

EMI TESTING REPORT

EUT : SERIES MOUSE

MODEL: CRE-VMOUSE1

FCCID: NHM-CREMS1

PREPARED FOR:

CRE TECHNOLOGY CO., LTD.

3F, NO. 46, SEC. 2,

KAI-FENG ST., TAIPEI,

TAIWAN, R.O.C.

PREPARED BY:

SPECTRUM RESEARCH & TESTING
LABORATORY INC.

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CHUNG-LI CITY, TAOYUAN, TAIWAN, R.O.C.

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1. TEST REPORT CERTIFICATION

APPLICANT : CRE TECHNOLOGY CO., LTD.

ADDRESS : 3F, NO. 46, SEC. 2,
KAI-FENG ST., TAIPEI,
TAIWAN, R.O.C.

EUT DESCRIPTION : SERIES MOUSE

(A) POWER SUPPLY : FROM PC

(B) MODEL : CRE-VMOUSE1

(C) FCC ID : NHM-CREMS1

FINAL TEST DATE : 05/08/1998

MEASUREMENT PROCEDURE USED :

PART 15 SUB PART B OF FCC RULES AND

REGULATIONS (47 CFR PART 15)

FCC / ANSI C63.4 - 1992

WE HEREBY SHOW 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.

TESTING ENGINEER : Ken Chang DATE 5/8/98

SUPERVISOR : J. T. H. DATE 5/8/98

APPROVED BY : D. H. DATE 5/8/98

2. TEST STATEMENT

2.1 TEST STATEMENT

TO whom it may concern,

This letter is to explain the test condition of this project.
The EUT be tested as the following status.

CPU: PENTIUM - 100MHz

CPU Clock Signal: 66MHz

The data shown in this report reflects the worst-case data for
the condition as listed above.

2. TEST STATEMENT

2.2 DEPARTURE FROM DOCUMENT POLICIES, PROCEDURE OR SPECIFICATIONS

DID HAVE

ANY DEPARTURE FROM DOCUMENT POLICIES
& PROCEDURES OR FROM SPECIFICATIONS.

YES _____ , NO N/A .

IF YES, THE DESCRIPTION AS BELOW.

2.3 TEST STATEMENT

1. THE CERTIFICATE OR REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF THE LABORATORY.
2. THE REPORT MUST NOT BE USED BY THE CLIENT TO CLAIM PRODUCT ENDORSEMENT BY NVLAP OR ANY AGENCY OF THE U.S. GOVERNMENT.

3. EUT MODIFICATIONS

THE FOLLOWING ACCESSORIES WERE ADDED TO THE EUT
DURING TESTING:

- 1) . ALL 1.2.3.4 PIN OF J2 ADD 220PF CAP.

4. MODIFICATION LETTER

THIS SECTION CONTAINS THE FOLLOWING DOCUMENTS:

A. LETTER OF MODIFICATIONS

N/A



佳 葦 有 限 公 司
CRE TECHNOLOGY CORP.,

TEL:886-2-3116305

FAX:886-2-3899811

3F, No. 46, Sec. 2, Kai-Feng St.

TAIPEI, TAIWAN. R.O.C.

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

To whom it may concern:

This is to serve as proper notice that our company agrees to make all modifications to
FCCID: NHM-CREMS1 as listed in section 3.0 of the test report
submitted by Spectrum Research and Testing Laboratory, Inc.

Respectfully,

Effective Dates:

Bon Lan

(Name,Surname)

From Apr-1-'97 to Apr-1-'99

Vice President

(Position/Title)

DATE: Apr-1-'97

5. CONDUCTED POWER LINE TEST

5.1 TEST EQUIPMENT

THE FOLLOWING TEST EQUIPMENT WAS USED DURING THE
CONDUCTED POWER LINE TEST :

EQUIPMENT/ FACILITIES	SPECIFICAT - IONS	MANUFACTURER	MODEL#/ SERIAL#	DATE OF CAL. & CAL.CENTER	DUE DATE
SPECTRUM ANALZER	9 KHz TO 1 GHz	HP	8590L/ 3624A01317	OCT, 1997 ETC	1Y
EMI TEST RECEIVER	9 KHz TO 30 MHz	ROHDE & SCHWARZ	ESHS30/ 893517/013	OCT, 1997 ETC	1Y
LISN	50 uH, 50 ohm	SOLAR ELECTRONICS	9252-50- R24-BNC/ 951315	AUGUST, 1997 ETC	1Y
LISN	50 uH, 50 ohm	SOLAR ELECTRONICS	9252-50- R24-BNC/ 951318	AUGUST, 1997 ETC	1Y
SIGNAL GENERATOR	9 KHz TO 1080 MHz	ROHDE & SCHWARZ	SMY01/ 841104/019	APRIL, 1998 ITRI	1Y
POWER CONVERTER	0 TO 300 VAC 47 - 500 Hz	AFC	AFC-1KW/ 850510	APRIL, 1998 SRT	1Y

5.2 CONFIGURATION OF THE EUT

THE EUT WAS CONFIGURED ACCORDING TO ANSI C63.4 - 1992.
ALL INTERFACE PORTS WERE CONNECTED TO THE APPROPRIATE
PERIPHERALS. ALL PERIPHERALS AND CABLES ARE LISTED
BELOW.

- EUT

DEVICE	MANUFACTURER	MODEL #	FCCID
SERIES MOUSE	CRE TECHNOLOGY CO., LTD.	CRE-VMOUSE1	NHM-CREMS1

- REMARK

- INTERNAL DEVICES

<u>DEVICE</u>	<u>MANUFACTURER</u>	<u>MODEL #</u>	<u>DoC/FCCID</u>
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-PERIPHERALS

DEVICE	MANUFAC-TURER	MODEL# / SERIAL#	FCCID	CABLE
MONITOR	PHILIPS	14B1320W	A3KM064	POWER-UNS DATA-S
PRINTER	HP	2225C	BS46XU2225C	POWER-UNS DATA-S
MODEM	HAYES	4007AM	BFJ4000AM	POWER-UNS DATA-S
KEYBOARD	HP	SK-2502	GYUR41SK	DATA-UNS
PC	HP	VE5-75	K4UVECTRAVE5	POWER-UNS

-REMARK

- (1). CABLE - UNS : UNSHIELDED CABLE
 S : SHIELDED CABLE
- (2). CABLES - ALL 1m OR GREATER IN LENGTH-
 BUNDLED ACCORDING TO ANSI C63.4 - 1992.

5.3 EUT OPERATING CONDITION

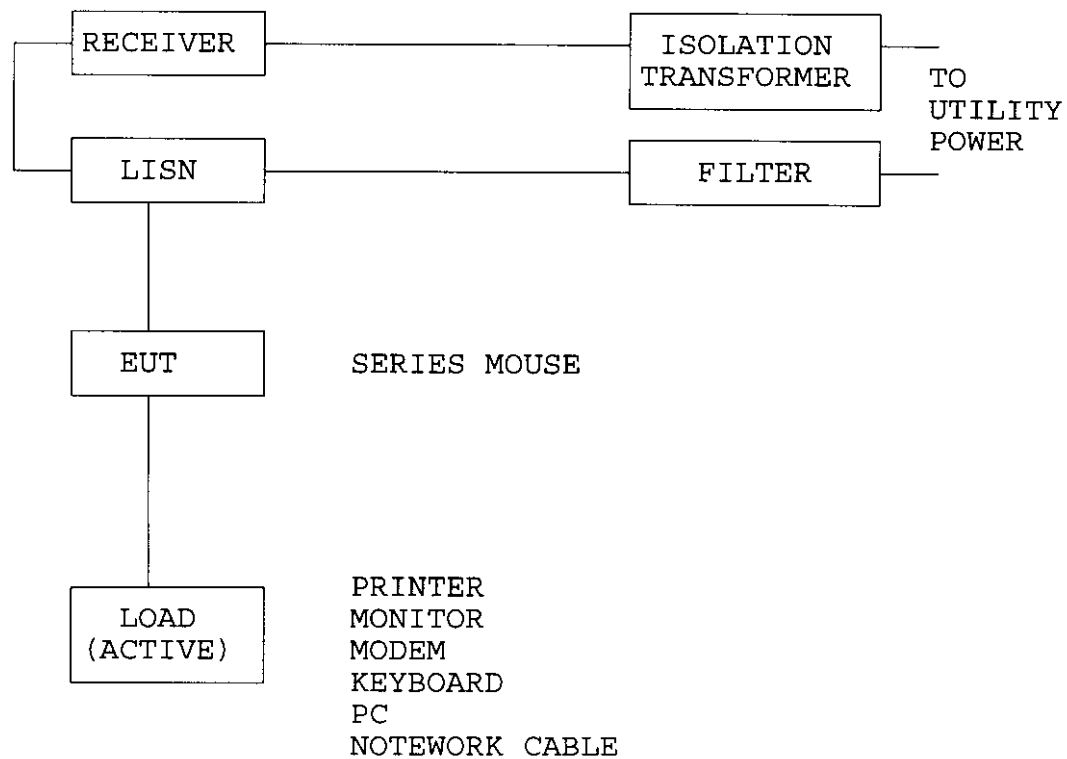
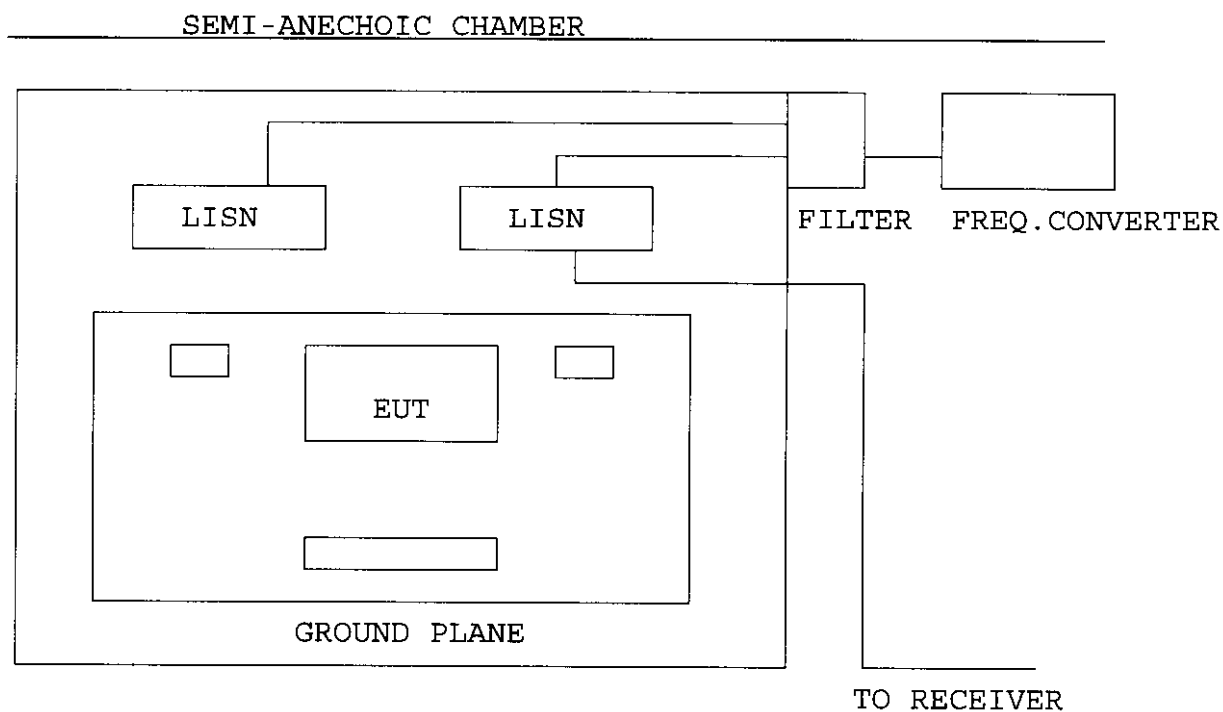
OPERATING CONDITION IS ACCORDING TO ANSI C63.4 - 1992.

1. EUT POWER ON.
2. "H" PATTERN SENT TO THE FOLLOWING PERIPHERALS:
 - PRINTER
 - MONITOR
 - MODEM
3. CPU : PENTIUM - 100MHz
CLOCK CHIP : 66MHz

5.4 TEST PROCEDURE

THE EUT WAS TESTED ACCORDING TO ANSI C63.4 - 1992. THE CONDUCTED TEST WAS PERFORMED IN AN ANECHOIC CHAMBER. THE FREQUENCY SPECTRUM FROM 0.45 MHz TO 30 MHz WAS INVESTIGATED. THE LISN USED WAS 50 ohm / 50 uHenry AS SPECIFIED BY SECTION 5.1 OF ANSI C63.4 - 1992. CABLES AND PERIPHERALS WERE MOVED TO FIND THE MAXIMUM EMISSION LEVELS FOR EACH FREQUENCY.

5.5 TEST SETUP



5.6 CONDUCTED POWER LINE EMISSION LIMIT

FREQUENCY RANGE (MHz)	CLASS A	CLASS B
0.045 - 1.705	1000 uV	250 uV
1.705 - 30	3000 uV	250 uV

NOTE : IN THE ABOVE TABLE, THE TIGHTER LIMIT
APPLIES AT THE BAND EDGES.

5.7 CONDUCTED POWER LINE TEST RESULT

THE FREQUENCY SPECTRUM FROM 0.45 MHz TO 30 MHz WAS INVESTIGATED. ALL READINGS ARE QUASI-PEAK VALUES WITH A RESOLUTION BANDWIDTH OF 9 KHZ.

TEMPERATURE : 28 C

HUMIDITY : 78 %RH

FREQUENCY (MHz)	LINE 1 (uv)	LINE 2 (uv)	LIMIT (uv)
0.45	46.77	58.21	250
0.81	*	23.17	250
2.18	12.74	*	250
4.25	17.99	18.41	250
23.5	34.27	34.67	250

- REMARKS : (1) . * = MEMENT DOES NOT APPLY FOR THIS FREQUENCY
 (2) . UNCERTAINTY IN CONDUCTED EMISSION MEASURED IS <+/-2dB
 (3) . CPU: PENTIUM - 100MHz CLOCK CHIP : 66MHz
 (4) . TEST CONFIGURATION PLEASE SEE 4.2
 (5) . TEST EQUIPMENT PLEASE SEE 4.1
 (6) . ANY DEPARTURE FROM SPECIFICATION : N/A

SIGNED BY TESTING ENGINEER :



6. RADIATED EMISSION TEST

6.1 TEST EQUIPMENT

THE FOLLOWING TEST EQUIPMENT WAS USED DURING THE
RADIATED EMISSION TEST :

EQUIPMENT / FACILITIES	SPECIFICAT -IONS	MANUFACTUR -ER	MODEL#/ SERIAL#	DATE OF CAL. & CAL. CENTER	DUE DATE
RECEIVER	20 MHz TO 1000 MHz	R & S	ESVS 30/ 841977/003	APRIL, 1998 ITRI	1Y
SPECTRUM ANALYZER	100 Hz TO 1500 MHz	HP	8568B/ 3019A05294	OCT , 1997 ETC	1Y
SPECTRUM ANALYZER	9 KHz TO 22 GHz	HP	8593E/ 3322A00670	APRIL, 1998 ITRI	1Y
SPECTRUM ANALYZER	100 Hz TO 1000 MHz	IFR	A-7550/ 2684/1248	AUGUST, 1997 ETC	1Y
SPECTRUM ANALYZER	9 KHz TO 2900 MHz	HP	8594A/ 3229A/00399	MAY, 1997 ETC	1Y
SIGNAL GENERATOR	9 KHz TO 1080 MHz	ROHDE & SCHWARZ	SMY01/ 841104/019	APRIL, 1998 ITRI	1Y
DIPOLE ANTENNA	28 MHz TO 1000 MHz	EMCO	3121C/ 9003-535	DEC, 1997 SRT	1Y
DIPOLE ANTENNA	28 MHz TO 1000 MHz	EMCO	3121C/ 9611-1239	DEC, 1997 SRT	1Y
BI-LOG ANTENNA	26 MHz TO 2000 MHz	EMCO	3142/ 96081-1073	DEC, 1997 SRT	1Y
BI-LOG ANTENNA	26 MHz TO 1100 MHz	EMCO	3143/ 9509-1152	DEC, 1997 SRT	1Y
PRE-AMPLIFIER	0.1 MHz TO 1300 MHz	HP	8447D/ 2944A08402	APRIL, 1998 ITRI	1Y
PRE-AMPLIFIER	0.1 MHz TO 1300 MHz	HP	8447D/ 2944A06412	OCT, 1997 ETC	1Y
HORN ANTENNA	1 GHz TO 18 GHz	EMCO	3115/ 9012-3619	DEC, 1997 SRT	1Y

6.2 CONFIGURATION OF THE EUT

SAME AS SECTION 5.4 OF THIS REPORT.

6.3 EUT OPERATING CONDITION

SAME AS SECTION 5.3 OF THIS REPORT.

6.4 TEST PROCEDURE

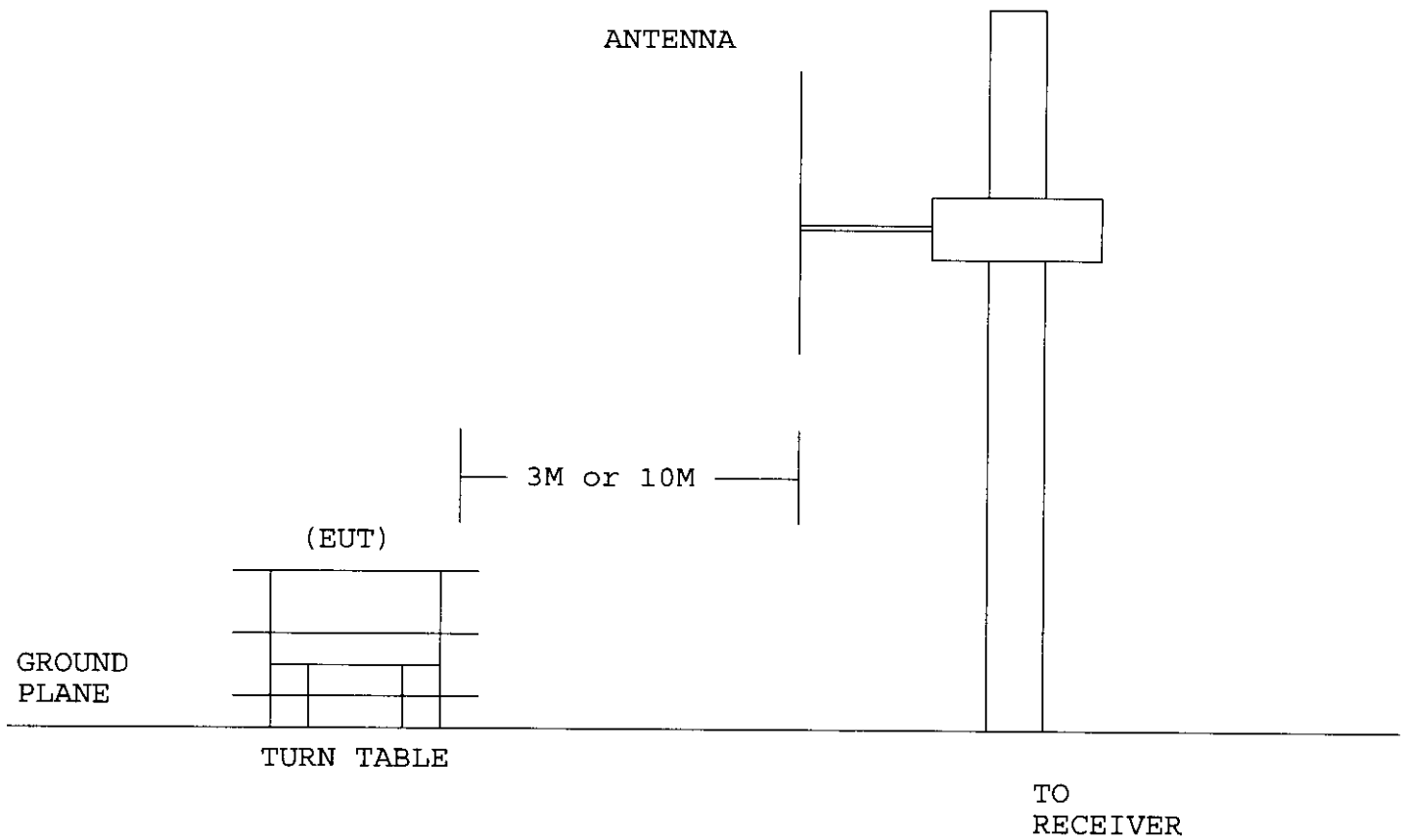
THE EUT WAS TESTED ACCORDING TO ANSI C63.4 - 1992. THE RADIATED TEST WAS PERFORMED AT SRT LAB'S OPEN SITE. THIS SITE IS ON FILE WITH THE FCC LABORATORY DIVISION, REFERENCE 31040/SIT.

THE FREQUENCY SPECTRUM FROM 30 MHz TO 1 GHz WAS INVESTIGATED. MEASUREMENTS WERE MADE AT THREE METERS WITH AN ADJUSTABLE DIPOLE ANTENNA. PERIPHERALS, CABLES, EUT ORIENTATION, AND ANTENNA HEIGHT WERE VARIED TO FIND THE MAXIMUM EMISSION FOR EACH FREQUENCY.

THE FREQUENCY SPECTRUM FROM 30 MHz TO 2 GHz WAS INVESTIGATED. THE MEASUREMENTS UNDER 1 GHz WITH RESOLUTION BANDWIDTH OF 120 KHz ARE QUASI-PEAK READING MADE AT THREE METERS USING AN ADJUSTABLE DIPOLE ANTENNA. PERIPHERALS, CABLES, EUT ORIENTATION, AND ANTENNA HEIGHT WERE VARIED TO FIND THE MAXIMUM EMISSION FOR EACH FREQUENCY.

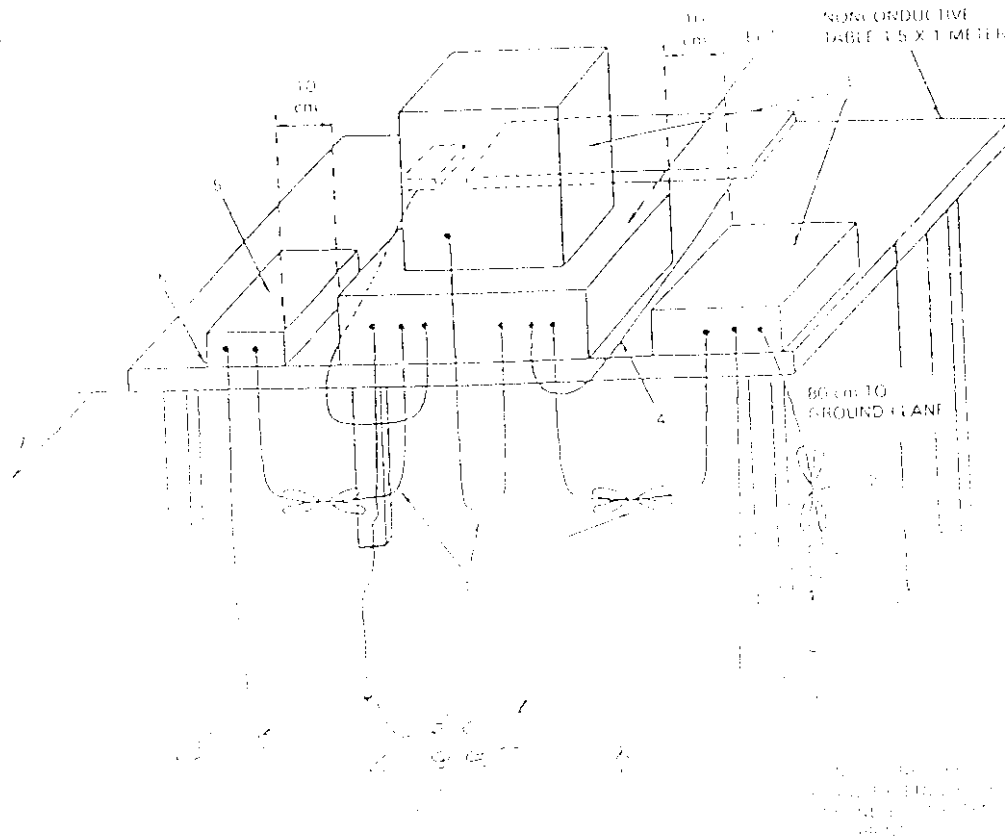
THE MEASUREMENTS ABOVE 1 GHz WITH A RESOLUTION BANDWIDTH OF 1 MHz ARE PEAK READING AT A DISTANCE OF THREE METERS WITH A HORN ANTENNA.

6.5 RADIATED TEST SETUP



6.5 RADIATED TEST SETUP

ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9 KHz TO 40 GHz

ANSI
C63.4-1997
$$\frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx = \frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx$$

1. Interconnects (cables) that hang closer than 40 cm to the ground plane must be shielded from the test plane to a length of 30 cm, extending from the middle between ground plane and cable.
2. If cables that are connected to a peripheral cable are bundled in center, the end of the cable must be terminated or shielded using correct terminating impedances. The total length shielded must exceed 1 m.
3. If EISNs are kept in the test setup for radiated emissions, it is preferred that they be shielded against 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 at a distance as possible to the controller.
5. Non EUT components of EUT system being tested.
6. The rest of all components of the system under test can be located flush with the rest of the system.
7. No vertical stacking with UUT.
8. Power and ground to the floor and are tested over a receptacle.

Fig. 36c
Test Configuration.
Tabletop Equipment Mounted on a Stand

6.6 RADIATED EMISSION LIMIT

ALL EMISSION FROM A DIGITAL DEVICE, INCLUDING ANY NETWORK OF CONDUCTORS AND APPARATUS CONNECTED THERE TO, SHALL NOT EXCEED THE LEVEL OF FIELD STRENGTH SPECIFIED BELOW :

FREQUENCY (MHZ)	DISTANCE (m)	FIELD STRENGTH (uV/m)
30 - 88	3	100
88 - 216	3	150
216 - 960	3	200
ABOVE 960	3	500

CLASS B

FREQUENCY (MHZ)	DISTANCE (m)	FIELD STRENGTH (uV/m)
30 - 88	3	199.5
88 - 216	3	298.5
216 - 960	3	398.1

CLASS B (OPEN CASE)

FREQUENCY (MHZ)	DISTANCE (m)	FIELD STRENGTH (uV/m)
30 - 88	3	316.3
88 - 216	3	473.2
216 - 960	3	613.0
ABOVE 960	3	1000.0

CLASS A

NOTE : 1. IN THE EMISSION TABLES ABOVE, THE TIGHTER LIMIT APPLIES AT THE BAND EDGES.
 2. DISTANCE REFERS TO THE DISTANCE BETWEEN MEASURING INSTRUMENT, ANTENNA, AND THE CLOSEST POINT OF ANY PART OF THE DEVICE OR SYSTEM.

6.7 RADIATED EMISSION TEST RESULT

THE FREQUENCY SPECTRUM FROM 30 MHz TO 1 GHz WAS INVESTIGATED. ALL READINGS UNDER 1 GHz ARE QUASI-PEAK VALUES WITH A RESOLUTION BANDWIDTH OF 120 KHZ. MEASUREMENTS WERE MADE AT 3 METERS.

THE MEASUREMENTS ABOVE 1 GHz WITH A RESOLUTION BANDWIDTH OF 1 MHz ARE PEAK READING AT A DISTANCE OF 3 METERS.

TEMPERATURE : 28 C HUMIDITY : 78 %RH

FREQ. (MHz)	CABLE LOSS (dB)	ANT. FACTOR (dB)	READING (dBuV)		EMISSION (uV)		LMTS (uV)
			HORIZ	VERT	HORIZ	VERT	
164.8	1.60	9.30	22.49	*	46.72	*	150
230.8	1.80	10.7	*	21.99	*	53.03	200
663.4	3.30	20.1	18.53	*	124.9	*	200
729.4	3.40	20.5	17.66	18.46	119.7	131.2	200
895.2	3.90	22.6	15.27	*	122.6	*	200

REMARKS : (1). MEASUREMENT DOES NOT APPLY FOR THIS FREQUENCY.

(2). THE MAXIMUM CONDITION WAS WITH THE MONITOR POWER CORD CONNECTED TO THE PERSONAL COMPUTER.

(3). CPU : PENTIUM - 100MHz CLOCK CHIP : 66MHz

(4). SAMPLE CALCULATION
 $20 \text{ LOG(EMISSION) uV/m} = \text{CABLE LOSS (dB)} + \text{FACTOR (dB)} + \text{READING (dBuV/m)}$

(5). TEST EQUIPMENT PLEASE SEE 5.1

(6). UNCERTAINTY IN RADIATED EMISSION MEASURED IS $\pm 4\text{dB}$

(7). ANY DEPARTURE FROM SPECIFICATION : N/A

SIGNED BY TESTING ENGINEER : 