HomeTek Technology Inc.

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

FCC TEST REPORT
FOR

APPLICANT	: AECL CANDU
ADDRESS	: 3251 SPEAKMAN DRIVE,
	BUILDING SP3 MISSISAUGA,
	ONTARIO, CANADA.
EUT	: Industrial PC
MODEL NO.	: AMB-311T
FCC ID	: N/A

Under Part 15, SUBPART B.

CLASS A

PREPARED BY :

HomeTek Technology Inc.

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

Taipei Hsien. TAIWAN, R. O. C.

Report # : FA7I012

EMC LAB
HomeTek
HomeTek Technology Inc.

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TEST REPORT CERTIFICATION

EUT	: Industrial PC
MODEL NO.	: AMB-311T
FCC ID	: N/A
Final Test Date	: 9/11/98
APPLICANT	: AECL CANDU
ADDRESS	: 3251 SPEAKMAN DRIVE,
	BUILDING SP3 MISSISAUGA,
	ONTARIO, CANADA.

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.

PREPARED BY : Angel Chen ANGEL CHEN DATE : 9/14/'98

CHECK BY : JOSEPH CHOU DATE : 9/14/'98

APPROVED BY : R.S. Huang R.S. HUANG/Manager DATE : 9/14/98

TABLE OF CONTENTS

GENERAL INFORMATION

1	APPLICANT	: AECL CANDU
2	ADDRESS	: 3251 SPEAKMAN DRIVE,
		BUILDING SP3 MISSISAUGA,
		ONTARIO, CANADA.
3	MANUFACTURER	: Astech Technology CO., LTD.
4	ADDRESS	: 6F-4, NO. 351, CHUNG-SHAN RD.,
		SEC. 2, CHUNG-HO CITY, TAIPEI,
		TAIWAN, R. O. C.

5 DESCRIPTION OF EUT :

EUT	: Industrial PC
FCC ID	: N/A
Model Number	: AMB-311T
Serial #	: N/A
Data Cable	: SHIELDED
Power Cord	: SHIELDED
Power Supply Type	: SWITCHING

6 FEATURES OF EUT :

6.1 Heavy-duty steel chassis, high-quality front panel

6.2 10.4" color DSTN, color TFT LCD display

6.3 Analog resistive touchscreen (option)

6.4 ISA-bus 14-slot (default) or PCI-bus 14-slot passive backplane, or space for motherboard

6.5 Universal 250W switching power supply (or other options)

6.6 ISA-bus (default) or PCI-bus flat panel/CRT display control card

6.7 One disk drive housing: for four half-high 5.25" HDDs or FDDs

6.8 Two 64 CFM cooling fans

6.9 Brightness & contrast control VRs, external keyboard connector, disk drive slots behind a lockable door on the front panel

6.10 Hold-down clamp for keeping add-on cards from vibration

6.11 19" rack mounting

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**.

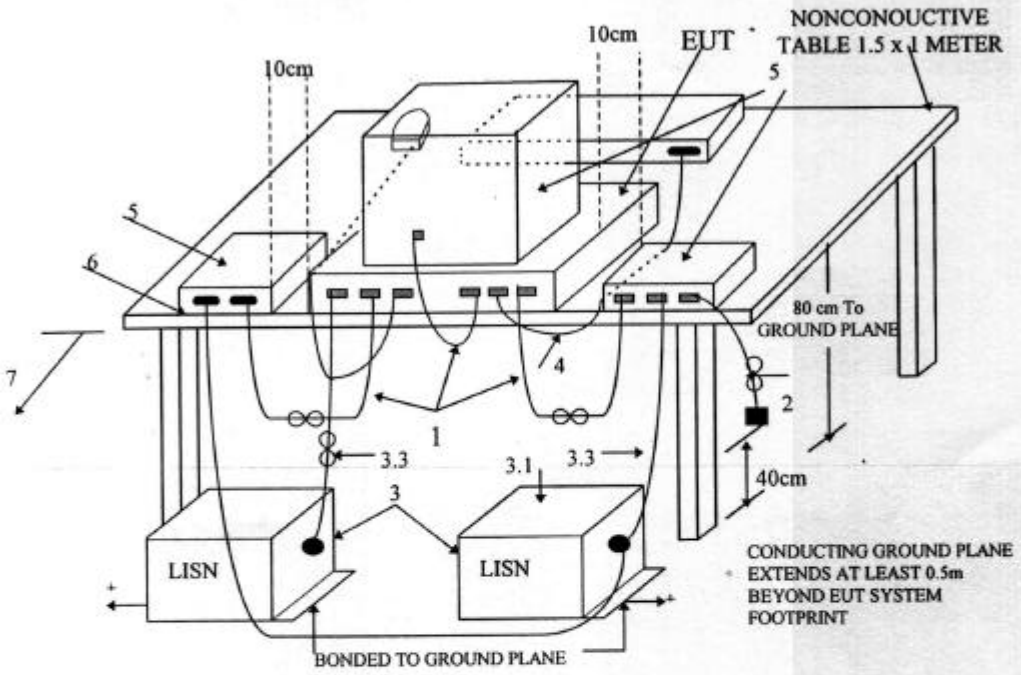
2.5 All the support peripherals are connect to the other LISN.

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.

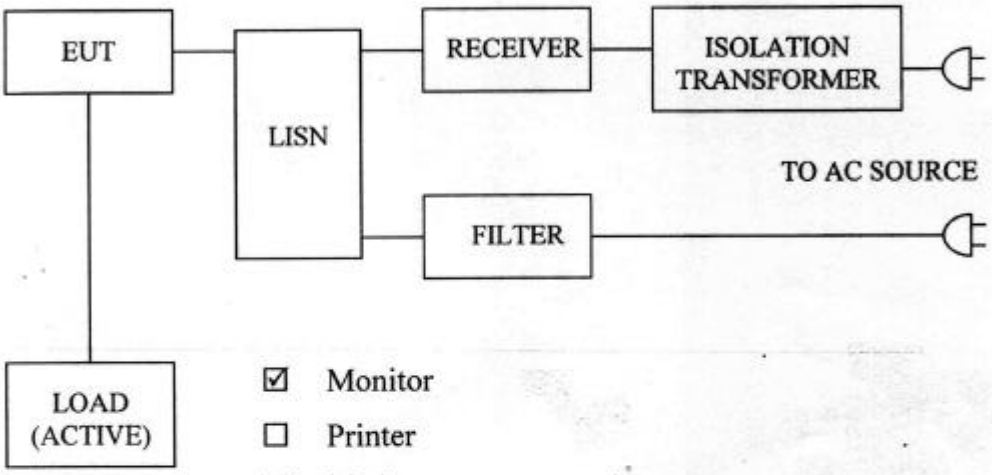
LEGEND:

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
- ☐ Joystick
- ☐ Network Cable
- ☐ 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	:	Industrial PC
Manufacturer	:	AECL
Model Number	:	AMB-311T
Serial Number	:	N/A
FCC ID	:	N/A
Data Cable	:	Shielded
Power Cord	:	Shielded, 1.8 m

4.2 PERIPHERALS

☑ Monitor

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

☑ Modem I

Manufacturer	:	DATATRONIC
Model Number	:	2814CX
Serial Number	:	1150541132
FCC ID	:	N/A
Data Cable	:	Shielded, 1.5 m
Power Cord & Adaptor	:	Un-Shielded, 1.8 m

☑ Modem II

Manufacturer	:	DATATRONIC
Model Number	:	2814CX
Serial Number	:	1150541132
FCC ID	:	N/A
Data Cable	:	Shielded, 1.5 m
Power Cord & Adaptor	:	Un-Shielded, 1.8 m

☑ Mouse (PS II)

Manufacturer	:	HP
Model Number	:	M-S34
Serial Number	:	LZA72270791
FCC ID	:	DZL211029
Data Cable	:	Shielded, 1.8 m

☑ KeyBoard

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

4.3 REMARK :

5 EUT OPERATING CONDITION

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

5.2 CPU : Pentium MMX - 233 MHz
CPU Clock : 66 MHz

5.3 Turn on the power of all equipments.

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

5.4.1 Monitor

5.4.2 Modem

5.4.3 Keyboard

6 LIMIT OF CONDUCTED POWER LINE EMISSION CLASS A:

Frequency Range	dBuV	uV
0.45 ~ 1.705 MHz	60.0	1000 uV
1.705 ~ 30 MHz	69.5	3000 uV

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

7 RESULT OF CONDUCTED POWER LINE TEST (1)

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 : 26 ℃, Humidity : 72 % RH.

7.4 Quasi-Peak :

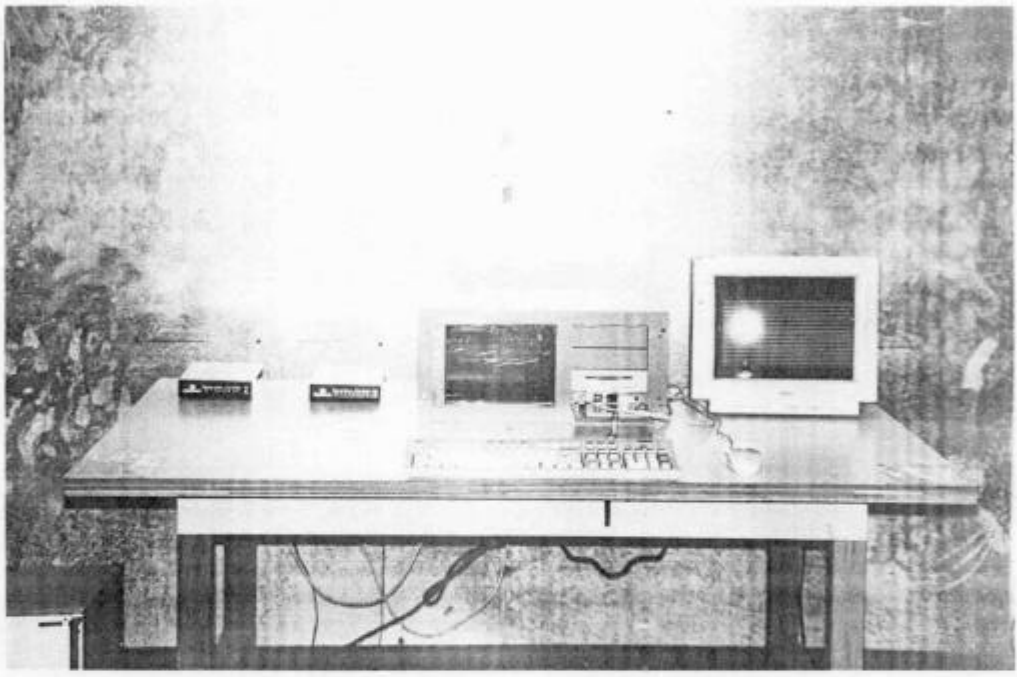
Frequency (MHz)	Line 1		Line 2		Limit	
	dBuV	uV	dBuV	Uv	dBuV	uV
0.520	44.58	169.43	43.78	154.53	60.0	1000
0.835	42.22	129.22	41.28	115.88	60.0	1000
1.080	40.61	107.28	42.73	136.93	60.0	1000
1.325	40.38	104.47	41.23	115.21	60.0	1000
3.670	37.37	73.88	34.17	51.11	69.5	3000
6.980	32.91	44.21	31.47	37.45	69.5	3000
14.480	23.57	15.08	22.73	13.69	69.5	3000
25.200	24.16	16.14	25.35	18.51	69.5	3000

REMARK :

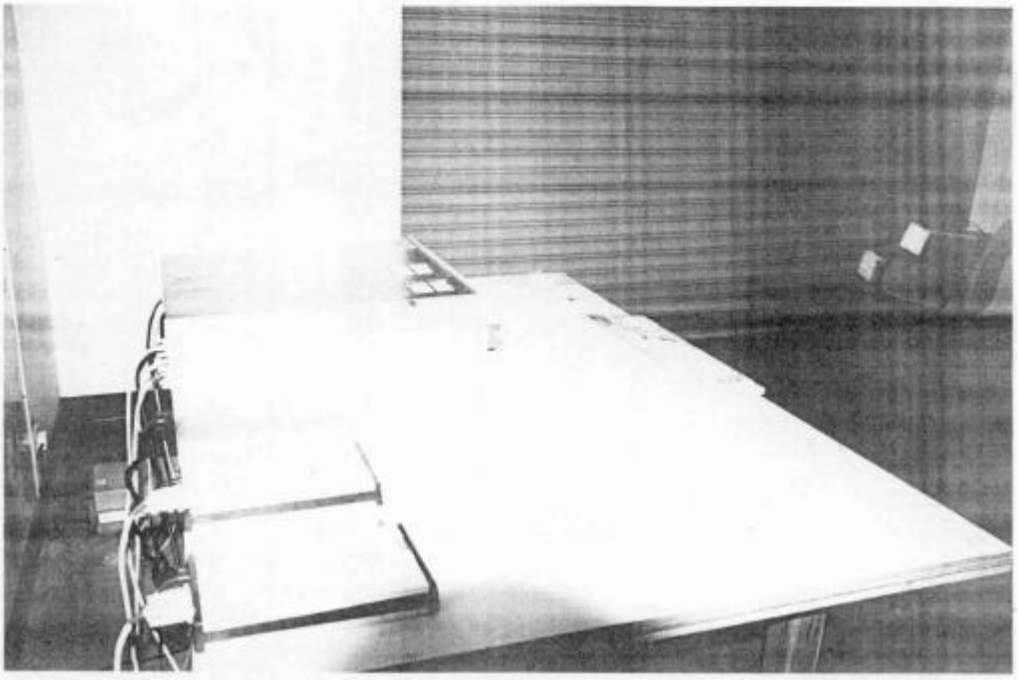
1. Model : AMB-311T
2. Measuring mode : Front K/B
3. Uncertainty in conduction emission measured : < ± 2.0dB.

8 PHOTO OF CONDUCTED POWER LINE TEST

Test Mode : Front K/B



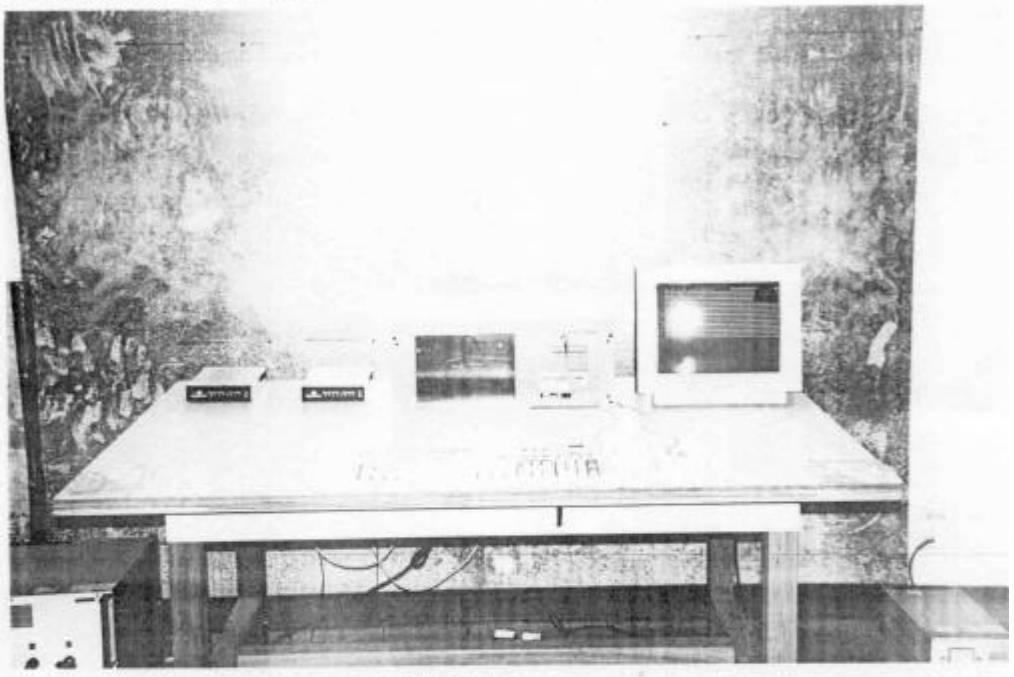
Front View



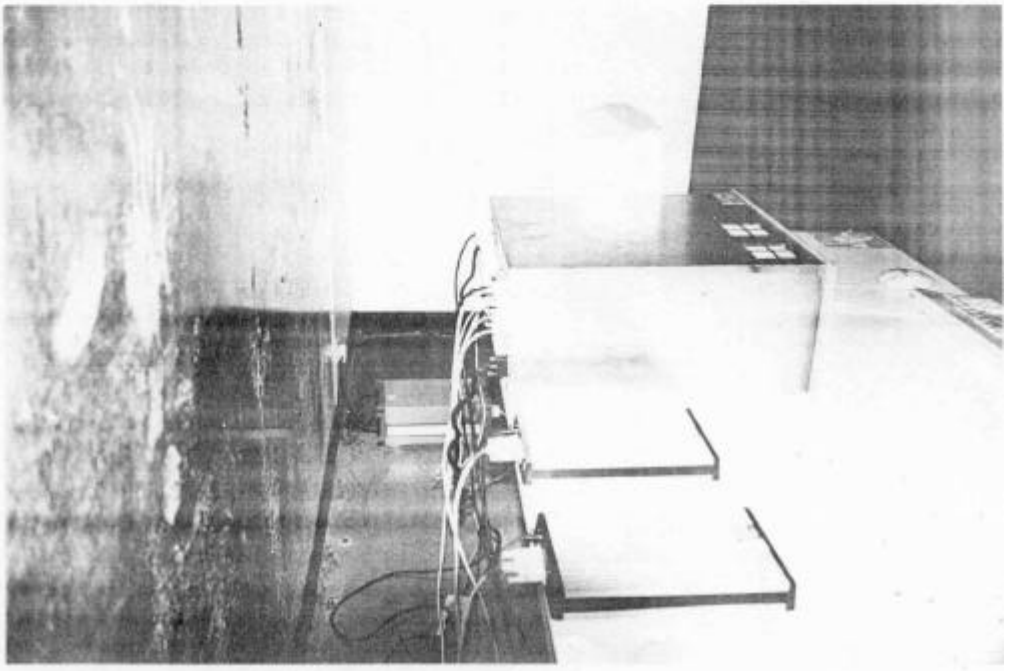
Rear View

10 PHOTO OF CONDUCTED POWER LINE TEST

Test Mode : Rear K/B



Front View



Rear View

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/98
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 II	MAR/98
8	ANTENNA (BI-LOG)	25MHz ~ 2GHz	ARA	LPB2520 S/N:1095	Open Site I	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**.

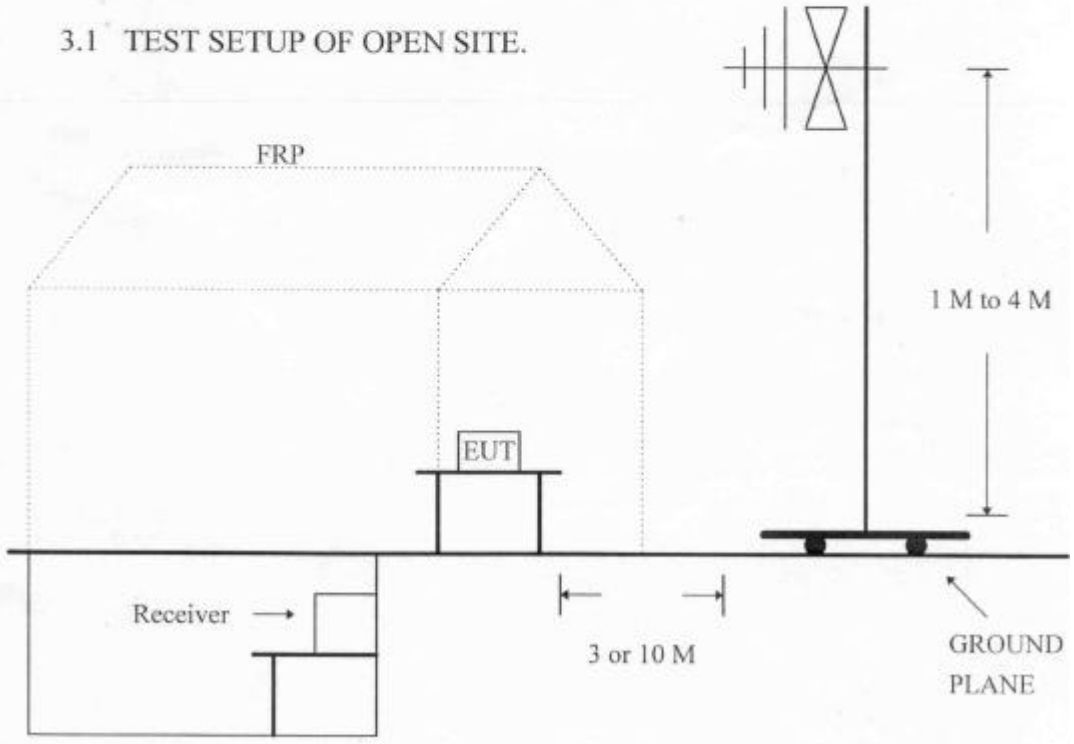
2.2 The radiated test was performed at HomeTek Lab's Open Site II.

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 10 meters, with a BI-log antenna.

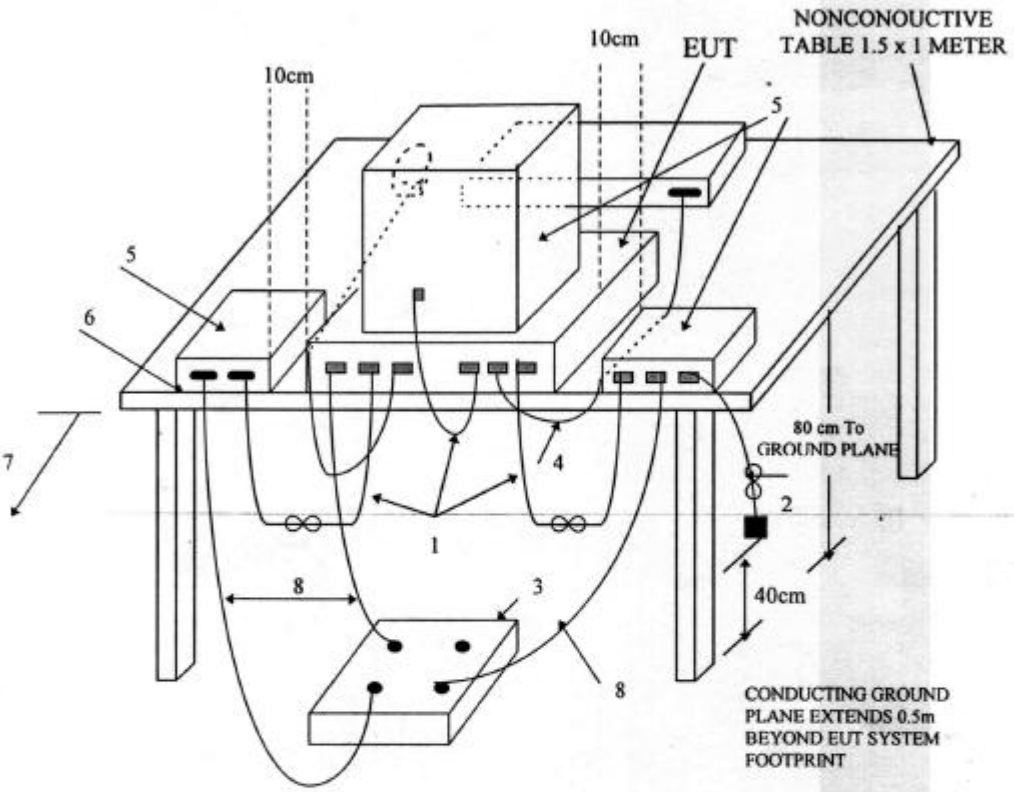
3 TEST SETUP

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 A:

Frequency (MHz)	Measurement Distance	dBuV	uV/m
30 - 88	10 (M)	39	90
88 - 216	10 (M)	43.5	150
216 - 960	10 (M)	46.4	210
Above 1000	10 (M)	49.5	300

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 (1)

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 10 meters.

7.3 The measurements were made at 10 meters of HomeTek Lab's open site II.

7.4 Temperature : 27 ℃, Humidity : 72 % RH.

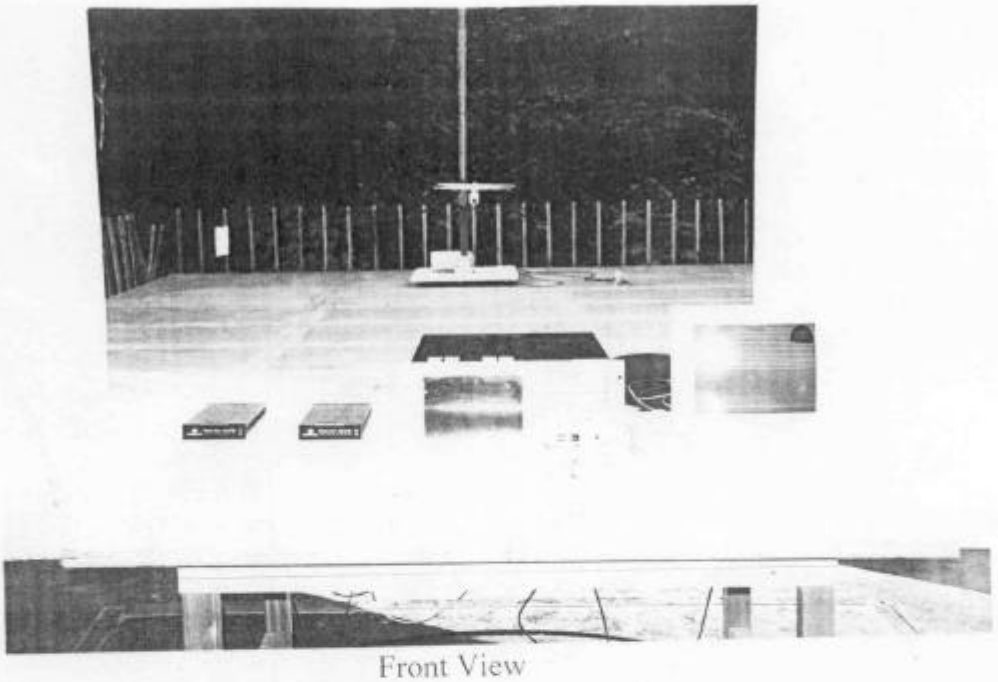
7.5 Radiated Emission data : **Horizontal**

Frequency (MHz)	Reading Level (dBuV)	ANT factor (dBuV)	Cable Loss (dBuV)	Emission Level (dBuV)	Emission Level (uV/m)	Limit (dBuV)	Limit (uV/m)
202.84	26.55	10.02	1.14	37.71	76.82	43.5	150
236.10	16.38	12.49	1.30	30.17	32.25	46.4	210
300.68	19.59	13.64	1.50	34.73	54.51	46.4	210
338.30	25.08	14.79	1.52	41.39	117.35	46.4	210
567.94	19.81	20.09	2.08	41.98	125.60	46.4	210
634.76	16.75	19.55	2.36	38.66	85.70	46.4	210

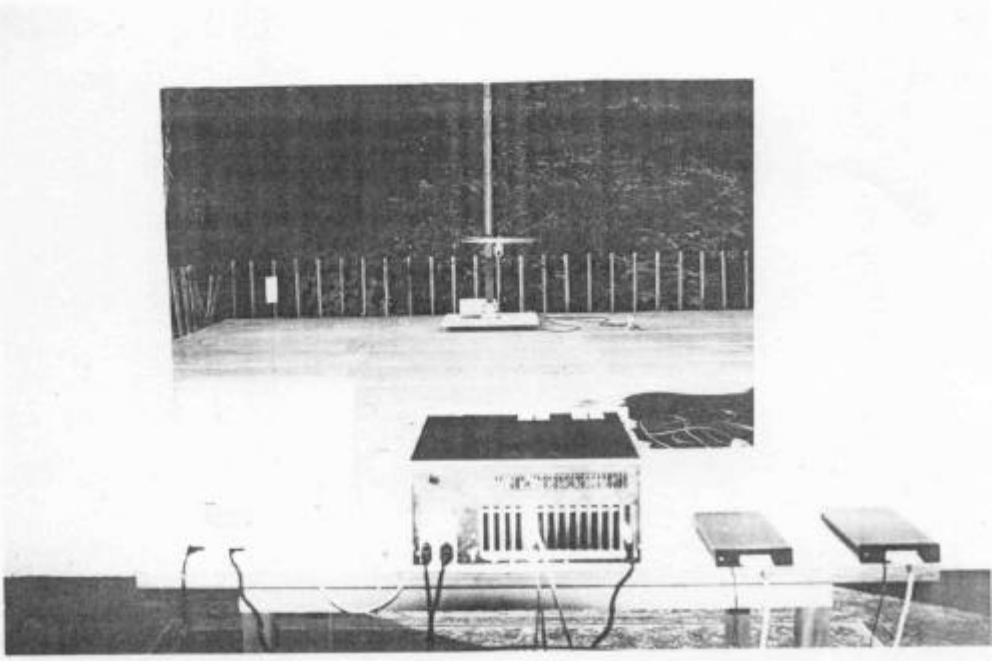
- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 634.76 MHz .
- Corrected Reading : (16.75)+ (19.55) + (2.36) = 38.66 . (Emission Level)

8 PHOTO OF RADIATED EMISSION TEST

Test Mode : Front K/B



Front View



Rear View

9 RESULT OF RADIATED EMISSION TEST (2)

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

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

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

9.4 Temperature : 27 ℃, Humidity : 72 % RH.

9.5 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)
197.34	18.60	10.48	1.14	30.22	32.43	43.5	150
232.52	14.59	12.39	1.24	28.22	25.76	46.4	210
300.68	20.61	13.64	1.50	35.75	61.31	46.4	210
338.32	26.50	14.79	1.52	42.81	138.20	46.4	210
567.94	19.60	20.09	2.08	41.77	122.60	46.4	210
601.35	11.08	20.39	2.31	33.78	48.87	46.4	210
634.76	16.27	19.55	2.36	38.18	81.10	46.4	210

- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 634.76 MHz .
- Corrected Reading : (16.27) + (19.55) + (2.36) = 38.18 . (Emission Level)

9.6 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)
232.68	15.73	12.58	1.32	29.63	30.30	46.4	210
300.68	24.54	13.21	1.50	39.25	91.73	46.4	210
338.28	21.85	15.08	1.52	38.45	83.66	46.4	210
600.09	10.14	18.70	2.31	31.15	36.10	46.4	210
601.35	10.70	18.70	2.31	31.71	38.50	46.4	210
637.76	18.68	18.83	2.36	39.87	98.51	46.4	210

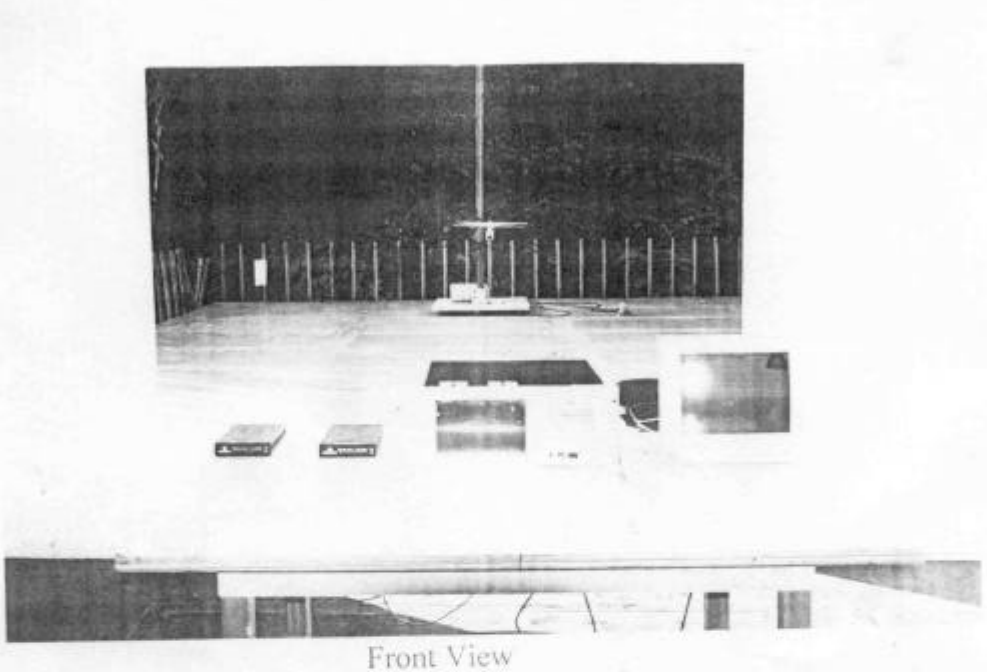
- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 637.76 MHz .
- Corrected Reading : (18.68) + (18.83) + (2.36) = 39.87 . (Emission Level)

REMARK :

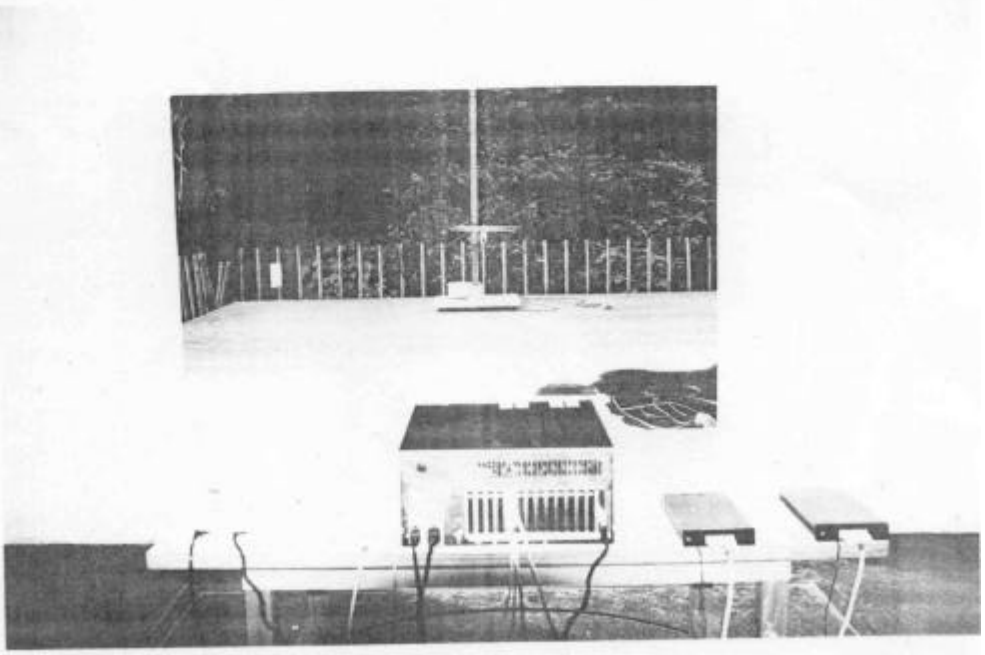
1. Model : AMB-311T
2. Measuring mode : Rear K/B
3. Uncertainty in radiated emission measured : $< \pm 4.0$dB.

10 PHOTO OF RADIATED EMISSION TEST

Test Mode : Rear K/B



Front View

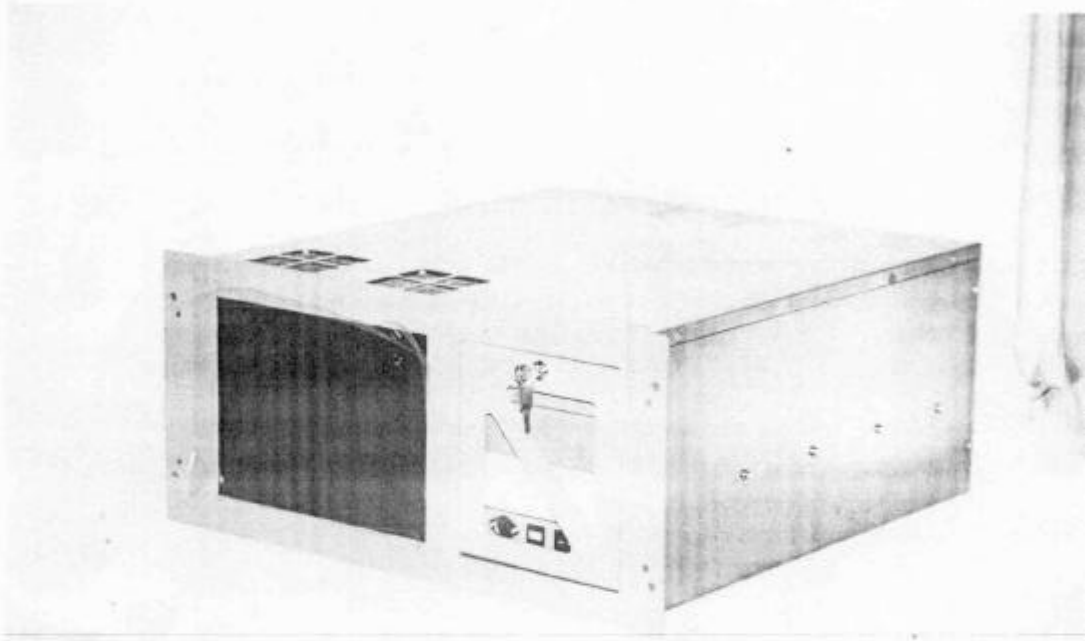


Rear View

PHOTO OF FCC LABEL

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference. And (2) this device must accept any interference that may cause undesired operation.

PHOTOS OF EUT



Front View