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Electronics Research & Service Organization
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ELECTROMAGNETIC COMPATIBILITY TEST REPORT

Company	ZyXEL COMMUNICATIONS CORPORATION.
Address	NO.6, Innovation Rd. II,Science- Based Industrial Park, Hsin-Chu, Taiwan , R.O.C
Sample Name	ADSL Router
Model	Prestige 641
Date Received	JUN. 30, 1999
Date Tested	JUN. 30, 1999

MEASUREMENT PROCEDURE USED

FCC RULES AND REGULATION PART 15 SUBPART B CLASS B OCTOBER 1998 AND ANSI C63.4 MAY 1992
CISPR 22, CLASS B, 1996

WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.

	Name	Signature	Date
Testing Engineer	C.F.Wu/NVLAP		July 16,1999
Approving Manager	Paul Y. Liau/NVLAP		July 16,1999

Notes
1. This report will be invalid if duplicated or photocopied in part.
2. This report refers only to the specimen(s) submitted to test, and is invalid as seperately used.
3. This report is invalid without examination stamp and signature of this institute.
4. The tested specimen(s) will be preserved for thirty days from the date issued.
5. This is a NIST/NVLAP accrediated report but not constituted and endorsed by US government.

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 DESCRIPTION OF EUT

MANUFACTURER ZyXEL COMMUNICATIONS CORPORATION.

SAMPLE NAME ADSL Router

MODEL NUMBER Prestige 641

SERIAL NO. ----------

POWER SOURCE 16VAC (from power adapter)

POWER ADAPTER

PART NUMBER	30-112-160601
MODEL NUMBER	MW48-1601000A
INPUT RATE	120VAC/ 60Hz
OUTPUT RATE	16VAC/1000mA
POWER CORD	1.5m , Unshielded

1.2 DESCRIPTION OF PERIPHERALS

1 PC

MODEL NUMBER	NetServer LDpro 6/180
SERIAL NUMBER	SG70100104
MANUFACTURER	HP CORP.
F.C.C. ID	B94HPLS107
POWER CORD	Unshielded , Detachable , 1.8m

2 MONITOR

MODEL NUMBER	JC-1571VMA-2
SERIAL NUMBER	6Z01162EA
MANUFACTURER	NEC CORP.
F.C.C. ID	A3DJC-1571VMA-2
POWER CORD	Shielded, Detachable, 1.5m.

3 KEYBOARD

PRODUCT NUMBER	C1405C#AB0
SERIAL NUMBER	3625M60145
MANUFACTURER	HP CORP.
F.C.C. ID	B94C1405X
SIGNAL CABLE	1.9m , Shielded cable

4 PRINTER

MODEL NUMBER	5152-002
SERIAL NUMBER	0754365
MANUFACTURER	IBM CORP.
FCC ID	BKM9A85152002
POWER CORD	Shielded , Non-Detachable , 1.5m

5 NoteBook PC

MODEL NUMBER	EXTENSA 503
SERIAL NUMBER	9145B0160C91400C1DM
MANUFACTURER	ACER CORP.
DC Rating	19V/ 2.4A

6 NoteBook PC

MODEL NUMBER	EXTENSA 503
SERIAL NUMBER	9145B0160C91000CF2M
MANUFACTURER	ACER CORP.
DC Rating	19V/ 2.4A

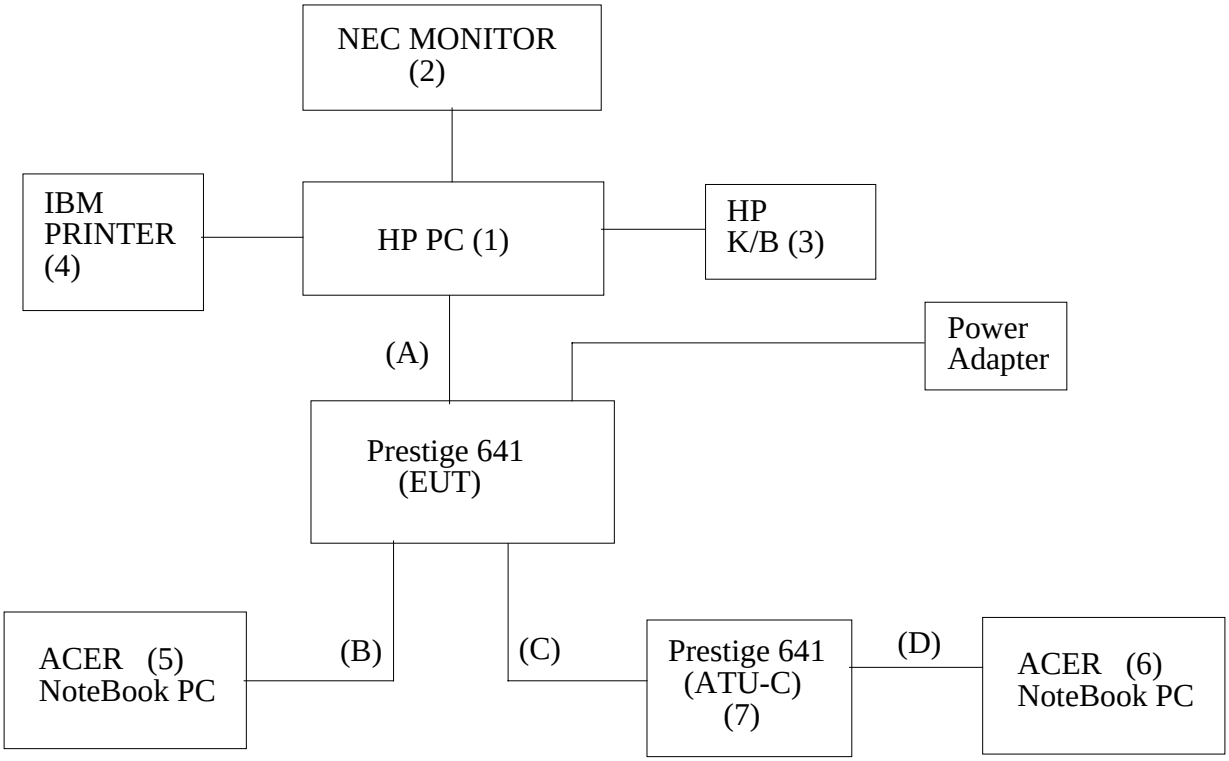
7 Terminal

MODEL NUMBER	Prestige 641(ATU-C)
MANUFACTURER	ZyXEL CORP.
Input Rating	16VAC/1000mA

8 Cable

NO.	TYPE	Connector	Shielded	Length
(A)	Console Cable	9 pin ↔ 9 pin RS232, metal	Yes	115cm
(B)	LAN Cable (Crossover)	RJ-45, metal	Yes	15m
(C)	Telphone Line	RJ-11, plastic	No	16m
(D)	LAN Cable (Crossover)	RJ-45, metal	Yes	1.8m

1.3 EUT & PERIPHERALS SETUP DIAGRAM



The indicated numbers (1)(2)-----please refer to item 1.2

1.4 EUT OPERATING CONDITION

1. Turned on EUT's power.
2. IP Setup:

PC(1)	None
Prestige 641 (ATU-C)	192.168.20.1
PC(5)	192.168.20.2
EUT's	192.168.30.1
PC(6)	192.168.30.2

3. Waiting for ADSL line auto-Link Up.
4. Using the FTP application S/W, PC(5) will transmit data to PC(6) via EUT's.
5. EUT's will show statistics message to PC(1) via Console Port(RS-232).
6. ADSL line transmitted rate: about 50k~60K byte/Sec.
7. Repeat step 2~5 item.

1.5 DESCRIPTION OF TEST SITE

SITE DESCRIPTION	FCC certificate NO. :31040/SIT DNV certificate NO. :510-96-1016 TUV certificate NO. : I9664582-9610 Lloyd's certificate NO. :LA003 BCIQ certificate NO. :SL2-IN-E-02 NVLAP Lab code : 200118-0 CNLA certificate NO. : CNLA-ZL97018 VCCI certificate NO. : R-706, C-650
NAME OF SITE	Electronics Research & Service Organization Industrial Technology Research Institute
SITE LOCATION	K500, 195-4 , sec. 4, Chung Hsing Rd., Chu-Tung Chen. Hsin-Chu, Taiwan 31015 R.O.C.

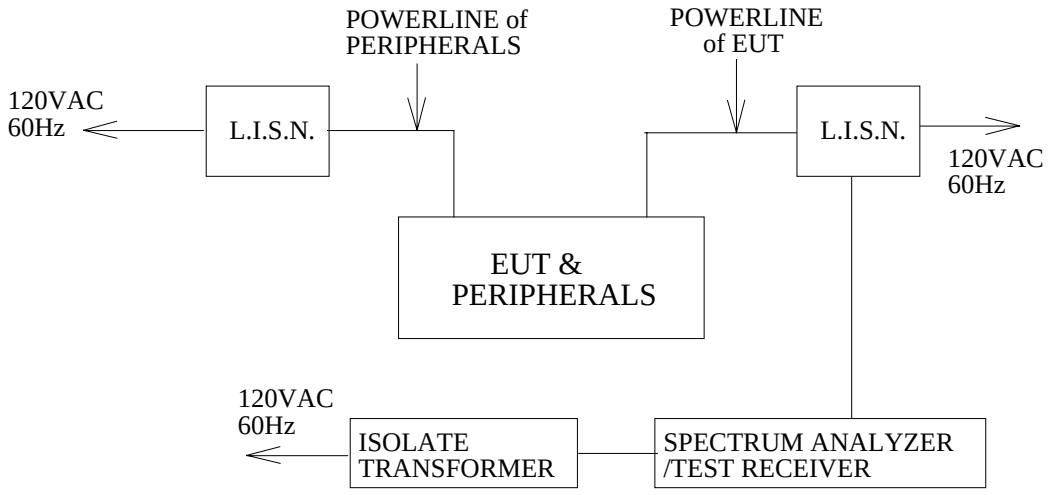
2. CONDUCTED POWERLINE TEST

2.1 TEST EQUIPMENTS

The following test equipments are used during the conducted powerline tests

MANUFACTURER OR TYPE	MODEL No	SERIAL NO.	DATE OF CALIBRATION
SPECTRUM ANALYZER & DISPLAY	HP 8568A	2235A02320	MAR. 18, 1999
QUASI-PEAK ADAPTER	HP 85650 A	2341A00672	MAR. 18, 1999
ISOLATION TRANSFORMER	SOLAR 7032-1	N/A	N/A
L.I.S.N.	EMCO 3850/2	9311-1025 9401-1028	MAR. 25. 1999
TEST RECEIVER	R/S ESH3	8720791118	MAR. 18, 1999
SHIELDED ROOM	KEENE 5983	N/A	N/A

2.2 TEST SETUP



2.3 CONDUCTED POWER LINE EMISSION LIMIT

FREQUENCY (MHz)	MAXIMUM RF LINE VOLTAGE (dB V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15-0.50	79	66	66-56	56-46
0.50-5.00	73	60	56	46
5.00-30.0	73	60	60	50

2.4 TEST PROCEDURE

The test procedure is performed in a 12ft×12ft×8ft(L×W×H) shielded room.
the EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chasis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chasis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

2.5 UNCERTAINTY OF CONDUCTED EMISSION

The uncertainty of conducted emission is ±1.36dB.

2.6 LINE CONDUCTED RF VOLTAGE MEASUREMENT

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

Temperature 27 Humidity 51 % RH

FREQUENCY	READING(dB V)				LIMITS (dB V)	
	ONE END & GRD'D		THE OTHER END & GRD'D			
(MHz)	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.150					66.00	56.00
2.448	32.08		37.18		56.00	46.00
2.794			35.28		56.00	46.00
14.364	42.66		40.36		60.00	50.00
16.226	45.07		46.47		60.00	50.00
17.849	42.57		41.77		60.00	50.00
18.328	42.68				60.00	50.00
20.270	42.48		41.48		60.00	50.00
24.271	41.49		41.49		60.00	50.00
30.000					60.00	50.00

REMARKS 1. Undetectable or the Q.P.values is lower than the limits of Ave

2. For Normal mode

2.6 LINE CONDUCTED RF VOLTAGE MEASUREMENT

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

Temperature 27 Humidity 51 % RH

FREQUENCY	READING(dB V)				LIMITS (dB V)	
	ONE END & GRD'D		THE OTHER END & GRD'D			
(MHz)	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.150	28.84		30.14		66.00	56.00
2.461			33.88		56.00	46.00
2.798	25.00				56.00	46.00
2.839			35.68		56.00	46.00
3.241			33.79		56.00	46.00
14.364	41.56				60.00	50.00
16.226	44.17		46.27		60.00	50.00
17.755	43.67				60.00	50.00
20.270			41.18		60.00	50.00
24.271	41.39		40.69		60.00	50.00
30.000					60.00	50.00

REMARKS 1. Undetectable or the Q.P.values is lower than the limits of Ave

2. For enhance mode

2.7 PHOTOS OF CONDUCTION TEST

MANUFACTURER ZyXEL COMMUNICATIONS CORPORATION.
MODEL NUMBER Prestige 641

3. RADIATED EMISSION TEST

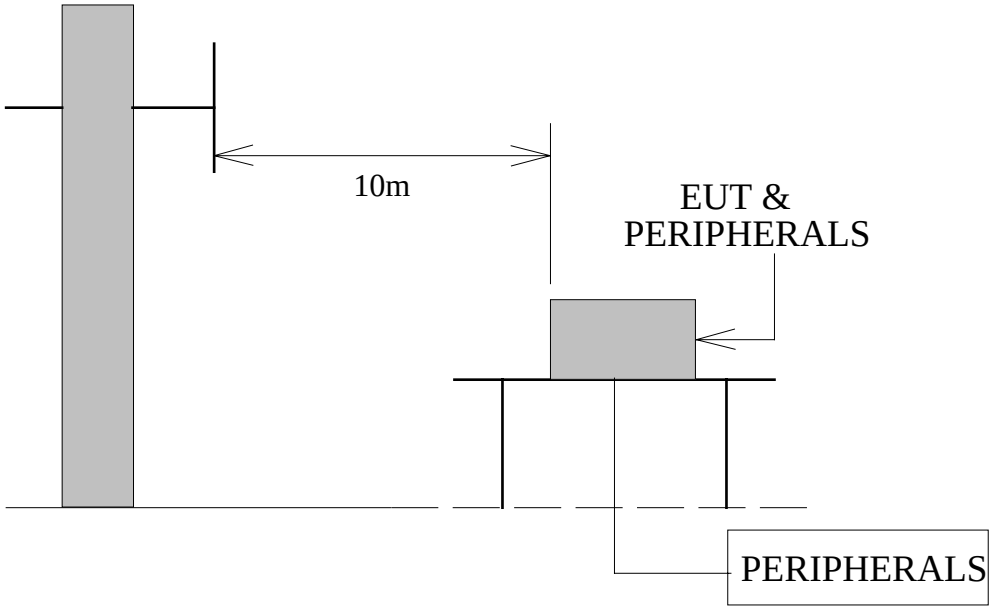
3.1 TEST EQUIPMENTS

The following test equipments are utilized in making the measurements contained in this report.

MANUFACTURER OR TYPE	MODEL NO	SERIAL NO	DATE OF CALIBRATION
CHASE BI-LOG ANTENNA	CBL6111A	1546	MAY.23, 1999
R/S TEST RECEIVER	ESMI	842088/005 841978/008	MAY.03, 1999
OPEN SITE	----------	No.1	AUG. 18, 1998

3.2 TEST SETUP

The diagram below shows the test setup which is utilized to make these measurements.



Antenna Elevation Variable

3.3 RADIATION LIMIT

All emanation from a class B computing device or system , including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below

FREQUENCY (MHz)	DISTANCE (METERS)	FIELD STRENGTHS(dB V/M)	
		CLASS A	CLASS B
30 230	10	40	30
230 1000	10	47	37

Note (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 closest point of any part of the device or system.

3.4 TEST PROCEDURE

The devices under test were placed on a rotatable table top 0.8 meter above ground. The table was rotated 360 degrees to determine the position of the highest radiation. EUT is set 10 meters from the interference receiving antenna which is mounted on the top of a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength Both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
The bandwidth setting on the E.M.I. meter (R/S TEST RECEIVER ESMI) is 120 KHz.
The levels are quasi peak value readings. The frequency spectrum from 30MHz to 1000MHz was investigated.

3.5 UNCERTAINTY OF RADIATED EMISSION

The uncertainty of radiated emission is ±2.72dB.

3.6 RADIATED RF NOISE MEASUREMENT

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.
All readings are quasi-peak values.

Temperature 33 Humidity 81 % RH

FREQ-UENCY (MHz)	ANTENNA FACTOR (dB/M)	CABLE LOSS (dB)	METER READING AT10m(dBµV) HORIZON-TAL	METER READING AT10m(dBµV) VERTICAL	LIMITS (dBµV/M)	EMISSION LEVEL AT10m(dBµV/M) HORIZON-TAL	EMISSION LEVEL AT10m(dBµV/M) VERTICAL
30.00	19.50	1.06	¡ ¯	¡ ¯	30.00	¡ ¯	¡ ¯
49.50	8.96	1.49	7.10	¡ ¯	30.00	17.55	¡ ¯
176.61	9.36	2.48	13.26	15.56	30.00	25.10	27.40
199.98	9.34	2.63	11.55	10.96	30.00	23.52	22.93
224.97	10.99	2.80	¡ ¯	4.10	30.00	¡ ¯	17.89
250.00	12.65	2.97	¡ ¯	7.04	37.00	¡ ¯	22.66
330.68	14.04	3.48	10.82	11.24	37.00	28.35	28.77
374.97	15.01	3.75	11.52	7.18	37.00	30.28	25.94
400.00	15.56	3.90	3.26	2.42	37.00	22.72	21.88
466.66	17.97	4.23	7.74	4.66	37.00	29.94	26.86
866.68	23.98	6.23	2.00	¡ ¯	37.00	32.21	¡ ¯
1000.00	24.86	6.80	¡ ¯	¡ ¯	37.00	¡ ¯	¡ ¯

REMARKS 1. Undetectable

2. Emission level (dB V/M) =Antenna Factor (dB/M) + Cable loss (dB) + Meter Reading (dB V).

3. For Normal mode

3.6 RADIATED RF NOISE MEASUREMENT

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.
All readings are quasi-peak values.

Temperature 25 Humidity 90 % RH

FREQ-UENCY (MHz)	ANTENNA FACTOR (dB/M)	CABLE LOSS (dB)	METER READING AT10m(dBµV)		LIMITS (dBµV/M)	EMISSION LEVEL AT10m(dBµV/M)	
			HORIZON-TAL	VERTICAL		HORIZON-TAL	VERTICAL
30.00	19.50	1.06	i –	i –	30.00	i –	i –
70.63	7.00	1.62	i –	16.65	30.00	i –	25.28
74.97	7.59	1.65	6.26	14.52	30.00	15.50	23.76
141.28	11.73	2.22	5.14	9.48	30.00	19.09	23.43
176.60	9.36	2.48	11.58	13.63	30.00	23.42	25.47
199.97	9.34	2.63	11.09	15.84	30.00	23.06	27.81
211.93	10.13	2.71	9.64	11.75	30.00	22.48	24.59
224.96	10.99	2.80	8.63	13.86	30.00	22.42	27.65
247.26	12.47	2.95	9.01	9.77	37.00	24.43	25.19
274.97	13.01	3.13	10.56	12.03	37.00	26.70	28.17
374.97	15.01	3.75	7.81	6.93	37.00	26.57	25.69
399.97	15.56	3.90	7.38	8.12	37.00	26.84	27.58
459.24	17.70	4.20	5.05	7.18	37.00	26.94	29.07
529.89	20.22	4.55	5.35	3.75	37.00	30.12	28.52
549.98	20.93	4.65	4.64	3.14	37.00	30.22	28.72
599.98	22.69	4.90	5.96	6.06	37.00	33.55	33.65
671.20	23.42	5.26	2.81	1.41	37.00	31.48	30.08
777.19	23.46	5.79	4.64	2.43	37.00	33.88	31.67
812.52	23.49	5.96	1.20	2.20	37.00	30.66	31.66
1000.00	24.86	6.80	i –	i –	37.00	i –	i –

REMARKS 1. Undetectable

2. Emission level (dBµV/M) =Antenna Factor (dB/M) + Cable loss (dB) + Meter Reading (dBµV).

3. For enhance mode

3.7 PHOTOS OF OPEN SITE

MANUFACTURER ZyXEL COMMUNICATIONS CORPORATION.
MODEL NUMBER Prestige 641

3.7 PHOTOS OF OPEN SITE

MANUFACTURER ZyXEL COMMUNICATIONS CORPORATION.
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