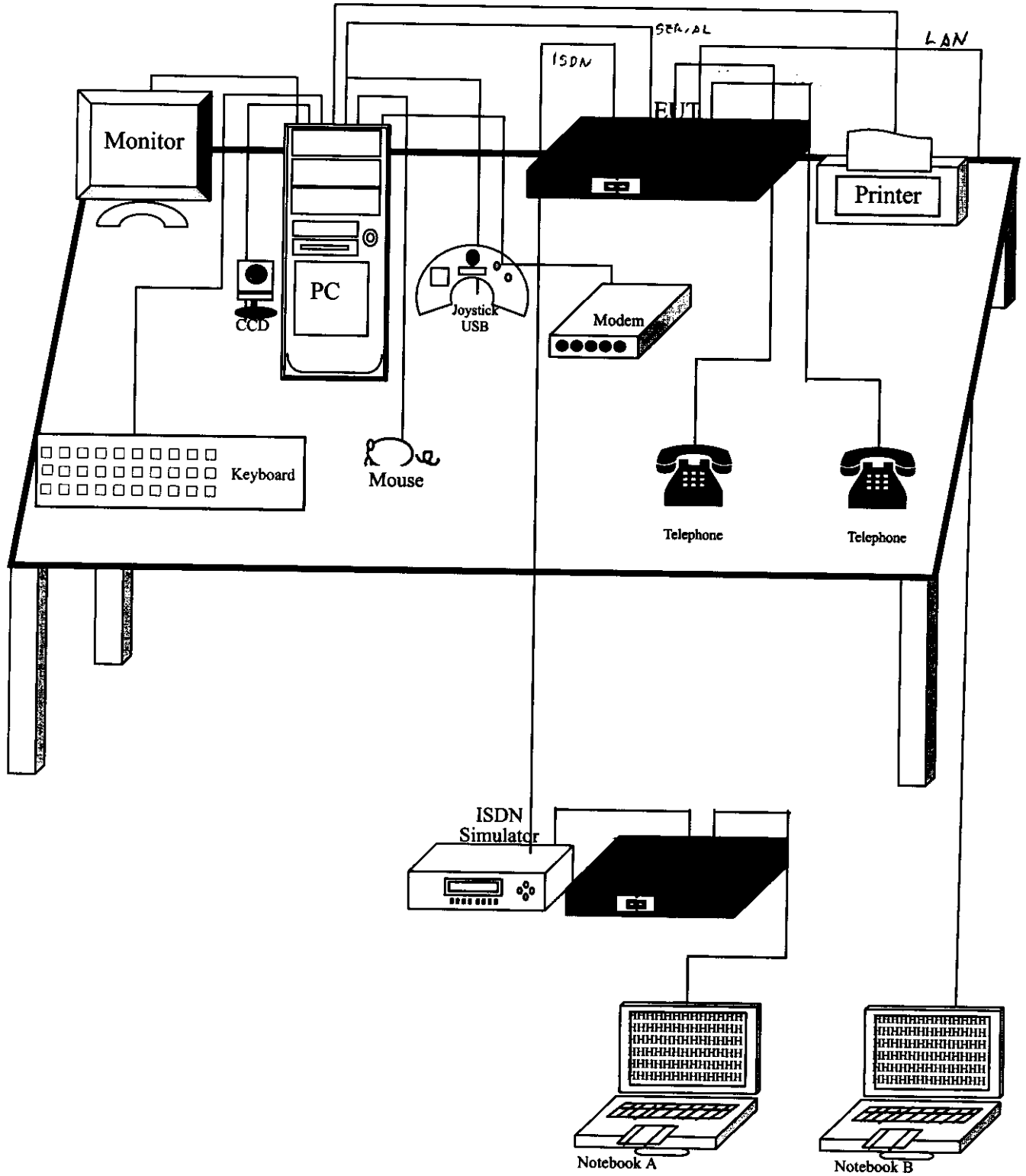
1.2.13 ISDN Router

Model Number : RT 338
Serial Number : N/A
Manufacturer : ZyXEL
Power Adapter : Non-Shielded, 1.8m
Data Cable :Non-Shield , 15m

1.2.14 Notebook B (LEO Designote Personal Computer)

Model Number : DESIGNOTE
FCC ID : EUNDESIGNOTE3
Manufacturer : First International Computer Inc.
Data Cable : Shielded , 15m

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 computer through ISDN Router (EUT) that is connected to USB port of personal computer.
- 1.4.5 The personal computer's and partner notebook personal computer's monitor will show the transmitting and receiving characteristics when the communication is success.
- 1.4.6 Printer and modem will keep at standby mode during EUT operation.
- 1.4.7 Telecom signal was communicate between personal computer and partner notebook PC A through the ISDN port of the EUT
- 1.4.8 Repeat the above procedure 1.4.4 to 1.4.7

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

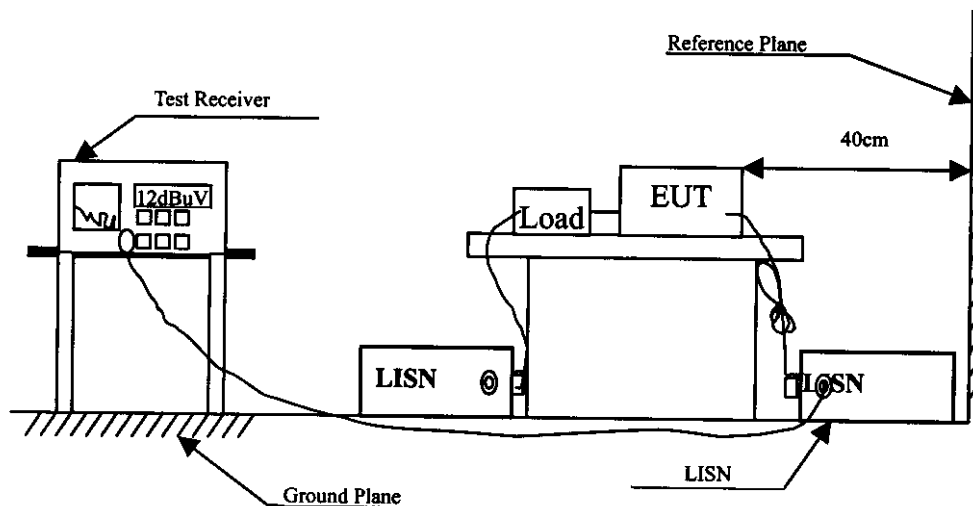
2.1 Test Equipment List

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, 1998	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 1998	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 1998	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 emission from the EUT was below the specified limits. The worst case emissions are shown in Chapter 4. The acceptance criterion was met and the EUT passed the test.

3. Radiated Emission

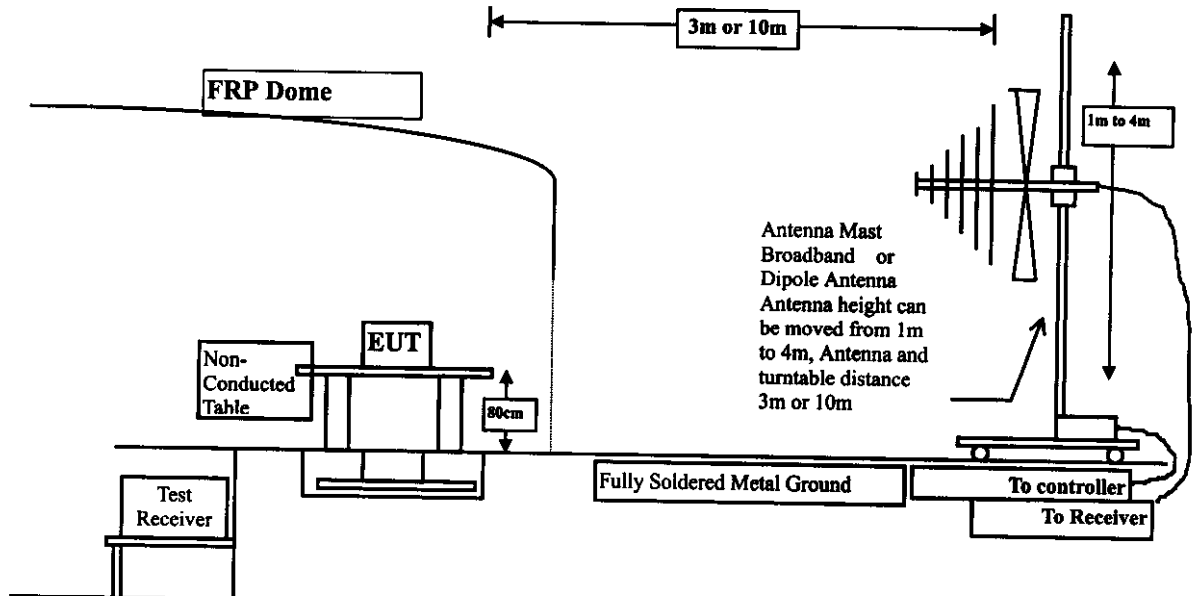
3.1 Test Equipment

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, 1998
	Spectrum Analyzer	Advantest	R3261C / 71720140	May, 1998
	Pre-Amplifier	HP	8447D/3307A01812	May, 1998
	X Bilog Antenna	Chase	CBL6112B / 12452	Sep., 1998
	X Horn Antenna	EM	EM6917 / 103325	May, 1998
SITE # 2	X Test Receiver	R & S	ESCS 30 / 825442/17	May, 1998
	Spectrum Analyzer	Advantest	R3261C / 71720609	May, 1998
	Pre-Amplifier	HP	8447D/3307A01814	May, 1998
	X Bilog Antenna	Chase	CBL6112B / 2455	Sep., 1998
	X Horn Antenna	EM	EM6917 / 103325	May, 1998

- 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 emission from the EUT was below the specified limits. The worst case emissions are shown in Chapter 4. The acceptance criterion was met and the EUT passed the test.



4. Summary of Test Results

The test results in the emission was and 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 is listed as the attached data.

All the tests were carried out with the EUT in normal operation, which was defined as:
Mode 1: Ethernet 100Mbps + ISDN 128Kbps

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

CONDUCTED EMISSION DATA

Date of Test : June 23 , 1999 EUT : ISDN Router
 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
0.184	0.01	0.10	50.78	50.89	64.29
*0.220	0.02	0.10	49.32	49.44	62.81
0.357	0.05	0.10	44.77	44.92	58.80
0.478	0.06	0.10	40.17	40.33	56.37
0.627	0.08	0.10	33.80	33.98	56.00
0.795	0.09	0.10	33.69	33.88	56.00

Average:

0.184	0.01	0.10	21.00	21.11	54.30
0.220	0.02	0.10	19.20	19.32	52.82
0.357	0.05	0.10	14.30	14.45	48.80
0.478	0.06	0.10	9.90	10.06	46.37
0.627	0.08	0.10	4.80	4.98	46.00
0.795	0.09	0.10	4.50	4.69	46.00

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worse emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Attached individual pages of peak scan curve data sheets.



CONDUCTED EMISSION DATA

Date of Test : June 23 , 1999 EUT : ISDN Router
 Test Mode : Mode 1 Detect Mode : Quasi-Peak & Average

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level Line2 dBuV	Measurement Level Line2 dBuV	Limits dBuV
0.154	0.00	0.10	52.00	52.10	65.76
0.185	0.01	0.10	50.43	50.54	64.25
*0.267	0.03	0.10	47.69	47.82	61.20
0.302	0.04	0.10	46.60	46.74	60.18
0.357	0.05	0.10	45.03	45.18	58.80
0.451	0.06	0.10	42.45	42.61	56.86

Average:

0.154	0.00	0.10	23.00	23.10	55.78
0.185	0.01	0.10	21.00	21.11	54.26
0.267	0.03	0.10	17.00	17.13	51.21
0.302	0.04	0.10	16.00	16.14	50.19
0.357	0.05	0.10	14.50	14.65	48.80
0.451	0.06	0.10	11.60	11.76	46.86

Remarks:

4. All Readings below 1GHz are Quasi-Peak, above are average value.
5. " * ", means this data is the worse emission level.
6. Emission Level = Reading Level + Antenna Factor + Cable loss

Attached individual pages of peak scan curve data sheets.

RADIATED EMISSION DATA

Date of Test : July 12, 1999 EUT : ISDN Router
 Test Mode : Mode 1 Detect Mode : Quasi-Peak

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
56.042	1.40	6.65	0.00	15.22	23.27	6.73	30.00	99	202
66.355	1.50	5.83	0.00	18.93	26.26	3.74	30.00	99	18
125.000	2.07	11.49	0.00	5.16	18.72	11.28	30.00	99	200
175.003	2.55	9.32	0.00	10.22	22.09	7.91	30.00	99	81
200.000	2.78	9.07	0.00	9.13	20.99	9.01	30.00	99	62
*225.005	3.03	9.68	0.00	12.16	24.86	5.14	30.00	99	94
250.000	3.27	12.26	0.00	9.92	25.45	11.55	37.00	99	70
325.000	3.88	14.29	0.00	11.90	30.07	6.93	37.00	112	83
599.893	5.31	18.42	0.00	4.71	28.45	8.55	37.00	338	203
625.000	5.44	18.50	0.00	2.60	26.55	10.45	37.00	257	62
729.860	5.99	19.18	0.00	3.47	28.64	8.36	37.00	204	16
796.210	6.34	19.22	0.00	3.88	29.44	7.56	37.00	204	152
829.430	6.52	19.62	0.00	4.23	30.36	6.64	37.00	213	23

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worse emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Attached individual pages of peak scan curve data sheets.



RADIATED EMISSION DATA

Date of Test : July 12, 1999 EUT : ISDN Router
 Test Mode : Mode 1 Detect Mode : Quasi-Peak

Freq.	Cable Loss	Probe Factor	PreAMP Reading	Measurement Level	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dB	dBuV/m	cm	deg
151.488	2.32	10.90	0.00	4.97	18.19	11.81	30.00	395 45
216.251	2.94	9.11	0.00	9.98	22.03	7.97	30.00	395 25
264.990	3.41	13.91	0.00	6.64	23.96	13.04	37.00	386 90
300.004	3.76	13.36	0.00	9.30	26.41	10.59	37.00	395 92
375.007	4.14	15.00	0.00	3.30	22.44	14.56	37.00	395 99
425.007	4.40	16.45	0.00	1.82	22.68	14.32	37.00	328 111
564.000	5.13	18.84	0.00	4.00	27.97	9.03	37.00	178 25
625.008	5.44	19.30	0.00	5.74	30.49	6.51	37.00	177 117
*696.710	5.82	19.16	0.00	3.57	31.17	5.45	37.00	177 5
796.290	6.34	20.07	0.00	4.40	30.81	6.19	37.00	173 45

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worse emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Attached individual pages of peak scan curve data sheets.



5. EMI Reduction Method During Compliance Testing

No modification was made during testing.

