HomeTek Technology Inc.

ADDRESS: No.85-5, Shir Men Road, Tu Cheng City,
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PHONE : 886-2-22608375 FAX : 886-2-22748013
E - mail : hometek@ms15.hinet.net

FCC TEST REPORT
FOR

APPLICANT : LANTECH Computer Company
ADDRESS : 3F, No.347, 349,
Yang-Kuang St., Nel-Hu Dis.,
Taipei, Taiwan, R. O. C.
EUT : ISDN Express Route
MODEL NO. : Express Route 80
FCC ID : L8G8460E80

Under Part 15, SUBPART B.

CLASS B

Certification

PREPARED BY :

HomeTek Technology Inc.

No. 85-5, Shir Men Road, Tu Cheng City,

Taipei Hsien. TAIWAN, R. O. C.

Report # : FB7D008

EMC LAB HomeTek
HomeTek Technology Inc.

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TEST REPORT CERTIFICATION

EUT	: ISDN Express Route
MODEL NO.	: Express Route 80
FCC ID	: L8G8460E80
Final Test Date	: 4/28/98
APPLICANT	: LANTECH Computer Company
ADDRESS	: 3F, No.347, 349, Yang-Kuang St.,
	Nei-Hu Dis., Taipei, Taiwan, R. O. C.

MEASUREMENT PROCEDURE USED :

PART 15 SUBPART B OF FCC RULES AND REGULATIONS
(47 CFR PART 15) FCC / ANSI C63.4-1992

WE HEREBY SHOW THAT :

THE MEASUREMENT SHOWN IN THE ATTACHMENT WERE MADE IN ACCORDANCE WITH THE PROCEDURES INDICATED, AND THE MAXIMUM ENERGY EMITTED BY THE EQUIPMENT WAS FOUND TO BE WITHIN THE FCC LIMITS APPLICABLE.

TEST ENGINEER : Tomy TOMY HU DATE : 4/28/98

CHECK BY : JOSEPH CHOU DATE : 5/1/98.

APPROVED BY : P.S. Kuang DATE : 5/2/98

TABLE OF CONTENTS

GENERAL INFORMATION

1 APPLICANT : LANTECH Computer Company

2 ADDRESS : 3F, No.347, 349,
Yang-Kuang St., Nel-Hu Dis.
Taipei, Taiwan, R. O. C.

3 MANUFACTURER : LANTECH Computer Company

4 ADDRESS : 3F, No.347, 349,
Yang-Kuang St., Nel-Hu Dis.
Taipei, Taiwan, R. O. C.

5 DESCRIPTION OF EUT :

EUT	:	ISDN Express Route
FCC ID	:	L8G8460E80
Model Number	:	Express Route 80
Serial #	:	N/A
Data Cable	:	SHIELDED
Power Cord	:	UN-SHIELDED
Power Supply Type	:	SWITCHING

6 FEATURES OF EUT :

ISDN

U or ST interfaces

Switched ISDN service for various switches worldwide: National ISDN, ATT 5ESS, DMS switches in North America EuroISDN (ETSI) switches in Europe

NTT switches in japan

EuroISDN switches in Taiwan, Singapore ATT 5ESS switches in

Korea

Detailed accounting including dialed numbers, disconnect causes, frame statistics

Auto Dial-out triggered by outgoing LAN traffic, auto disconnect

due to inactive connection

Bandwidth-On-Demand, 0< - >1< - >2 bandwidth management, 1B to 2B if traffic increases beyond threshold,. 2B to 1B if traffic falls below threshold, 1B to 0B if traffic is idle for more than an pre-defined period

Ethernet

4 port Ethernet Repeater with unlimited LAN users

Internet/Intranet

PPP, MultiLink PPP (MLPPP), LCP, IPCP, IPXCP, and BCP

internet and intranet connection profiles. Allows one B channel for internet connection and the other B channel for intranet connection

STAC LZS data compression with 128 KPBS -> 512 KBPS, 4:1 compression ratio on normal text file

Static or dynamic IP address assignment

Static or dynamic IP Route

Security

CLID (caller ID)

Call-Back (hang-up and dial the caller)

PAP/CHAP (PPP authentication protocol)

Access List (filtering of packets bases upon IP address)

NAT (network address translation). Hides internal IP addresses from outside world, no need to change existing IP address

assignments, allows the subscription of single IP address account for the entire LAN.

Network Management

From local console, NMS/SNMP or Web Browser/HTTP

NMS runs on Windows 3.1, Windows95 and NT platforms

Alarm warning on ISDN usage

Configuration file save and restore

Analog Services

2 RJ-11 ports for telephone, modem or fax analog devices

Router Software

Software upgraded through TFTP and stored in FLASH memory

MODIFICATION LIST

THE FOLLOWING ACCESSORIES WERE ADDED TO THE EUT DURING TESTING :

NO MODIFICATION BY HOMETEK TECHNOLOGY INC.

CONDUCTED POWER LINE TEST

1 TEST INSTRUMENTS & FACILITIES

The following test Instruments was used during the conducted test :

Item	Instruments/ Facilities	Specification	Manufacturer	Model # / S/N#	Date Of Cal.
1	EMI Receiver	9KHz ~ 30MHz	ROHDE & SCHWARZ	ESHS 30 844827/007	FEB/98
2	LISN	50 Ω/50uH/100A 9KHz ~ 30MHz	SCHWARZ BECK	NNLK 8121 8121370	FEB/98
3	LISN	9KHz ~ 30MHz	ROHDE & SCHWARZ	ESH3-Z5 846128/007	FEB/98
4	Signal Generator	9KHz ~ 2080MHz	ROHDE & SCHWARZ	SMY02 845096/018	FEB/98
5	Pulse Limiter	9KHz ~ 30MHz	ROHDE & SCHWARZ	ESH3Z2 357.8810.52	N/A

Note : All equipment upon which need to calibrated are with period of 1 year.

2 TEST PROCEDURE

2.1 The EUT was tested according to **ANSI C63.4 - 1992**.

2.2 The EUT was placed 0.4 meter from the conducting wall of shielding room and kept at least 0.8 meter from any other grounded conducting surface.

2.3 The frequency range form 0.45 MHz to 30 MHz was investigated.

2.4 The LISN used was 50 Ohm / 50 uHenry as specified by Section 5.1 of **ANSI C63.4 - 1992**.

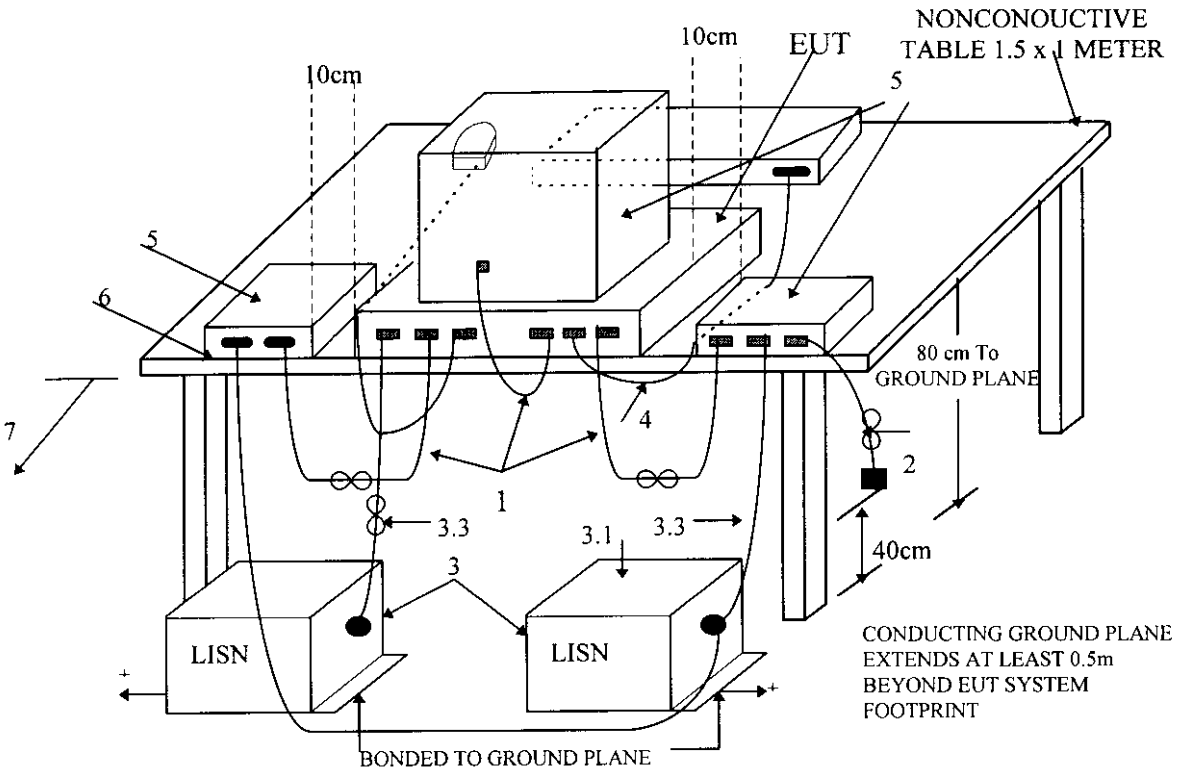
2.5 All the support peripherals are connect to the other LISN.

2.6 Cables and peripherals were moved to find the maximum emission levels for each frequency.

3 TEST SETUP

3.1 Typical : Setup Of Conducted Test

ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9kHz TO 40 GHz — ANSI C63.4-1992



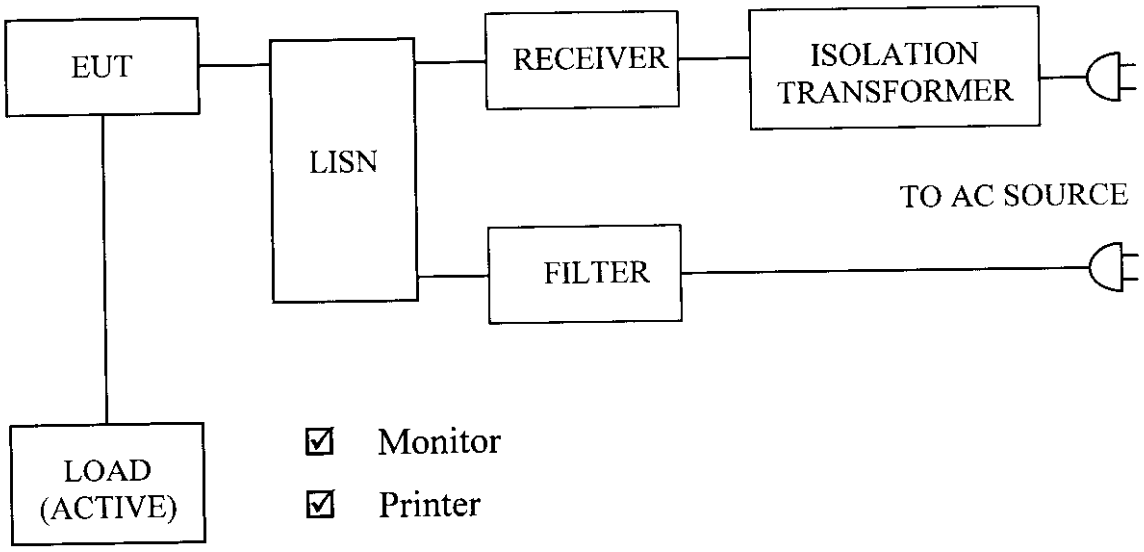
+LISNs may have to be moved to the side to meet 3.3 below.

LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1m.
3. EUT connected to one LISN. Unused LISN connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, ground plane.
   - 3.1 All other equipment powered from second LISN.
   - 3.2 Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
   - 3.3 LISN at least 80 cm from nearest part of EUT chassis.
4. Cables of hand-operated devices, such as keyboards, mouses, etc., have to be placed as close as possible to the host.
5. Non-EUT components being tested.
6. Rear of EUT, including peripherals, shall be all aligned and flush with rear of tabletop.
7. Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the floor ground plane (see 5.2).

Test Configuration
Tabletop Equipment Conducted Emission

3.2 Block Diagram Of Conducted Test



- ☑ Monitor
- ☑ Printer
- ☑ Modem
- ☑ Key Board
- ☑ Mouse
- ☑ Network Cable
- ☐ Joystick
- ☐ Speaker
- ☐ Line in Device

4 CONFIGURATION OF THE EUT

The EUT was configured according to **ANSI C63.4 - 1992**. All I/O ports were connected to the appropriate peripherals. All peripherals and cables are listed below (including internal device) :

4.1 EUT

Device	:	ISDN Express Route
Manufacturer	:	LANTECH
Model Number	:	Express Route 80
Serial Number	:	N/A
FCC ID	:	L8G8460E80
Data Cable	:	Shielded
Power Cord	:	Un-Shielded

4.2 PERIPHERALS

☑ Host Personal Computer

Manufacturer	:	HP
Model Number	:	Vectra VE 5/133
Serial Number	:	SG72200537
FCC ID	:	B94VECTRAVE53
Data Cable	:	Shielded, 1.5m
Power Cord	:	Shielded, 1.8m

☑ Monitor

Manufacturer	:	ATEC
Model Number	:	G450DU
Serial Number	:	714PD000Q0002
FCC ID	:	GKR450
Data Cable	:	Shielded, 1.5m
Power Cord	:	Un-Shielded, 1.8m

☑ Printer

Manufacturer	:	HP
Model Number	:	DJ400
Serial Number	:	MY77V1C0DD
FCC ID	:	B94C2642X
Data Cable	:	Shielded, 1.5m
Power Cord & Adaptor	:	Un-Shielded, 1.8m

☑ Modem I

Manufacturer	:	DATATRONIC
Model Number	:	2814CX
Serial Number	:	1200CK
FCC ID	:	N/A
Data Cable	:	Shielded, 1.5m
Power Cord & Adaptor	:	Un-Shielded, 1.8m

☐ Modem II

Manufacturer	:	
Model Number	:	
Serial Number	:	
FCC ID	:	
Data Cable	:	
Power Cord & Adaptor	:	

☑ Mouse (PS II)

Manufacturer	:	HP
Model Number	:	M-S34
Serial Number	:	LZA61236877
FCC ID	:	DZL210582
Data Cable	:	Shielded, 1.8m

☑ KeyBoard

Manufacturer	:	AST
Model Number	:	SK-2000REW
Serial Number	:	
FCC ID	:	GYUR26SK
Data Cable	:	Shielded

4.4 REMARK :

5 EUT OPERATING CONDITION

5.1 Operating condition is according to **ANSI C63.4 - 1992.**

5.2 The oscillator Frequency of the EUT were 3.686 MHz.

5.3 EUT power ON.

5.4 Test program sent "H" pattern to peripherals as following :

5.4.1 Printer

5.4.2 Monitor

5.4.3 Modem

5.4.4 Mouse

5.4.5 KeyBoard

5.4.6 Pc

6 LIMIT OF CONDUCTED POWER LINE EMISSION CLASS B:

Frequency Range	Class A	Class B
0.45 ~ 1.705 MHz	1000 uV	250 uV
1.705 ~ 30 MHz	3000 uV	250 uV

6.1 In the above table, the tighter limit applies at the band edges.

7 RESULT OF CONDUCTED POWER LINE TEST

7.1 The frequency range from 0.45 MHz to 30 MHz was investigated. All readings are quasi-peak values.

7.2 IF bandwidth : 9 kHz, Meas Time : 1 sec.

7.3 Temperature : 21 ℃, Humidity : 72 % RH.

7.4 Quasi-Peak :

Frequency (MHz)	Line 1		Line 2		Limit	
	dBuV	uV	dBuV	uV	dBuV	uV
0.450	42.80	138.04	41.94	125.03	48	250
0.590	35.63	60.46	34.46	52.84	48	250
1.285	29.73	30.65	29.20	28.84	48	250
1.720	17.89	7.84	17.44	7.45	48	250
7.050	12.93	4.43	13.56	4.76	48	250
10.000	27.31	23.20	23.98	15.81	48	250
20.000	36.68	68.23	38.93	88.41	48	250
24.000	20.69	10.83	19.34	9.27	48	250

REMARK :

1. Model : Express Route 80
2. Measuring mode :
3. Uncertainty in conduction emission measured : < ± 2.0dB.

Test Engineer : Jenny

RADIATED EMISSION TEST

1 TEST INSTRUMENTS & FACILITIES

The following test Instruments was used during the radiated emission test :

Item	Instruments /facilities	Specification	Manufacturer	Model # / S/N#	Location	Date of Cal.
1	SPECTRUM ANALYZER	9KHz ~ 1.8GHz	HP	HP8591 3710A06158	Open Site I	APR/98
2	EMI TEST RECEIVER	20MHz ~ 1GHz	ROHDE & SCHWARZ	ESVS10 845165/017	Open Site I	FEB/98
3	PRE-AMPLIFIER	0.1MHz ~ 1.3 GHz	HP	8447D 1937A02095	Open Site I	MAY/97
4	EMI TEST RECEIVER	20Hz ~ 26.5GHz	ROHDE & SCHWARZ	ESMI 845442/006	Open Site II	FEB/98
5	PRE-AMPLIFIER	20MHz ~ 7GHz	ROHDE & SCHWARZ	ESMI-Z7 846363/001	Open Site II	FEB/98
6	SIGNAL GENERATOR	9KHz ~ 2080MHz	ROHDE & SCHWARZ	SMY02 845096/018		FEB/98
7	ANTENNA (BI-LOG)	25MHz ~ 2GHz	ARA	LPB2520 S/N:1096	Open Site I	MAR/98
8	ANTENNA (BI-LOG)	25MHz ~ 2GHz	ARA	LPB2520 S/N:1095	Open Site II	MAR/98
9	ANTENNA (DIPOLE)	30 ~ 300MHz	ROHDE & SCHWARZ	HZ-12 842899/08		JAN/98
10	ANTENNA (DIPOLE)	300 ~ 1000MHz	ROHDE & SCHWARZ	HZ-13 842007/0004		JAN/98

Note : All equipment upon which need to calibrated are with period of 1 year.

2 TEST PROCEDURE

2.1 The EUT was test according to **ANSI C63.4 - 1992**.

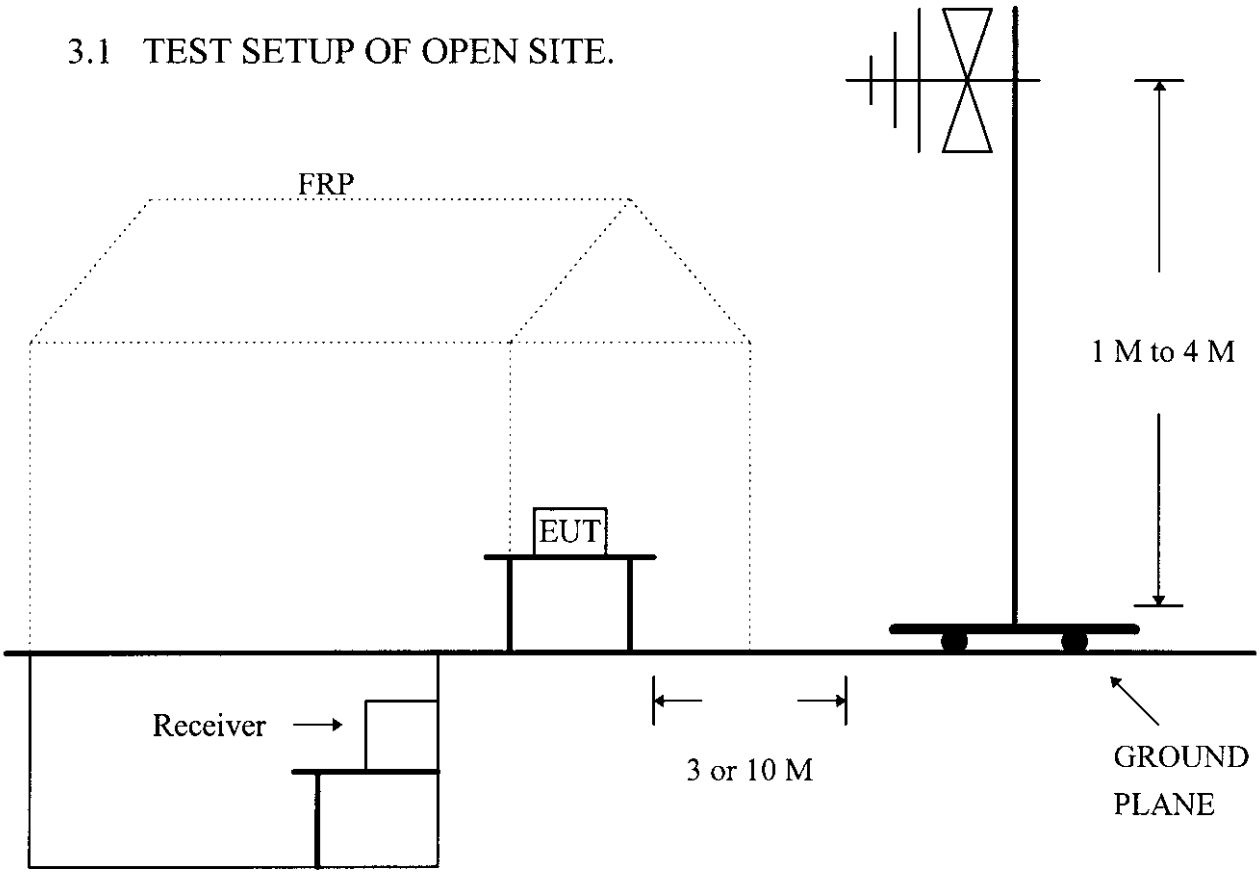
2.2 The radiated test was performed at HomeTek Lab's Open Site II.

2.3 This site is on file with the FCC laboratory division, reference 31040/site 1300F2, Date : August 22, 1997.

2.4 The frequency range from 30 MHz to 1 GHz, the measurement were made at 3 meters, with a BI-log antenna.

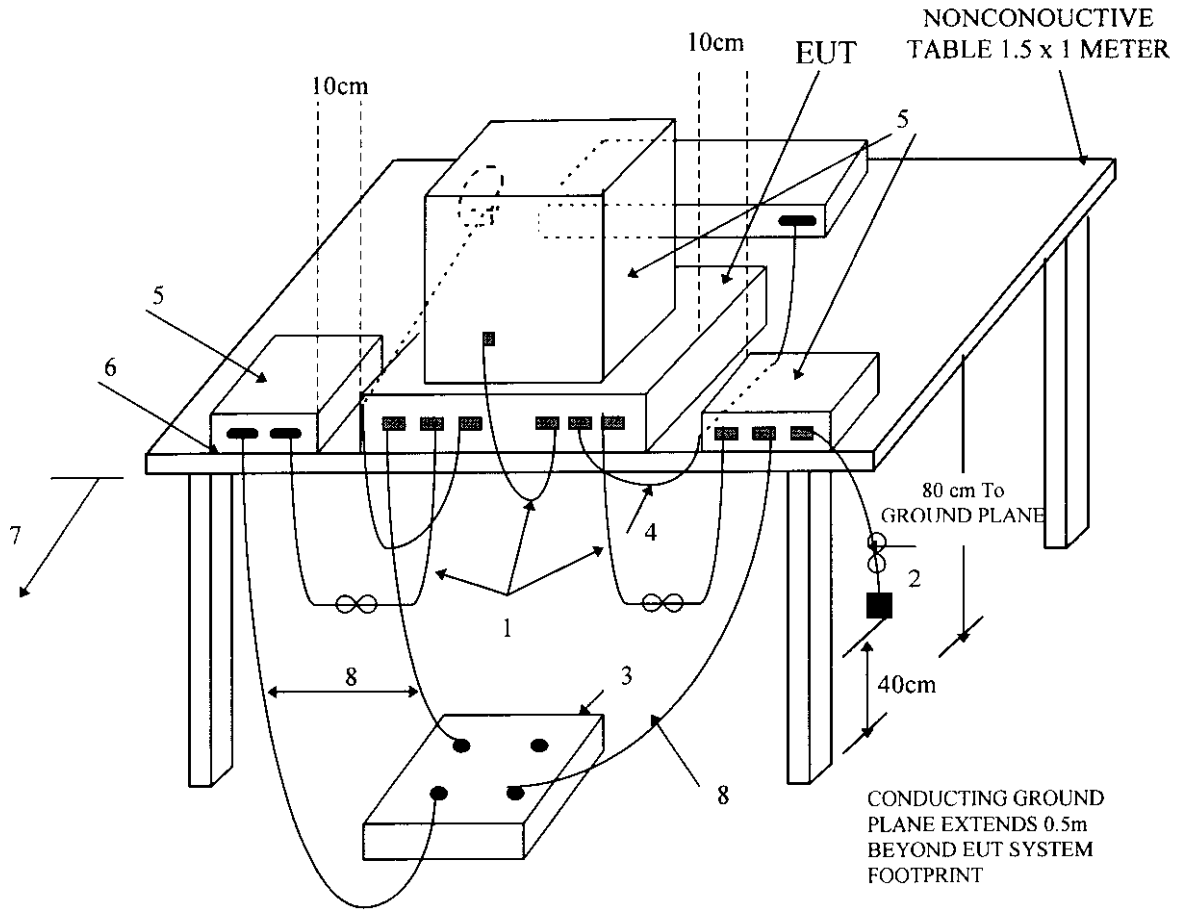
3 TEST SETUP

3.1 TEST SETUP OF OPEN SITE.



3.2 TEST SET OF EUT

ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9kHz TO 40 GHz ANSI C63.4-1992



LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1m.
3. If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground plane with the receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, mouses, etc., have to be placed as close as possible to the controller.
5. Non-EUT components of EUT system being tested.
6. The rear of all components of the system under test shall be located flush with the rear of the table.
7. No vertical conducting wall used.
8. Power cords drape to the floor and are routed over to receptacle.

Test Configuration

Tabletop Equipment Radiated Emission

4 CONFIGURATION OF THE EUT

Same as "Conducted Power Line test", section 4

5 EUT OPERATING CONDITION

5.1 Same as "Conducted Power Line test", section 5

5.2 The radiated emission in the frequency range from 30 MHz - 1000 MHz was test in a horizontal and vertical polarization at HomeTek Lab's open site II.

6 LIMIT OF RADIATED EMISSION CLASS B:

Frequency (MHz)	Measurement Distance	Limit (uV/m)	
		Class A	Class B
30 - 88	3 (M)	300	100
88 - 216	3 (M)	500	150
216 - 960	3 (M)	700	200
Above 1000	3 (M)	1000	500

6.1 The tighter limit shall apply at the edge between two frequency bands.

6.2 Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

7 RESULT OF RADIATED EMISSION TEST

7.1 The frequency range from 30 MHz to 1 GHz was investigated. All readings are quasi-peak values with resolution bandwidth of 120 kHz.

7.2 The measurements above 1 GHz with a resolution bandwidth of 1 MHz are peak reading at 3 meters.

7.3 The measurements were made at 3 meters of HomeTek Lab's open site II.

7.4 Temperature : 21 ℃, Humidity : 72 % RH.

7.5 Radiated Emission data : **Horizontal**

Frequency (MHz)	Reading Level (dBuV)	ANT factor (dBuV)	Cable Loss (dBuV)	Emission Level (dBuV)	Emission Level (uV/m)	Limit (dBuV)	Limit (uV/m)
212.99	24.78	12.38	0.91	38.07	71.37	43.5	300
279.99	25.15	16.06	0.99	42.20	128.82	46.0	200
339.97	24.67	16.96	0.96	42.59	134.74	46.0	200
419.99	23.97	16.71	1.32	42.00	146.22	46.0	200
479.96	22.88	17.92	1.37	42.17	114.42	46.0	200
958.80	15.35	23.46	1.93	40.74	108.89	46.0	200

- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 958.80 MHz .
- Corrected Reading : (15.35) + (23.46) + (1.93) = 40.74 . (Emission Level)

7.6 Radiated Emission data : **Vertical**

Frequency (MHz)	Reading Level (dBuV)	ANT factor (dBuV)	Cable Loss (dBuV)	Emission Level (dBuV)	Emission Level (uV/m)	Limit (dBuV)	Limit (uV/m)
59.40	20.10	14.54	0.43	35.07	56.69	40.0	100
198.66	27.40	10.11	0.81	38.32	82.41	43.5	150
279.98	23.53	15.39	0.99	39.91	98.97	46.0	200
419.99	22.64	18.33	1.32	42.29	130.17	46.0	200
439.98	22.84	18.77	1.19	42.80	138.04	46.0	200
479.97	17.36	19.60	1.37	38.33	82.51	46.0	200

- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 479.97 MHz .
- Corrected Reading : (17.36) + (19.60) + (1.37) = 38.33 . (Emission Level)

REMARK :

1. Model : Express Route 80
2. Measuring mode :
3. Uncertainty in radiated emission measured : < ± 4.0dB.

Test Engineer : Jemy