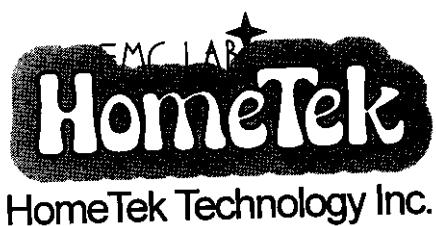


FCC/MELLON OCT 08 1998



ADDRESS: No.85-5, Shir Men Road, Tu Cheng City,
Taipei Hsien, TAIWAN, R. O. C.
PHONE : 886-2-22608375 FAX : 886-2-22748013
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FCC TEST REPORT FOR

APPLICANT : EZKEY Corp.
ADDRESS : 11F, NO. 167, FU HOD RD.,
YUNG HO CITY, TAIPEI HSIEH,
TAIWAN, R. O. C.
EUT : Computer Keyboard
MODEL NO. : EZ-3000
FCC ID : MWIEZ-3000

Under Part 15, SUBPART B.

CLASS B

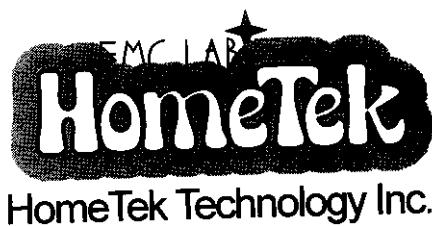
Certification

PREPARED BY :

HomeTek Technology Inc.

No. 85-5, Shir Men Road, Tu Cheng City,
Taipei Hsien, TAIWAN, R. O. C.

Report # : FB7I015



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TEST REPORT CERTIFICATION

EUT : Computer Keyboard
MODEL NO. : EZ-3000
FCC ID : MWIEZ-3000
Final Test Date : 9/15/98
APPLICANT : EZKEY Corp.
ADDRESS : 11F, NO. 167, FU HO RD.
YUNG HO CITY, TAIPEI HSIEN,
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 HU DATE : 9/30/98

CHECK BY : JOSEPH CHOU DATE : 9/30/98

APPROVED BY : R.S. Huang DATE : 9/30/98
R.S. HUANG/Manager

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**GENERAL INFORMATION**

1 APPLICANT : EZKEY Corp.
2 ADDRESS : 11F, NO. 167, FU HO RD.,
YUNG HO CITY, TAIPEI HSIEN,
TAIWAN, R. O. C.

3 MANUFACTURER : EZKEY Corp.
4 ADDRESS : 11F, NO. 167, FU HO RD.,
YUNG HO CITY, TAIPEI HSIEN,
TAIWAN, R. O. C.

5 DESCRIPTION OF EUT :
EUT : Computer Keyboard
FCC ID : MWIEZ-3000
Model Number : EZ-3000
Serial # : N/A
Data Cable : SHIELDED
Power Cord : N/A
Power Supply Type : N/A

6 FEATURES OF EUT :

PC/AT, PS/2 This keyboard is designed to be AT,PS/2 mode Mode Selection selection is done by auto-switchable.

Mode There are three LEDs on the keyboard to indicate Indicators 'Caps Lock', 'Num Lock', 'Scroll Lock' and "On-Line Lock". The LEDs are 'toggled'. The first depression of the key turns on the LED. The second depression turns the LED off and so on. LEDs are off on power-up or software reset, but will flash during power-on initialization.

Type Ahead	<p>The keyboard has 16 keys type ahead capability. This means that you can depress 16 keys before host can receive. If more keys are pressed before the host allows keyboard output, the additional data is lost.</p>
Typematic	<p>With the exception of the Pause key, all keys are Delay and typematic. When a key is pressed and held down, the Repeat keyboard delays 0.5 sec. and begins sending a make Rate Code for that key at a rate of 10.9 characters per second. (The delay is called typematic Delay and the rate is called Repeat Rate.)</p> <p>If two or more keys are pressed, only the last key pressed is repeated at the repeat rate. Typematic operation stops only when the last key pressed is released, even if other keys are still held down. If a key is pressed and held down while keyboard transmission is disable, only the first make code is stored in the type ahead buffer. This prevents the type ahead buffer overflow as result of typematic action.</p> <p>In AT mode, the typematic delay and repeat rate are programmable, this is done by command from host.</p>
Pesudo	<p>The default data:</p> <p>Typematic Delay = 0.5 sec.</p> <p>Repeat Rate = 10.9 characters per sec.</p> <p>The 'N' key roll-over capability where 'N' is the total N key number of keys on the keyboard 'N' key roll is the Roll-over number of keys that may be held depressed simultaneously capability and have the keyboard generate the appropriate code for each pressed and released key without keyboard interruption.</p>
Diagnostic	<p>The keyboard microprocessor will perform a diagnostic test self-test after Power-up or after the host system signals the keyboard to perform a software Reset.</p> <p>The microprocessor will check its data memory locations, do a sum-check internal RAM check and check for any depressed keys.</p> <p>If the diagnostic test is correct, the keyboard will transmit an 'AA HEX' code.</p> <p>This will be the first transmission following a Power-Up condition.</p> <p>If the diagnostic test was unsuccessful, then the keyboard will transmit an 'FD/FC HEX' code. In either case, after the diagnostic check the keyboard will begin normal operation.</p>



MODIFICATION LIST

THE FOLLOWING ACCESSORIES WERE ADDED TO THE EUT DURING TESTING :

1. Added a 300Ω resistor between pin E of Q1 and VCC shown as page “24”
2. Added a 1000p Cap between VCC and GND. shown as page “24”
3. Added a copper tape on the GND. Of membrane to contact PCB GND. shown as page “27”
4. The black wire on page “24”, just for repair the damage trace only.

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

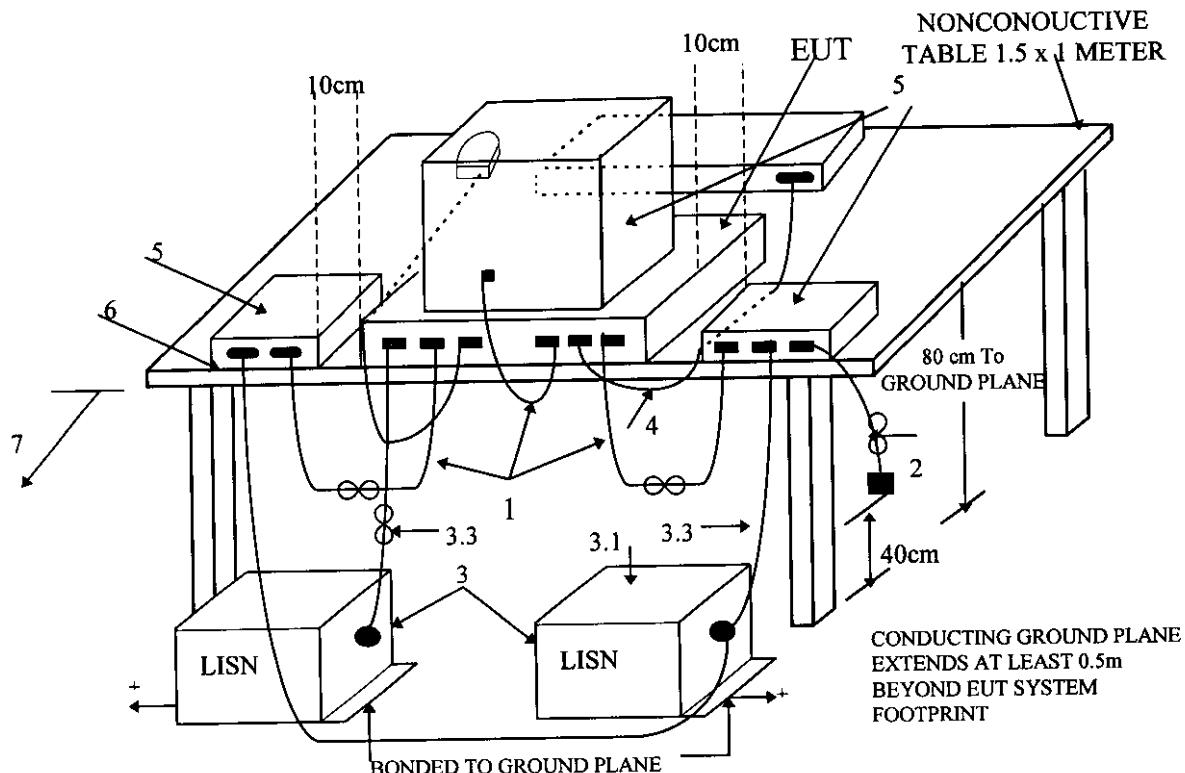
- 2.1 The EUT was tested according to **ANSI C63.4 - 1992**.
- 2.2 The EUT was placed 0.4 meter from the conducting wall of shielding room and kept at least 0.8 meter from any other grounded conducting surface.
- 2.3 The frequency range form 0.45 MHz to 30 MHz was investigated.
- 2.4 The LISN used was 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



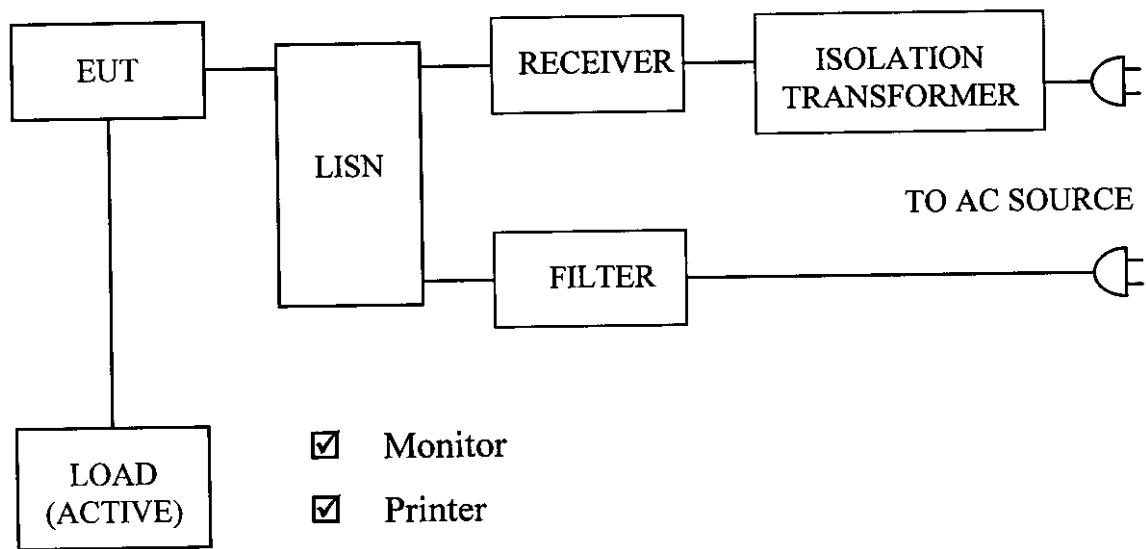
±1 JSNs may have to be moved to the side to meet 3.3 below.

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 $50\ \Omega$. 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	:	Computer Keyboard
Manufacturer	:	EZKEY
Model Number	:	EZ-3000
Serial Number	:	N/A
FCC ID	:	MWIEZ-3000
Data Cable	:	Shielded, 1.6 m
Power Cord	:	N/A

4.2 PERIPHERALS

Host Personal Computer

Manufacturer	:	UMAX
Model Number	:	UDLX-A0
Serial Number	:	N/A
FCC ID	:	FCC DoC
Data Cable	:	Shielded, 1.8 m
Power Cord	:	Shielded, 1.8 m

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

Printer

Manufacturer : HP
Model Number : DJ400
Serial Number : MY77T1D0DD
FCC ID : B94C2642X
Data Cable : Shielded, 1.5 m
Power Cord & Adaptor : Un-Shielded, 1.8 m

Modem

Manufacturer : DATATRONIC
Model Number : 1200CK
Serial Number : N/A
FCC ID : E2050V1200CK
Data Cable : Shielded, 1.5 m
Power Cord & Adaptor : Un-Shielded, 1.8 m



Mouse

Manufacturer : LOGITECH
Model Number : M-S34
Serial Number : LZA73037418
FCC ID : DZL211029
Data Cable : Shielded, 1.8 m

KeyBoard

Manufacturer : SILITEK
Model Number : SK-2000U
Serial Number : N/A
FCC ID : GYUR50SK
Data Cable : Shielded, 1.5 m

4.3 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 **4** MHz.
- 5.3 Turn on the power of all equipments.
- 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 Keyboard

6 LIMIT OF CONDUCTED POWER LINE EMISSION CLASS B:

Frequency Range	dBuV	uV
0.45 ~ 1.705 MHz	48	250 uV
1.705 ~ 30 MHz	48	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 : 26 °C, Humidity : 72 % RH.

7.4 Quasi-Peak :

Frequency (MHz)	Line 1		Line 2		Limit	
	dBuV	uV	dBuV	uV	dBuV	uV
0.492	39.09	90.05	37.14	71.94	48	250
1.675	28.35	26.15	20.85	11.03	48	250
3.075	36.21	57.61	28.10	25.41	48	250
6.550	30.31	32.77	27.73	24.35	48	250
10.180	26.41	20.92	24.84	17.46	48	250
19.720	26.85	22.00	25.48	18.79	48	250
23.710	42.17	128.38	42.03	126.33	48	250
25.670	22.82	13.84	22.92	14.00	48	250

REMARK :

1. Model : EZ-3000
2. Measuring mode :
3. Uncertainty in conduction emission measured : <± 2.0dB.

Test Engineer :

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	CABLES			No. 2, No. 4 No. 1, No. 3	OATS 1 OATS 2	JUL/98 JUL/98
10	OPEN AREA TEST SITE	<input type="checkbox"/> OATS 1 <input checked="" type="checkbox"/> OATS 2				
11	ANTENNA (DIPOLE)	30 ~ 300MHz	ROHDE & SCHWARZ	HZ-12 842899/08		JAN/98
12	ANTENNA (DIPOLE)	300 ~ 1000MHz	ROHDE & SCHWARZ	HZ-13 842007/0004		JAN/98

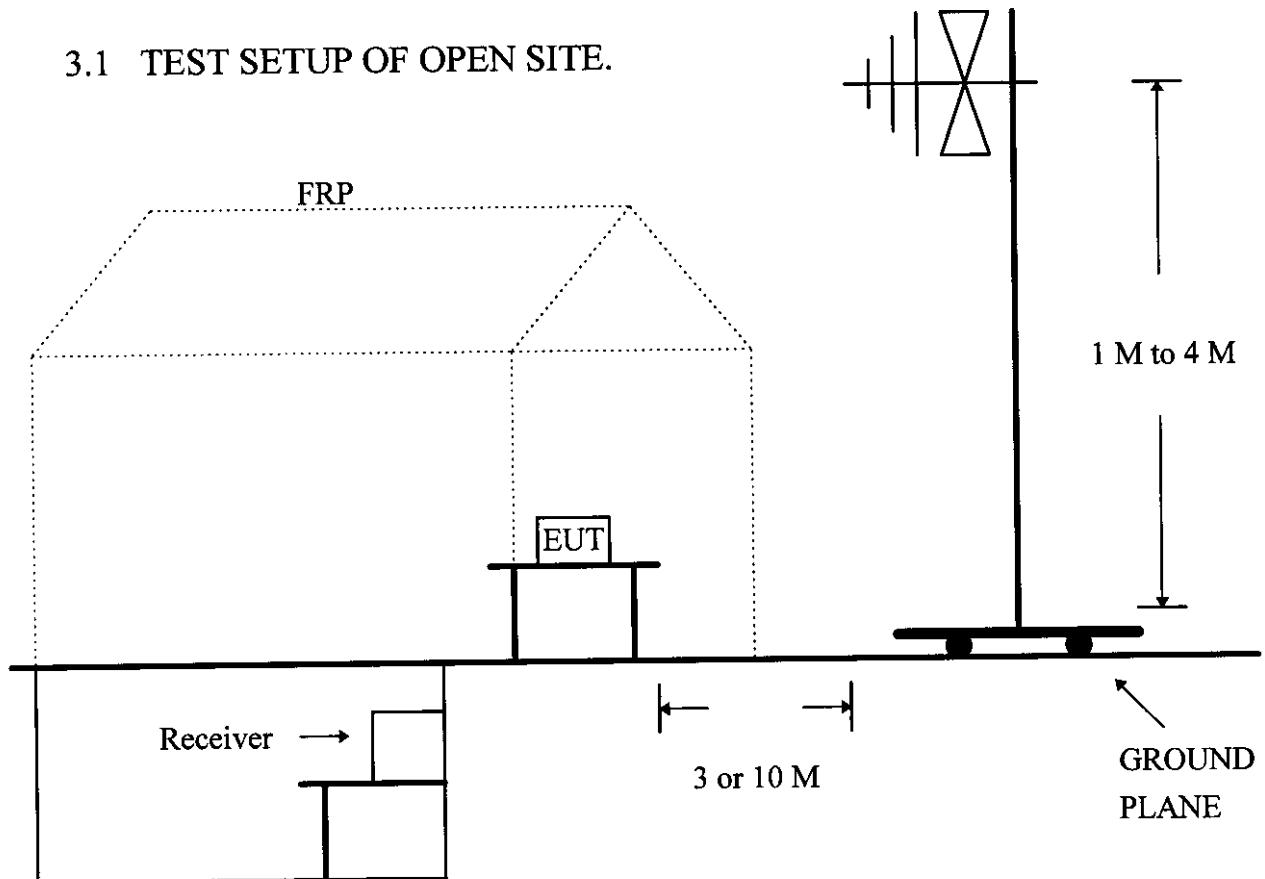
Note : 1. Items 1 ~ 10 upon which need to calibrated are with period of 1 year.
 2. Items 11 ~ 12 upon which need to calibrated are with period of 3 year.

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

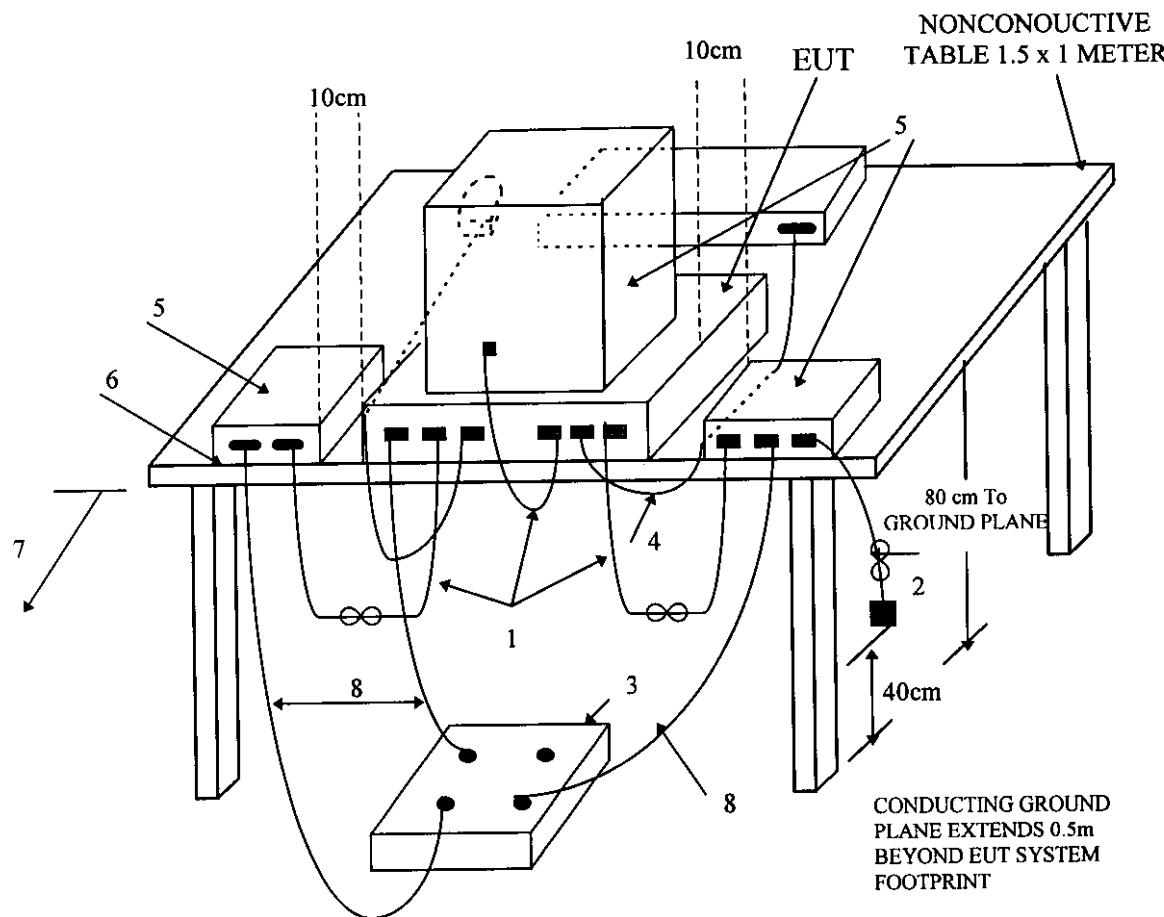
3.1 TEST SETUP OF OPEN SITE.



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	dBuV	uV/m
30 - 88	3 (M)	40	100
88 - 216	3 (M)	43.5	150
216 - 960	3 (M)	46	200
Above 1000	3 (M)	54	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 : 27 °C, 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)
31.51	19.37	15.17	0.41	34.95	55.91	40.0	100
39.37	17.92	15.12	0.41	33.45	47.04	40.0	100
42.00	7.41	14.97	0.51	22.89	13.95	40.0	100
68.52	15.85	7.73	0.58	24.16	16.14	40.0	100
111.99	11.24	11.75	0.66	23.65	15.22	43.5	150
137.85	20.15	10.97	0.69	31.81	39.31	43.5	150
149.47	20.71	9.72	0.76	31.19	36.27	43.5	150
152.38	25.18	9.85	0.76	35.79	61.59	43.5	150

- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 152.38 MHz .
- Corrected Reading : (25.18) + (9.85) + (0.76) = 35.79 . (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)
55.04	16.04	10.38	0.43	26.85	22.00	40.0	100
58.41	6.71	8.46	0.46	15.63	6.05	40.0	100
62.89	21.55	5.97	0.53	28.05	25.26	40.0	100
66.50	16.98	5.80	0.48	23.26	14.55	40.0	100
70.33	21.93	9.05	0.51	31.49	37.54	40.0	100
73.55	22.59	10.13	0.55	33.27	46.08	40.0	100
86.53	23.53	9.89	0.58	34.00	50.12	40.0	100

- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 86.53 MHz .
- Corrected Reading : $(23.53) + (9.89) + (0.58) = \underline{34.00}$. (Emission Level)

REMARK :

1. Model : EZ-3000
2. Measuring mode :
3. Uncertainty in radiated emission measured : $< \pm 4.0\text{dB}$.

Test Engineer :