

# OHTAMA CO.,LTD.

1744, OSHITATE, INAGI-SHI, TOKYO, 206-0811

TEL:0423-77-4311 FAX:0423-78-2219 TELEX:2832-445

## EMI TEST REPORT

### FCC PART 15 SUBPART B

APPLICANT : NEC Corporation

CLASS OF REGULATION : B

MEASURING DISTANCE : 3 m

MEASUREMENT PROCEDURE : ANSI C63.4-1992

EQUIPMENT : TRAVAN NS LOADER

TRADE NAME : NEC

MODEL NUMBER : TL620NS

FCC ID CODE : \*\*\*\*\*

SERIAL NUMBER : 1055

COMPANY NAME : NEC Corporation

ADDRESS : 1-10, Nisshin-cho, Fuchu-shi, Tokyo

: 183-8501 Japan

DATE OF TEST : 4-6. November. 1998

REPORT No. : OTMAJ No. A0078

TEST SITE : YAMANASHI EMC OPEN FIELD No.3 TEST SITE

LOCATION : No.1661, OHSYUKU, ASHIGAWA-MURA, HIGASHI-

: YATSUSHIRO-GUN YAMANASHI-KEN 409-3704 JAPAN

FCC FILE NUMBER : 31040-SIT 1300F2

NVLAP LAB CODE : 200175-0

Measurement Results: Positive

OHTAMA CO.,LTD



HIDEMASA FUJIMOTO

QUALITY SUB MANAGER

TECHNICAL SUB MANAGER

DATE 6 November 1998

4-6. Nov. 1998 OHTAMA CO.,LTD

REGULATION : FCC Class B

MODEL : TL620NS

REPORT No. : OTAMJ No. A0078

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### 1.0 CONFIGURATION

The test configuration consists of a Personal computer (PC) Display (CRT) Keyboard(KB) Mouse (MS) PRINTER(PRT) and TRAVAN NS LODER (EUT) when the devices are connected to the I/F cable.

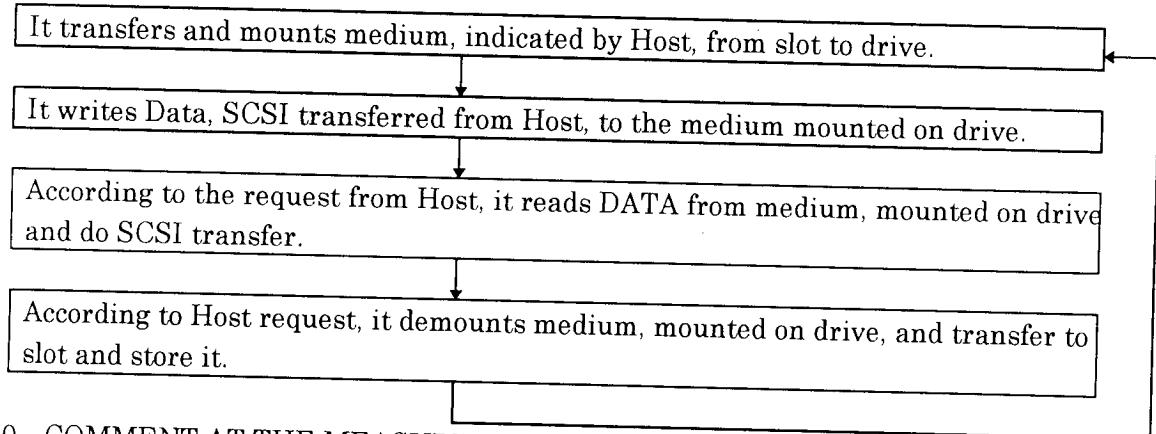
All peripherals including EUT are operating during the test.

AC120V 60Hz power supplied to the EUT with 3.0meters non-shielded power cable.

### 2.0 TEST PROGRAM

Operation mode: data back up

Operation flow : During test, it operates as below flow;



### 3.0 COMMENT AT THE MEASUREMENTS

The preliminary searches were carried out for all available modes and cable layout modes to produce maximum emissions at each frequency and finally it was found that the above configuration emanates larger emission levels on both conducted and radiated emission Measurements.

Every I/F cables that hang closer than 40 centimeter to the ground plane are bundled 30 to 40 centimeter in length about in the middle between ground plane and table.

The test report results are found to be compliant with the FCC part 15 subpart B of the specifications.

The minimum margins to the limits are;

Radiation measurement

1.2dB at 33.31MHz Vertical polarization

Conduction measurement

2.7dB at 0.4896MHz

The photographs show the cable and equipment layout which produces maximum emissions.

- 3-1 The test results in this report shall be effective only for the ITEM tested.
- 3-2 This report shall not be reproduced except in full, without the written approval of the laboratory.
- 3-3 NVLAP accreditation shall not constitute any product endorsement by NVLAP or any agent of the U.S.Government.

4-6.Nov.1998 OHTAMA CO.,LTD  
REGULATION : FCC Class B

MODEL : TL620NS  
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#### 4.0 MEASUREMENT UNCERTAINTY

The measured test results may contain measurement uncertainty.  
The measurement uncertainty values are estimated as follows.

##### Radiated emission uncertainty

: Used Biconical antenna

about +3.9 ~ -3.9dB

: Used Logperiodic antenna

about +4.7 ~ -3.2dB

##### Conducted emission uncertainty

about  $\pm 2.5$ dB

## 5.0 DESCRIPTION OF EQUIPMENT

This EUT consists of Magnetic Tape Medium Storage Room (SLOT) which stores Magnetic Tape Medium, Magnetic Tape Drive which writes/reads data on Magnetic Tape Medium and Magnetic Tape Medium Accessor Mechanism (ACC) which transfer Magnetic Tape Medium between Magnetic Tape Drive and Magnetic Medium Storage Room.

This EUT reads/writes data and controls Magnetic Tape Medium Accessor Mechanism according to the command from Host.

It usually used as auto back up equipment on server etc.

The clock frequency used in the EUT are 20.00MHz, 24MHz and 40MHz.

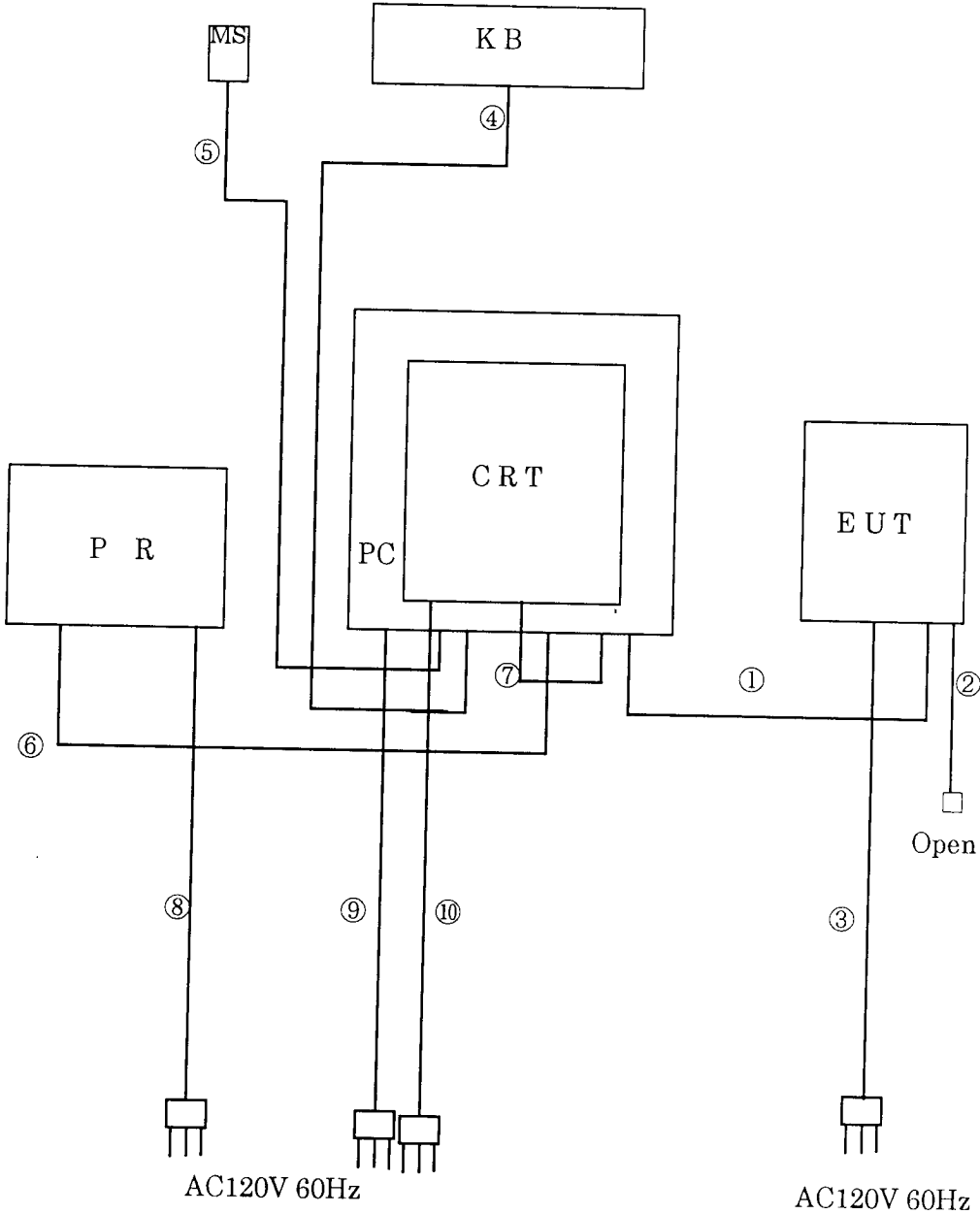
The switching frequency of the AC power supply unit in the EUT is 100kHz.

The power rating of the EUT is AC120V 60Hz and AC power cable is provided through 3.0 meters non-shielded cable.

The serial number of the EUT is 1055.

The EUT is manufactured in November 1998.

Configuration of the system for EMI testing



6.0 DEVICES USED FOR THE TEST

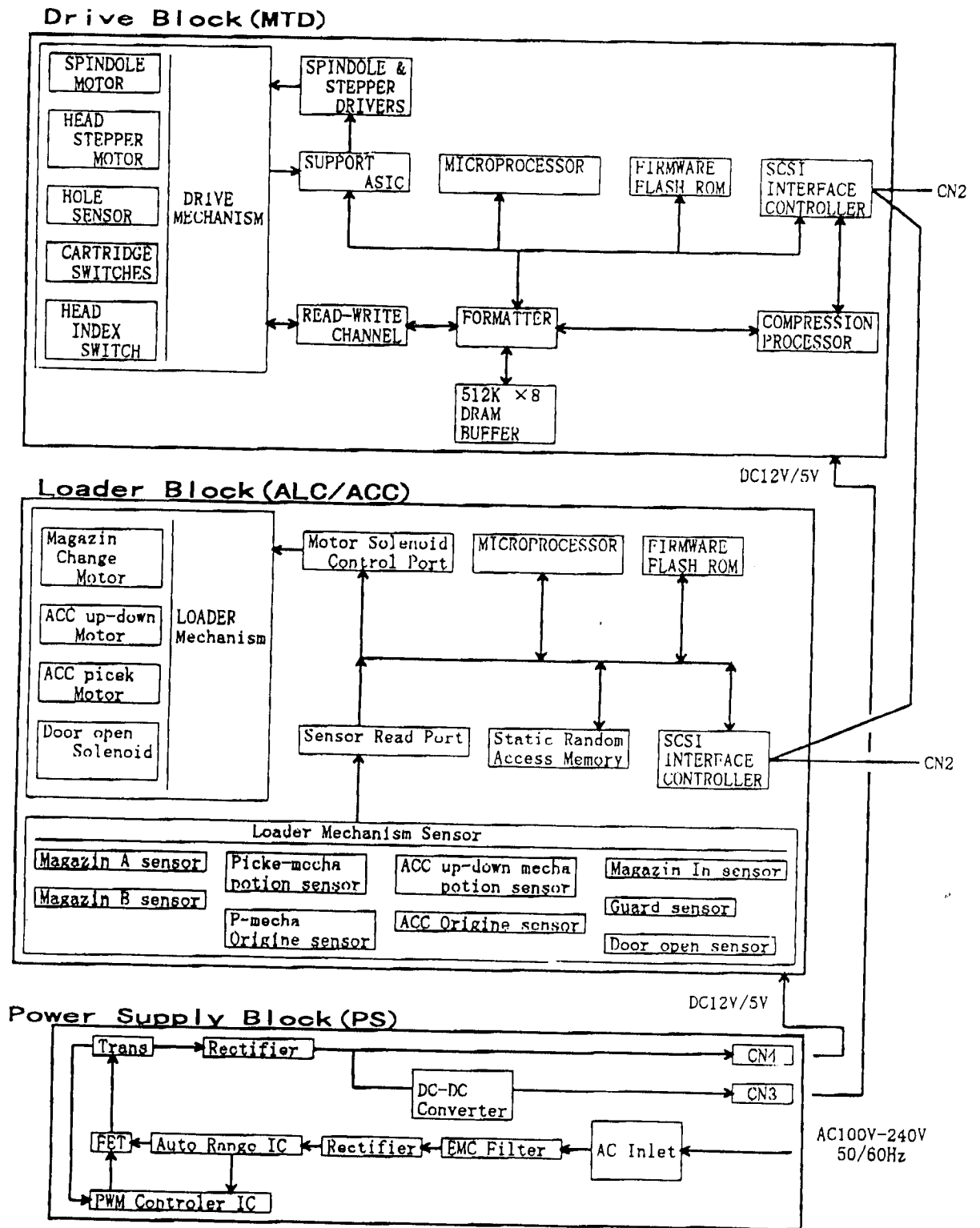
MARK	NAME	MODEL	SERIAL.No.	MAKER	FCC ID
EUT	TRAVAN NS LODER	TL620NS	1055	NEC	
P C	Personal Computer	DP2000	7731BK530551	COMPAQ	
CRT	Display	611	721BC11UA406	COMPAQ	BR8SM-569
K B	Keyboard	RT235BTW JP	B0C1C0B39FB0PE	COMPAQ	AQ6-72BC15
M S	Mouse	M-S34	B04AB0H5BF840KA	COMPAQ	DZL211029
PRT	Printer	120D	1145776-76	SEIKO	

## 7.0 CABLE USED

Length & Shielded MARK	NAME	LENGTH	SHIELDED	FROM	TO
①	SCSI Cable	0.9m	Yes	EUT	PC
②	SCSI Cable	0.9m	Yes	EUT	Open
③	AC Cable	3.0m	None	AC120V	EUT
④	Keyboard Cable	2.3m	None	KB	PC
⑤	Mouse Cable	1.8m	None	MS	PC
⑥	Printer Cable	2.0m	None	PRT	PC
⑦	CRT Cable	1.4m	None	CRT	PC
⑧	AC Cable	1.7m	None	AC120V	PRT
⑨	AC Cable	3.0m	Yes	AC120V	PC
⑩	AC Cable	3.0m	Yes	AC120V	CRT



Circuit diagram of the EUT



## 8.0 Radiated radio noise measurement

The setting up of the equipments, its interface cables, and the operating conditions of the EUT in seeking the maximum emission levels are duly in accordance with the testing procedures that are described in ANSI C63.4-1992.

Test shall be performed as the following procedure:

- 1) By using broad band antenna(Biconical-antenna, Log-periodic antenna) and the spectrum analyzer, the frequency and approximate level of radiated emission shall be checked
- 2) By using the field strength meter and the broad band antenna or half wave dipole antenna, the field strength for above checked frequency shall be measured in order.  
When testing, the ascent and descent of the measuring antenna and the rotation of the EUT turntable are operated with each frequency.

Calculation of measuring data:

The field strength of the EMI is available from reading the value at the field strength meter multiplied by the antenna factor.

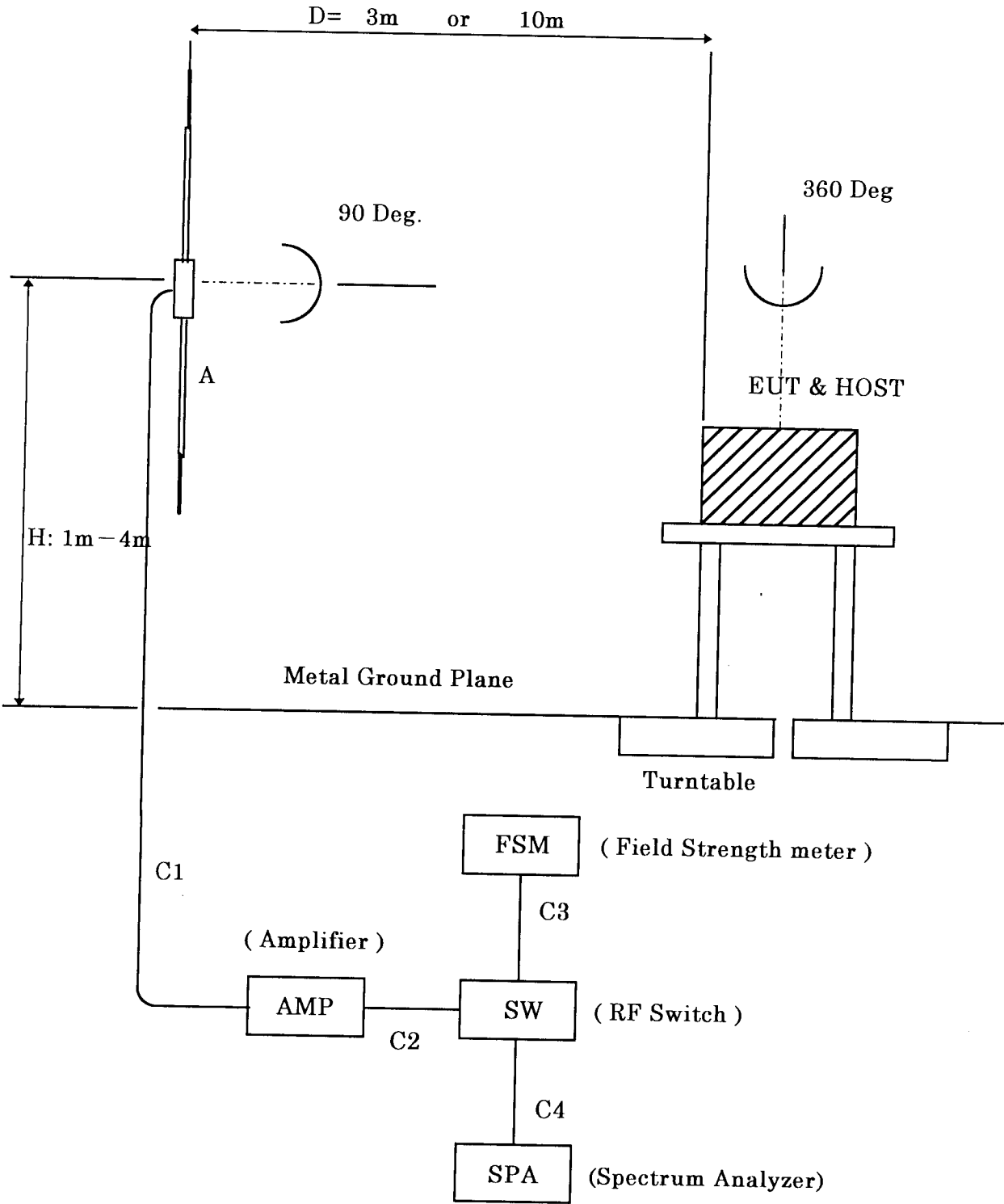
The following is the formula to express its calculation.

Radiated field strength level [dB  $\mu$  V/m]  
= reading value at Field Strength Meter [dB  $\mu$  V] + correction factor [dB/m] .

We show the schematic of the measuring equipments for RFI emissions and the equipment list in the next page.

: Correction factor means Antenna factor + Cable loss + Pad - Preamp gain.

DETAILS OF LOCATION OF EQUIPMENT FOR RADIATED  
RADIO NOISE MEASUREMENT



## 9.0 AC power line conducted RF voltage measurements

Measurement of AC power line conducted RF voltage is made in the shielded enclosure installed in the ground floor underneath the metal ground plane.

The dimension of this shielded enclosure is 9 meters in length, 4 meters in width and 3 meters in height.

In case the EUT is desk top type, it is set up on a desk made of wood, the top of which is 1.0 meter by 1.5 meters in size and height 0.8 meter above the metal plane and the EUT is a floor type, it is set up on a plane made of rubber above the metal plane.

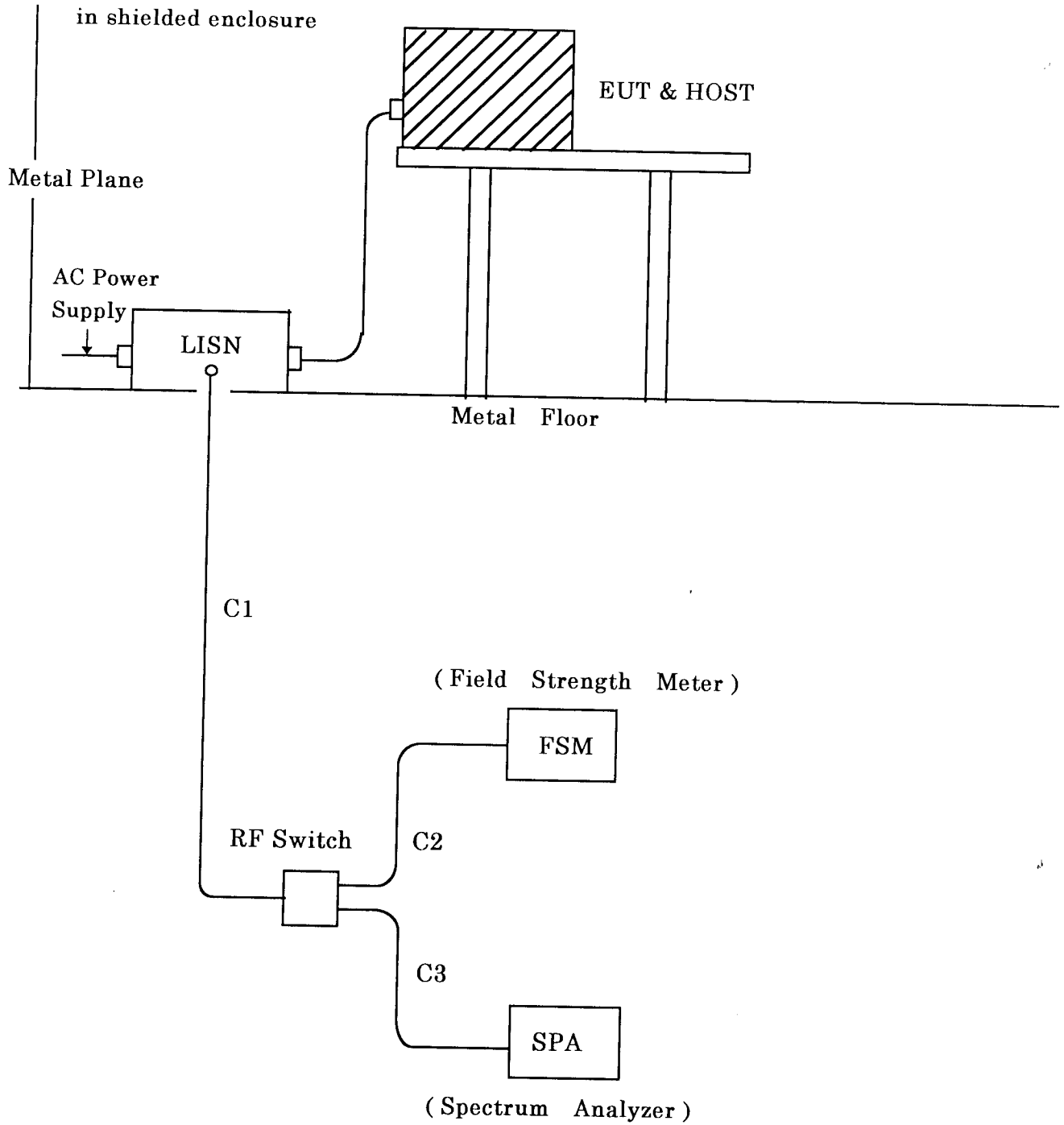
It is view show in the measurement results.

The measuring data is calculated as the following formula

$$\text{RF voltage} = \text{reading [dB } (\mu \text{ V)] of field strength meter} + \text{cable loss(dB).} \\ + \text{LISN correction factor.}$$

We show the schematic of the measuring equipments for AC power line conducted RF voltage and the equipment list in the next page.

DETAILS OF LOCATION OF EQUIPMENT FOR AC POWER LINE  
CONDUCTED RF VOLTAGE MEASUREMENT



## List of measuring Instruments (No 3 SITE)

Item	Model	Manufacturer	Serial No.	Date of last Calibration	Calibration Period
Field strength meter	ESVS10	Rohde&Shwarz	845165/016	Dec.17.1997	1Year®
Field strength meter	ESHS10	Rohde&Shwarz	845635/007	Mar. 3.1998	1Year©
Spectrum analyzer	HP8567A	Hewlett Packard	2848A17429	Sep.18. 1998	1Year®©
Broadband amplifier	HP8447D	Hewlett Packard	2727A05969	Feb.28 1998	1Year®
Half wave length dipole antenna	VHA9103	Schwarzbeck	2108	Feb.28 1998	1Year®
Half wave length dipole antenna	UHA9105	Schwarzbeck	2109	Feb.28 1998	1Year®
Biconical antenna	BBA9106	Schwarzbeck	2120	Feb.28.1998	1Year®
Log-periodic antenna	UHALP9107	Schwarzbeck	91071129	Sep.16.1998	1Year®
Loop antenna	6502	Emco	1068	Feb.28.1998	1Year®
LISN	KNW407	Kyoritsu	8-764-5	Sep.25.1998	1Year©
	3825/2	EMCO	93052106	Oct. 6.1997	1Year©
Site attenuation				Apr. 4.1998	1Year
Radiated Cable				Mar.26 1998	1Year
Conducted Cable				Mar.26 1998	1Year

® : Radiation equipment

©: Conduction equipment

## 11.0 Measurement results

### 11.1 Radiated radio noise measurement

The measurement result in this test which was made duly in accordance with ANSI C63.4-1992 are shown in the next page.

# Measurement Results

RADIATED ELECTRIC FIELD NOISE

4-6.Nov.1998 OHTAMA CO.,LTD  
REGULATION : FCC Class B

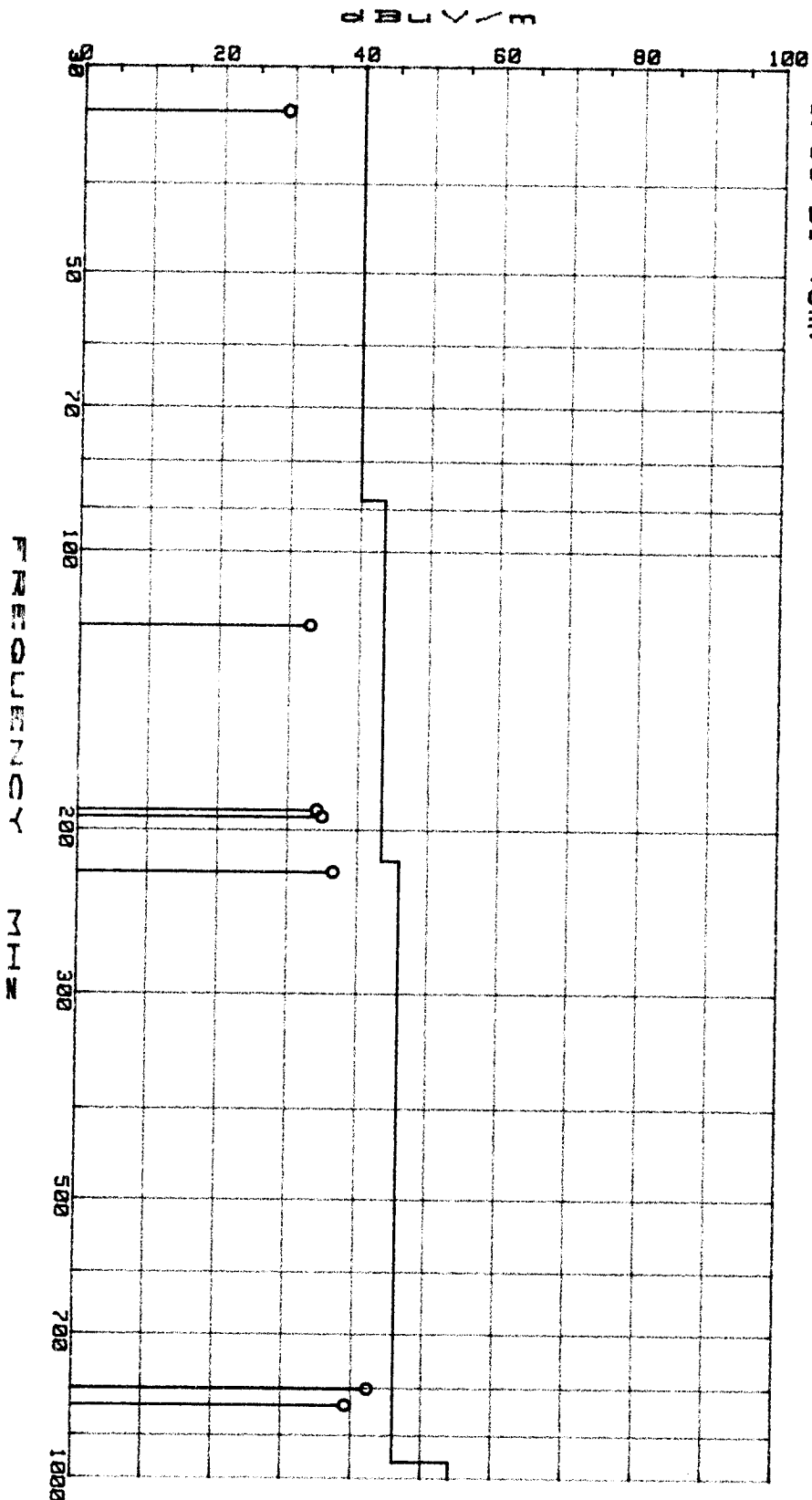
MODEL : TL620NS  
REPORT No. : OTAMJ No.A0078



# RADIATED EMISSIONS

MODEL NAME : TL620NS  
 SERIAL NO. : 1055  
 POWER SUPPLY: AC120V 60Hz  
 EUT COND. :  
 DET. MODE : QP  
 Limits : ( 30 ~ 1000 MHz )  
 [FCC B] <3m>

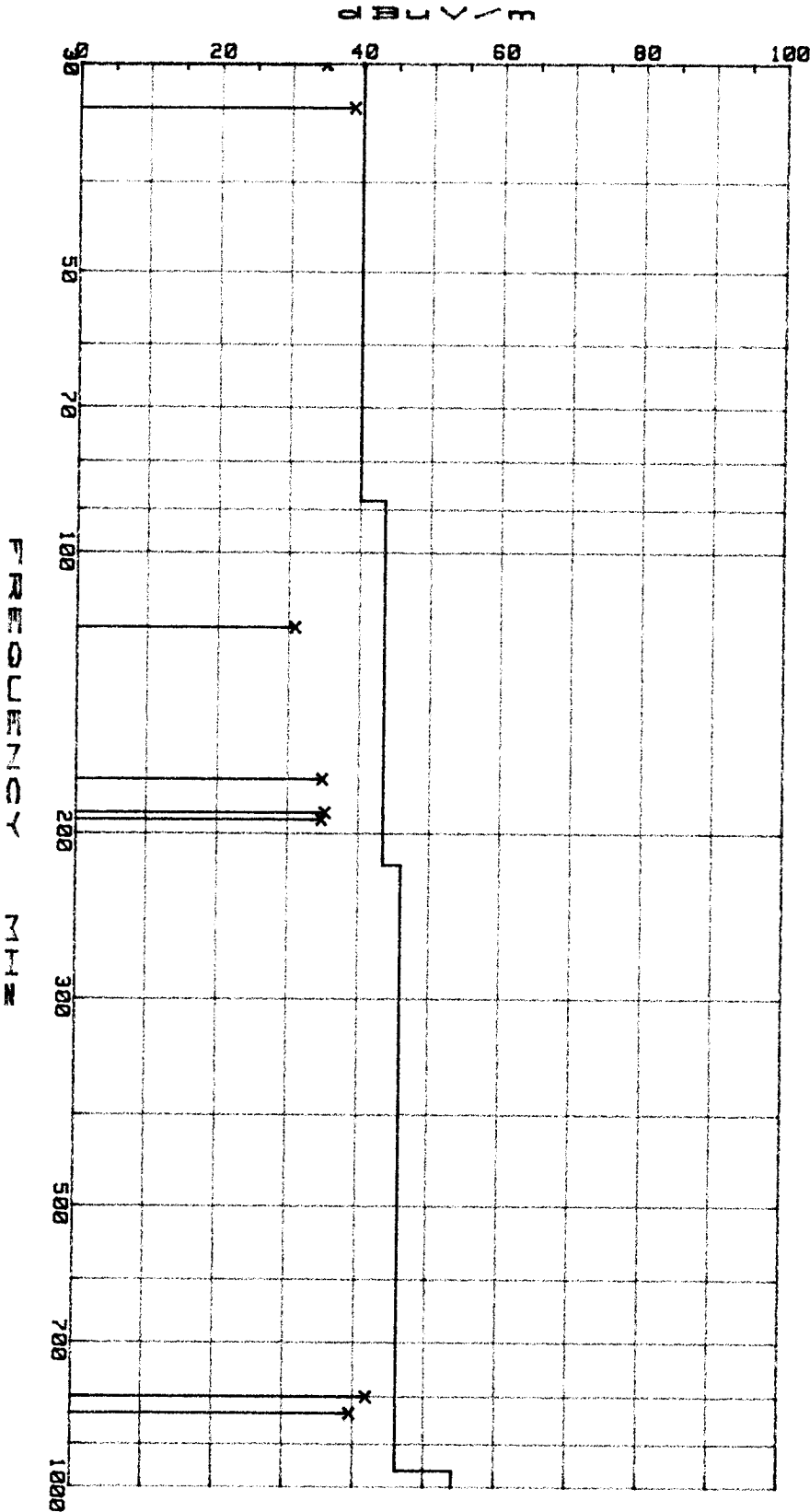
POINT FREQ. : 7  
 LINE MODE : Horizontal  
 TEST EQUIP. : ESV.EVP.ESS  
 ENGINEER : N.Shimoda  
 WEATHER COND. : Cloudy  
 DATE: 4 Nov 1998  
 TEMP: 24°C HUMI: 43%



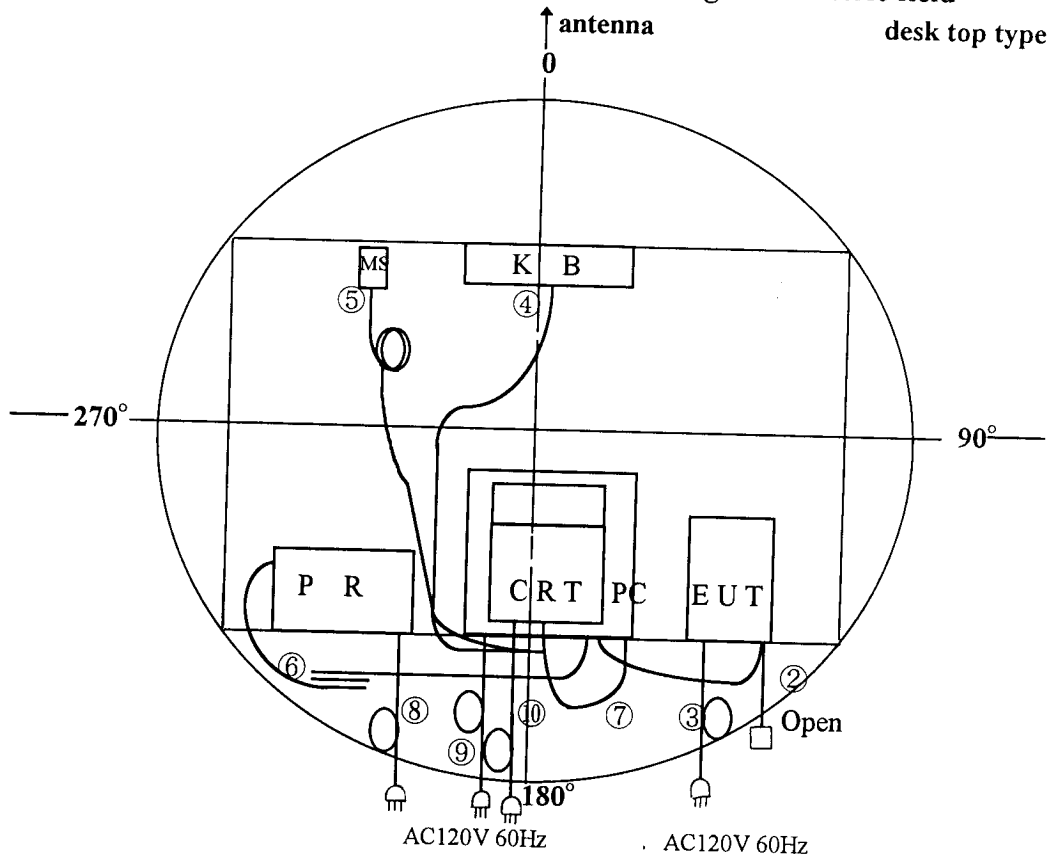
# RADIATED EMISSIONS

MODEL NAME : TL620NS  
 SERIAL NO. : 1055  
 POWER SUPPLY: AC120V 60Hz  
 EUT COND. :  
 DET. MODE : QP  
 Limits : ( 30 ~ 1000 MHz )  
 [FCC B] <3m>

POINT FREQ. : 8  
 LINE MODE : Vertical  
 TEST EQUIP. : ESV.ESVP.ESS  
 ENGINEER : N.Shimoda  
 WEATHER COND. : Cloudy  
 DATE: 4 Nov 1998  
 TEMP: 24°C HUMI: 43%

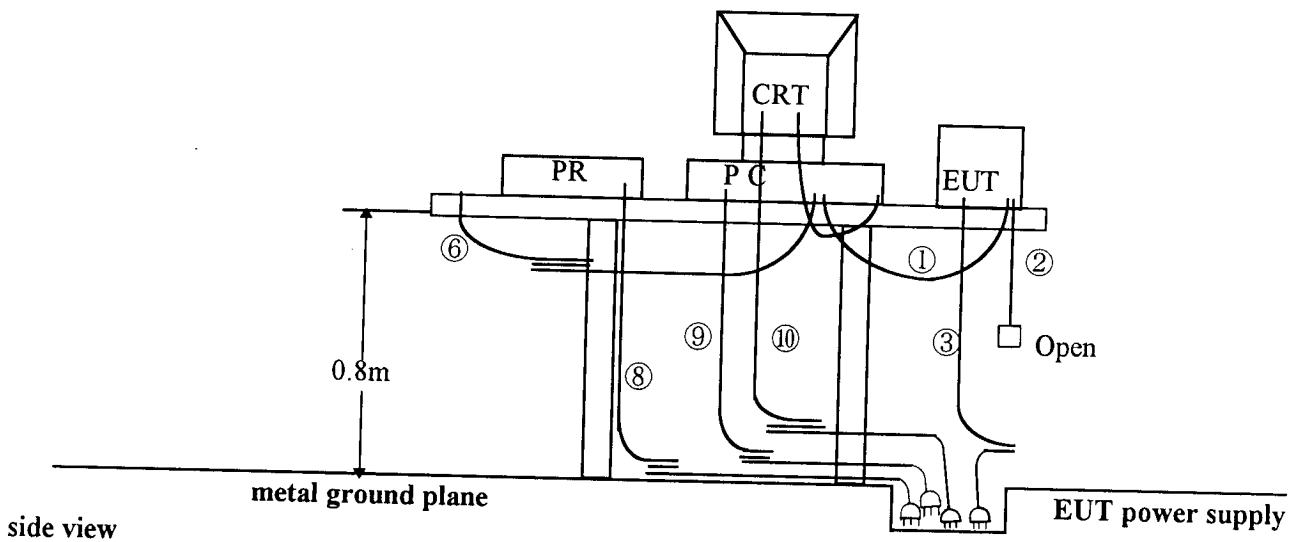


**Configuration of measurement for the strength of electric field**



plane view

The photographs show the cable and equipment detailed layout



side view

## 11.2 AC power line conducted RF voltage measurement

The measurement result in this test which was made duly in accordance with ANSI C63.4-1992 are shown in the next page.

# Measurement Results

CONDUCTED RF VOLTAGE NOISE

4-6.Nov.1998 OHTAMA CO.,LTD  
REGULATION : FCC Class B

MODEL : TL620NS  
REPORT No. : OTAMJ No.A0078

**TEST DATA (Conducted emissions)**

**Model name :** TL620NS  
**Serial No. :** 1055  
**Power supply :** AC120V 60Hz  
**Limit :** FCC Class B  
**VA** : (Grounded one end)

**Test date :** 6 September 1998  
**Temperature :** 20 °C  
**Humidity :** 57 %  
**Test engineer :** N.Shimoda

Frequency (MHz)	Reading (dB $\mu$ V)		Correction factor(dB)	Noise level (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)	
	QP	AVR		QP	AVR	QP	AVR	QP	AVR
0.4912	43.0		0.2	43.2		48.0		4.8	
0.8840	38.6		0.3	38.9		48.0		9.1	
0.9825	39.6		0.3	39.9		48.0		8.1	
2.9476	36.4		0.4	36.8		48.0		11.2	
7.0782	32.9		0.6	33.5		48.0		14.5	
20.7243	25.7		1.0	26.7		48.0		21.3	

Correction Factor = LISN Factor + Cable Loss

4-6.Nov.1998 OHTAMA CO.,LTD  
REGULATION : FCC Class B

MODEL : TL620NS  
REPORT No. : OTAMJ No.A0078

**TEST DATA (Conducted emissions)**

**Model name :** TL620NS  
**Serial No. :** 1055  
**Power supply :** AC120V 60Hz  
**Limit :** FCC Class B  
**VB :** (Grounded the other end)

**Test date :** 6 September 1998  
**Temperature :** 20 °C  
**Humidity :** 57 %  
**Test engineer :** N.Shimoda

Frequency (MHz)	Reading (dB μ V)		Correction factor(dB)	Noise level (dB μ V)		Limit (dB μ V)		Margin (dB)	
	QP	AVR		QP	AVR	QP	AVR	QP	AVR
0.4896	45.1		0.2	45.3		48.0		2.7	
0.5884	39.5		0.2	39.7		48.0		8.3	
0.9830	39.6		0.3	39.9		48.0		8.1	
1.0810	39.5		0.3	39.8		48.0		8.2	
7.0770	33.1		0.6	33.7		48.0		14.3	
20.7244	25.4		1.0	26.4		48.0		21.6	

Correction Factor = LISN Factor + Cable Loss

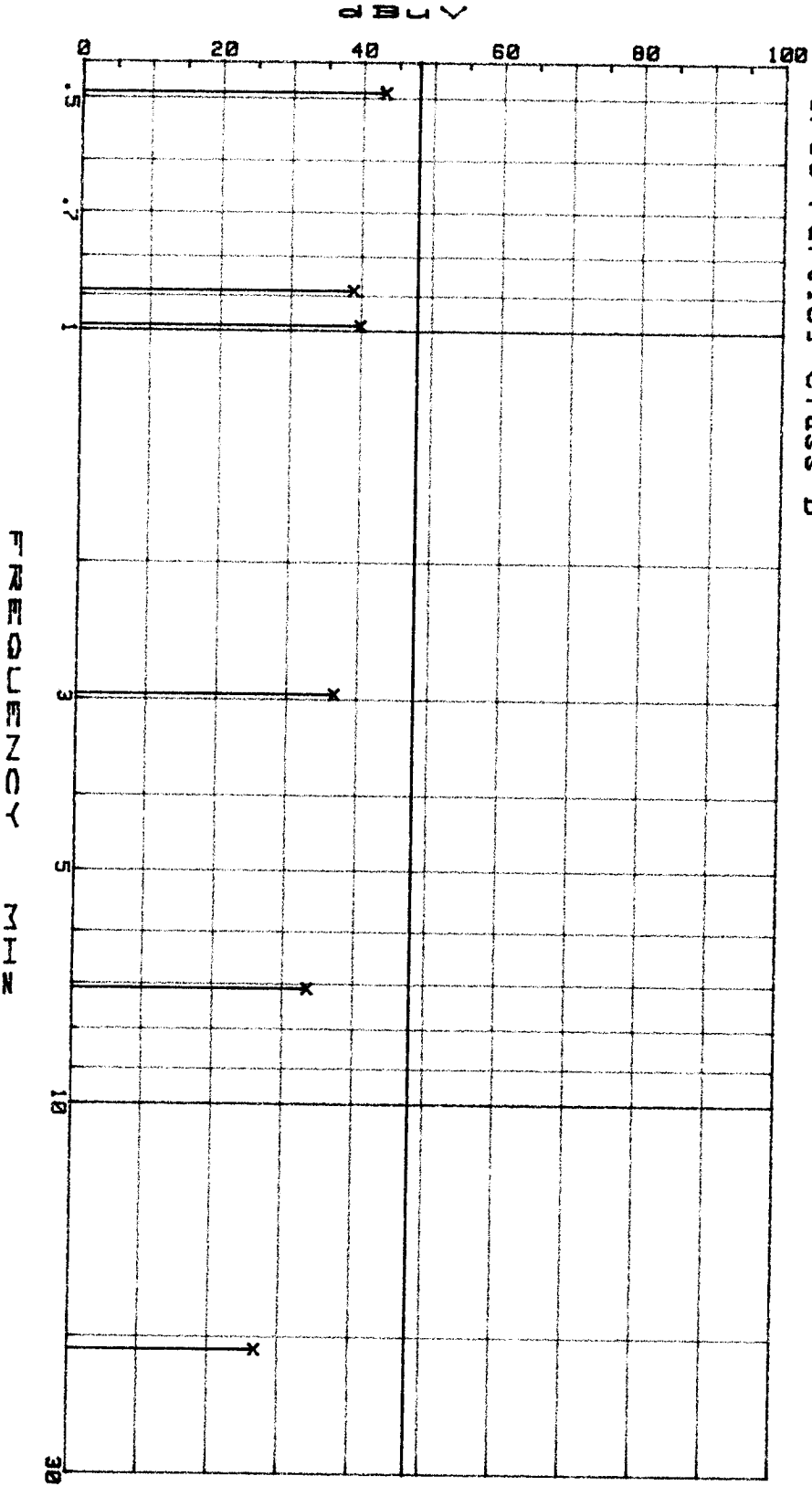
4-6.Nov.1998 OHTAMA CO.,LTD  
 REGULATION : FCC Class B

MODEL : TL620NS  
 REPORT No. : OTAMJ No.A0078

# CONDUCTED EMISSIONS

MODEL NAME : TL620NS  
 SERIAL NO. : 1055  
 POWER SUPPLY: RC120V 60Hz  
 EUT COND. :  
 DET. MODE : QP  
 Limits : ( 0.45 ~ 30 MHz )  
 FCC Part15] Class B

POINT FREQ. : 6  
 LINE MODE : VR  
 TEST EQUIP. : ESH-3.ESS  
 ENGINEER : N.Shimoda  
 WEATHER COND. :  
 DATE: 6 Nov 1998  
 TEMP: 20°c HUMI: 57%

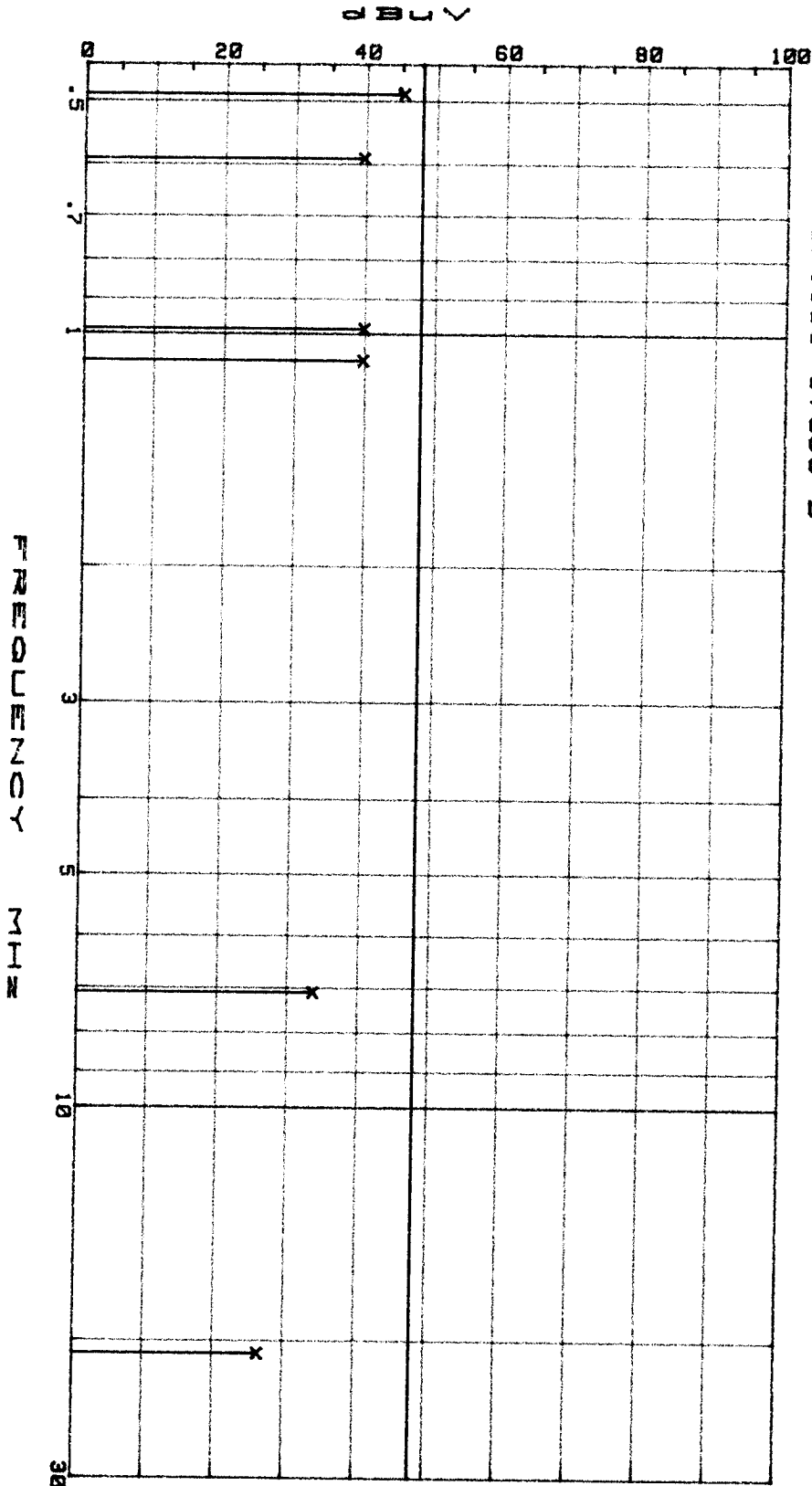




# CONDUCTED EMISSIONS

MODEL NAME : TL620NS  
 SERIAL NO. : 1055  
 POWER SUPPLY: AC120V 60Hz  
 EUT COND. :  
 DET. MODE : QP  
 Limits : ( 0.45 ~ 30 MHz )  
 [FCC Part15] Class B

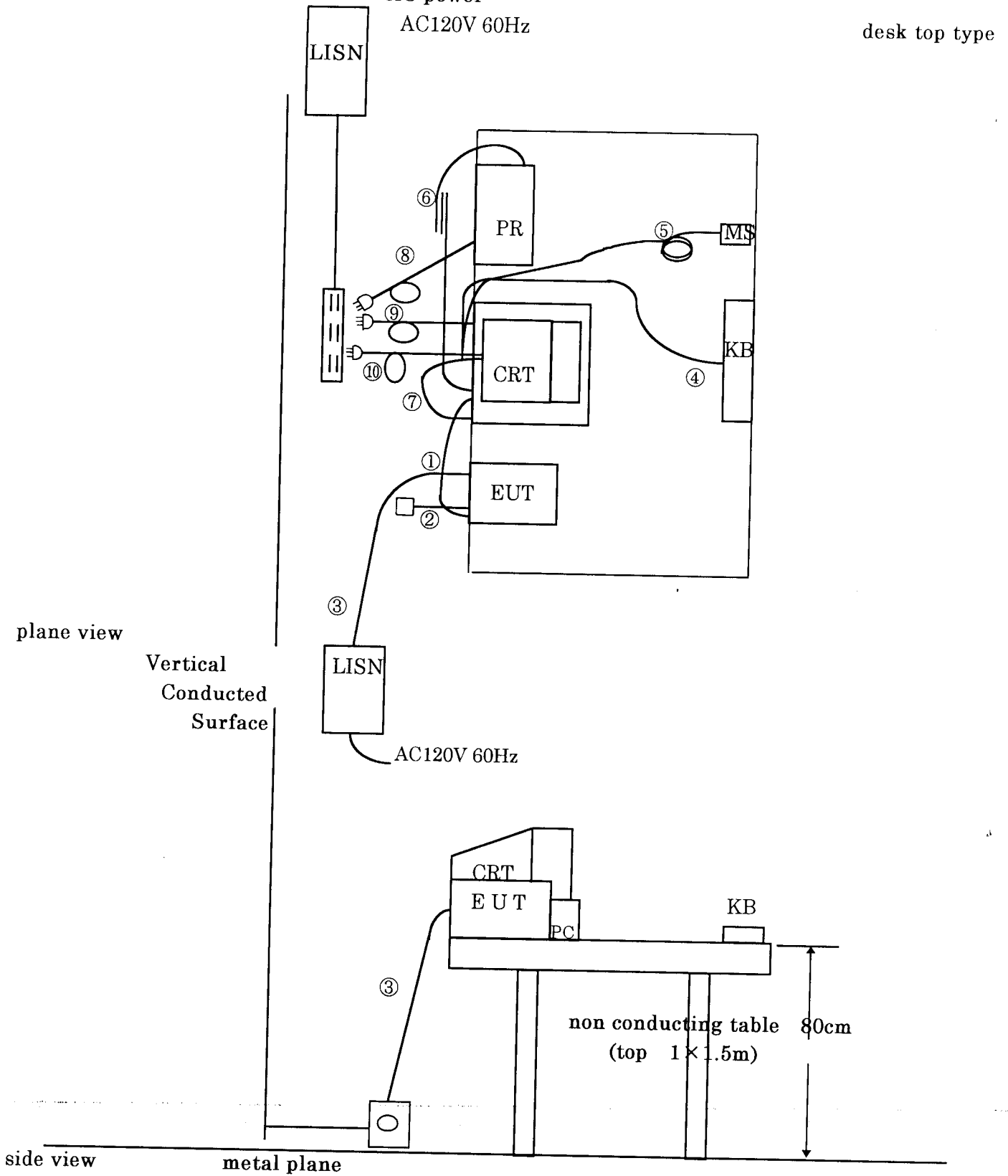
POINT FREQ. : 6  
 LINE MODE : VB  
 TEST EQUIP. : ESH-3.ESS  
 ENGINEER : N.Shimoda  
 WEATHER COND. :  
 DATE: 6 Nov 1998  
 TEMP: 20°C HUMI: 57%



Configuration of measurement for the radio frequency interference voltage

AC power  
AC120V 60Hz

desk top type



National Institute  
of Standards and Technology



**COPY**  
National Voluntary  
Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990  
ISO 9002:1987

## Scope of Accreditation



Page: 1 of 1

**ELECTROMAGNETIC COMPATIBILITY  
AND TELECOMMUNICATIONS**

NVLAP LAB CODE 200175-0

**OHTAMA CO., LTD. YAMANASHI EMC TEST SITE**

1661 Oshuku Asigawa Higashi-Yatsushiro

Yamanashi

JAPAN

Mr. Etsuji Nogami

Phone: 81-552-98-2141 Fax: 81-552-98-2125

*NVLAP Code Designation / Description*

### **International Special Committee on Radio Interference (CISPR) Methods**

12/CIS22 IEC/CISPR 22:1993: Limits and methods of measurement of radio disturbance characteristics of information technology equipment

### **Federal Communications Commission (FCC) Methods**

12/F01 FCC Method - 47 CFR Part 15 - Digital Devices

12/F01a Conducted Emissions, Power Lines, 450 KHz to 30 MHz

12/F01b Radiated Emissions

### **Australian Standards referred to by clauses in AUSTEL Technical Standards**

12/T51 AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

June 30, 1999

A handwritten signature in black ink, appearing to read 'John L. ...', is written over a horizontal line.

Effective through

For the National Institute of Standards and Technology

CERTIFICATE

# CARAT CERTIFICATE

COPY



Certification after Recognition of  
Agent's Testing

OHTAMA CO., LTD.

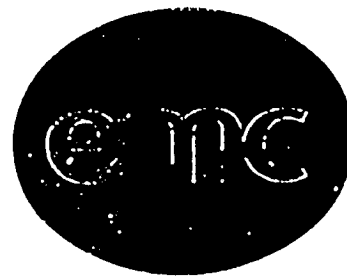
EMC Open Test Site (No. 1, No. 2 & No. 3)  
1661 Ashikawa Higashi-Yatsushiro,  
Yamanashi 409-37 Japan

This certifies that this Laboratory with its testing facilities: open test site (No. 1, No. 2 & No. 3) is included by TÜV PRODUCT SERVICE GROUP (TÜV) in its Listing of Recognized Laboratories qualified in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories available from TÜV. Use of this certificate is the Laboratory's representation that this Laboratory continues to meet TÜV's CARAT Program requirements\* (which are based on EN 45001).

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Expiration Date: 1998-11-28

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Dr. Wolfgang Kreinberg



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