



EMI TEST REPORT

JQA APPLICATION NO. : 400-00071

Model No. : MLU-100A

Type of Equipment : Memory Label Reader/Writer

Regulations Applied : CFR 47 FCC Rules and Regulations Part 15

FCC ID : AK8MLU100A

Applicant : Sony Corporation

Address : 4-14-1, Asahi-cho, Atsugi-shi,
Kanagawa-ken 243-0014, Japan

Manufacture : Sony Corporation

Address : 4-14-1, Asahi-cho, Atsugi-shi,
Kanagawa-ken 243-0014, Japan

Received date of EUT : April 26, 2000

Final Judgment : Passed

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to Electrotechnical Lab. of MITI Japan and Communications Research Lab. of MPT Japan.

The test results only respond to the tested sample. It is not allowed to copy this report even partly without the allowance of the JQA EMC Engineering Dept. Testing Div.

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1 DOCUMENTATION**1.1 TEST REGULATION**

FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) Intentional Radiators

Test procedure :

AC power line conducted emission, radiated emission, frequency stability and occupied bandwidth tests were performed according to the procedures in ANSI C63.4-1992.

1.2 GENERAL INFORMATION**1.2.1 Test facility :**

1) Test Facility located at EMC Engineering Dept. Testing Div. :

- No.2 and 3 Anechoic Chambers(3 meters Site).
- Shielded Enclosure.

Expiration date of FCC test facility filing : June 4, 2002

TSURU EMC Branch: Open Site No.1, No.2, An Anechoic Chamber (3 m and 10 m, on common plane) and a Shielded Room (Date of Listing: March 30,1999)

2) EMC Engineering Dept. Testing Div. and TSURU EMC Branch are recognized under the National Voluntary Laboratory accreditation Program for satisfactory compliance established in title 15, Part 285 Code of Federal Regulations.

NVLAP Lab Code : 200189-0 (Effective through : June 30, 2000)

NVLAP Lab Code : 200192-0 (Effective through : June 30, 2000)

1.2.2 Description of the Equipment Under Test (EUT) :

- | | |
|---|---|
| 1) Type of Equipment | : Memory Label Reader/Writer |
| 2) Product Type | : Pre-Production |
| 3) Category | : Low Power Communication Device
Transmitter |
| 4) EUT Authorization | : Certification |
| 5) FCC ID | : AK8MLU100A |
| 6) Trade Name | : SONY |
| 7) Model No. | : MLU-100A |
| 8) Operating Frequency Range | : 13.56 MHz |
| 9) Highest Frequency Used in the EUT | : 13.56 MHz |
| 10) Serial No. | : 1001 |
| 11) Date of Manufacture | : - |
| 12) Power Rating | : DC 9.0V |
| The EUT was operated with the AC adaptor(Model:AC-E90HG, Input:120VAC 60Hz, Output:9.0VDC by SONY). | |
| 13) EUT Grounding | : None |

1.2.3 Definitions for symbols used in this test report :

- x - indicates that the listed condition, standard or equipment is applicable for this report.
- indicates that the listed condition, standard or equipment is not applicable for this report.

1.3 TEST CONDITION

1.3.1 The measurement of the AC Power Line Conducted Emission

 X - was performed in the following test site.

 - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

 X - Shielded Enclosure

 - Anechoic Chamber No. 2 (portable Type)

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<u> X </u> - Test Receiver	ESH-2	Rohde & Schwarz	880370/016	Sep. 1999	1 Year
<u> </u> - Test Receiver	ESH-3	Rohde & Schwarz	881460/030	Jun. 1999	1 Year
<u> X </u> - LISN(for Peripheral)	KNW-407	Kyoritsu Electrical	8-833-6	Apr. 2000	1 Year
<u> X </u> - LISN(for EUT)	KNW-407	Kyoritsu Electrical	8-855-2	Apr. 2000	1 Year
<u> </u> - LISN	KNW-407	Kyoritsu Electrical	8-757-1	Apr. 2000	1 Year
<u> </u> - RF Cable	3D-2W	Fujikura	155-21-006E0	Apr. 2000	1 Year
<u> X </u> - RF Cable	3D-2W	Fujikura	155-21-007E0	Apr. 2000	1 Year
<u> X </u> - 50ohm Termination		SUHNER	154-06-501E0	Jan. 2000	1 Year
<u> </u> - 50ohm Termination		SUHNER	154-06-502E0	Jan. 2000	1 Year

1.3.2 The measurement of the Radiated Emission(9 kHz - 30 MHz)

x - was performed in the following test site.

___ - was not applicable.

Test location :

JQA SAFTY TESTING CENTER EMC ENGINEERING DEPT. TSURU EMC BRANCH
2096 Ohhata, Tanbozawa, Tsuru-shi Yamanashi-ken 402-0045, JAPAN

___ - Open Site No. 1 (3, 10 or 30 meters)

x - Open Site No. 2 (3, 10 or 30 meters)

___ - Anechoic Chamber(3 or 10 meters)

Validation of Site Attenuation :

1) Last Confirmed Date : N/A

2) Interval : N/A

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<u>x</u> - Test Receiver	ESH-2	Rohde & Schwarz	880370/016	Sep. 1999	1 Year
___ - Test Receiver	ESV	Rohde & Schwarz	872148/039	May 2000	1 Year
___ - Test Receiver	ESVS10	Rohde & Schwarz	826148/002	Jun. 1999	1 Year
___ - Test Receiver	ESVP	Rohde & Schwarz	881487/004	May 2000	1 Year
___ - Test Receiver	ESVP	Rohde & Schwarz	881487/005	Dec. 1999	1 Year
<u>x</u> - Antenna	NFH2-Z2	Rohde & Schwarz	881058/61	May 2000	1 Year
___ - Antenna	KBA-511A	Kyoritsu Electrical	0-170-1	Nov. 1999	1 Year
___ - Antenna	KBA-511A	Kyoritsu Electrical	0-201-13	Nov. 1999	1 Year
___ - Antenna	KBA-611	Kyoritsu Electrical	0-147-14	Nov. 1999	1 Year
___ - Antenna	KBA-611	Kyoritsu Electrical	0-210-5	Nov. 1999	1 Year
___ - Biconical Antenna	BBA9106	Schwarzbeck	VHA91031150	May 2000	1 Year
___ - Biconical Antenna	BBA9106	Schwarzbeck	11905078E0	May 2000	1 Year
___ - Log-Periodic Antenna	UHALP9107	Schwarzbeck	11905079E0	May 2000	1 Year
___ - Log-Periodic Antenna	UHALP9107	Schwarzbeck	11905110	May 2000	1 Year
___ - RF Cable	5D-2W	Fujikura	155-21-001E0	Feb. 2000	1 Year
___ - RF Cable	5D-2W	Fujikura	155-21-002E0	Feb. 2000	1 Year

1.3.3 The measurement of the Radiated Emission(30 MHz - 1000 MHz)

 x - was performed in the following test site.

 - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

 x - Anechoic Chamber No. 2 (3 meters)

 - Anechoic Chamber No. 3 (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date :March, 2000

2) Interval :1 year

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<u> </u> - Test Receiver	ESH-2	Rohde & Schwarz	880370/016	Sep. 1999	1 Year
<u> </u> - Test Receiver	ESV	Rohde & Schwarz	872148/039	May 2000	1 Year
<u> </u> - Test Receiver	ESVS10	Rohde & Schwarz	826148/002	Jun. 1999	1 Year
<u> x </u> - Test Receiver	ESVP	Rohde & Schwarz	881487/004	May 2000	1 Year
<u> </u> - Test Receiver	ESVP	Rohde & Schwarz	881487/005	Dec. 1999	1 Year
<u> </u> - Antenna	HFH2-Z2	Rohde & Schwarz	881058/61	May 2000	1 Year
<u> </u> - Antenna	KBA-511A	Kyoritsu Electrical	0-170-1	Nov. 1999	1 Year
<u> </u> - Antenna	KBA-511A	Kyoritsu Electrical	0-201-13	Nov. 1999	1 Year
<u> </u> - Antenna	KBA-611	Kyoritsu Electrical	0-147-14	Nov. 1999	1 Year
<u> </u> - Antenna	KBA-611	Kyoritsu Electrical	0-210-5	Nov. 1999	1 Year
<u> x </u> - Biconical Antenna	BBA9106	Schwarzbeck	VHA91031150	May 2000	1 Year
<u> </u> - Biconical Antenna	BBA9106	Schwarzbeck	11905078E0	May 2000	1 Year
<u> x </u> - Log-Periodic Antenna	UHALP9107	Schwarzbeck	11905079E0	May 2000	1 Year
<u> </u> - Log-Periodic Antenna	UHALP9107	Schwarzbeck	11905110	May 2000	1 Year
<u> x </u> - RF Cable	5D-2W	Fujikura	155-21-001E0	Feb. 2000	1 Year
<u> </u> - RF Cable	5D-2W	Fujikura	155-21-002E0	Feb. 2000	1 Year

1.3.4 The measurement of the Radiated Emission(Above 1000 MHz)

___ - was performed in the following test site.

x - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

___ - No. 2 site (3 meters)

___ - No. 3 site (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date : N/A

2) Interval : N/A

Used test instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
___ - Spectrum Analyzer	8563E	Hewlett Packard	3221A00201	May 2000	1 Year
___ - Spectrum Analyzer	8560E	Hewlett Packard	3240A00189	Sep. 1999	1 Year
___ - Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 2000	1 Year
___ - RF Pre-selector	85685A	Hewlett Packard	2648A00522	Apr. 2000	1 Year
___ - Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	May 2000	1 Year
___ - RF Pre-selector	85685A	Hewlett Packard	2091A00933	May 2000	1 Year
___ - Log-Periodic Antenna	HL 025	Rohde & Schwarz	340182/015	Nov. 1999	1 Year
___ - RF Amplifier	DBP-0102N5334272B	DBS Microwave Inc.	012	Jun. 1999	1 Year
___ - RF Amplifier	WJ-6882-814	Watkins-Johnson	0414	Jun. 1999	1 Year
___ - RF Amplifier	WJ-5315-556	Watkins-Johnson	106	Jun. 1999	1 Year
___ - RF Amplifier	WJ-5320-307	Watkins-Johnson	645	Jun. 1999	1 Year
___ - RF Cable(10m)	S 04272B	Suhner	155-21-011E0	May 2000	1 Year
___ - RF Cable(2m)	SUCOFLEX 104	Suhner	155-21-012E0	May 2000	1 Year
___ - RF Cable(1m)	SUCOFLEX 104	Suhner	155-21-013E0	May 2000	1 Year

1.3.5 The measurement of the Frequency Stability x - was performed. - was not applicable.**Used test instruments :**

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<u> x </u> - Frequency Counter	53131A	Hewlett Packard	3546A11807	May 2000	1 Year
<u> x </u> - Oven	-	Ohnishi Co. Ltd.	-	Aug. 1999	1 Year
<u> </u> - DC Power Supply	6628A	Hewlett Packard	3224A00284	July 1999	1 Year

1.3.6 The measurement of the Occupied Bandwidth x - was performed. - was not applicable.**Used test instruments :**

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
<u> </u> - Spectrum Analyzer	8560E	Hewlett Packard	3240A00189	Sep. 1999	1 Year
<u> </u> - Spectrum Analyzer	8563E	Hewlett Packard	3221A00201	May 2000	1 Year
<u> x </u> - Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 2000	1 Year
<u> </u> - Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	May 2000	1 Year
<u> </u> - Function Generator	3325A	Hewlett Packard	2512A21776	May 2000	1 Year
<u> </u> - FM Linear Detector	MS61A	Anritsu Corp.	M77486	Sep. 1999	1 Year
<u> </u> - Level Meter	ML422C	Anritsu Corp.	M87571	June 1999	1 Year



1.4 EUT MODIFICATION / Deviation from Standard

1.4.1 EUT MODIFICATION

- ☒ - No modifications were conducted by JQA to achieve compliance to Class B levels.
☐ - To achieve compliance to Class B levels, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant :

Date :

Typed Name :

Position :

1.4.2 Deviation from Standard:

- ☒ - No deviations from the standard described in clause 1.1.
☐ - The following deviations were employed from the standard described in clause 1.1:

1.5 TEST RESULTS

AC Power Line Conducted Emission X - Applicable - NOT Applicable

The requirements are X - PASSED - NOT PASSED

Remarks :

Radiated Emission [§15.225(a)(b)] X - Applicable - NOT Applicable

The requirements are X - PASSED - NOT PASSED

Remarks:

Frequency Stability [§15.225(c)] X - Applicable - NOT Applicable

The requirements are X - PASSED - NOT PASSED

Remarks:

Occupied Bandwidth [§15.225(b)] X - Applicable - NOT Applicable

The requirements are X - PASSED - NOT PASSED

Remarks:

1.6 SUMMARY

General Remarks :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) under the test configuration, as shown in clause 1.7 to 1.10.

The conclusion for the test items of which are required by the applied regulation is indicated under the final judgment.

Final Judgment :

The "as received" sample;

- x - fulfill the test requirements of the regulation mentioned on clause 1.1.
- fulfill the test requirements of the regulation mentioned on clause 1.1, but with certain qualifications.
- doesn't fulfill the test regulation mentioned on clause 1.1.

Begin of testing : April 26, 2000

End of testing : May 19, 2000

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved by:

Signatories:

Issued by:



Masaaki Takahashi
Manager
JQA EMC Engineering Dept.



Shigeru Osawa
Assistant Manager
JQA EMC Engineering Dept.

1.7 TEST CONFIGURATION / OPERATION OF EUT

1.7.1 Test Configuration

The equipment under test (EUT) consists of :

Symbol	Item	Manufacturer	Model No.	FCC ID	Serial No.
A(*1)	Memory Label Reader/Writer	Sony Corporation	MLU-100A	AK8MLU100A	1001
B	AC Adaptor	Sony Corporation	AC-E90HG	N/A	-

Note 1. This equipment was operated with the AC adaptor(Input:120VAC, 60Hz, Output:9.0VDC by Sony).

The measurement was carried out with the following support equipment connected :

Symbol	Item	Manufacturer	Model No.	FCC ID	Serial No.
C	Personal Computer	Dell Computer	MMM	E2KSTNGRMT	S36M9
D	Monitor	Sony Corporation	GDM-17SE1	AK8GDM17SE1	2100506
E	Mouse	Microsoft	2.1A	C3KKMP3	2023610
F	Key Board	Dell Computer	SK-1000REW	GYVR26SK	M960493442
G	Printer	Hewlett Packard	895Cxi	N/A(DoC)	SG9541W0QT
H	AC Adaptor(for Printer)	Hewlett Packard	C6409-60014	N/A	B9D12B

Type of Cable :

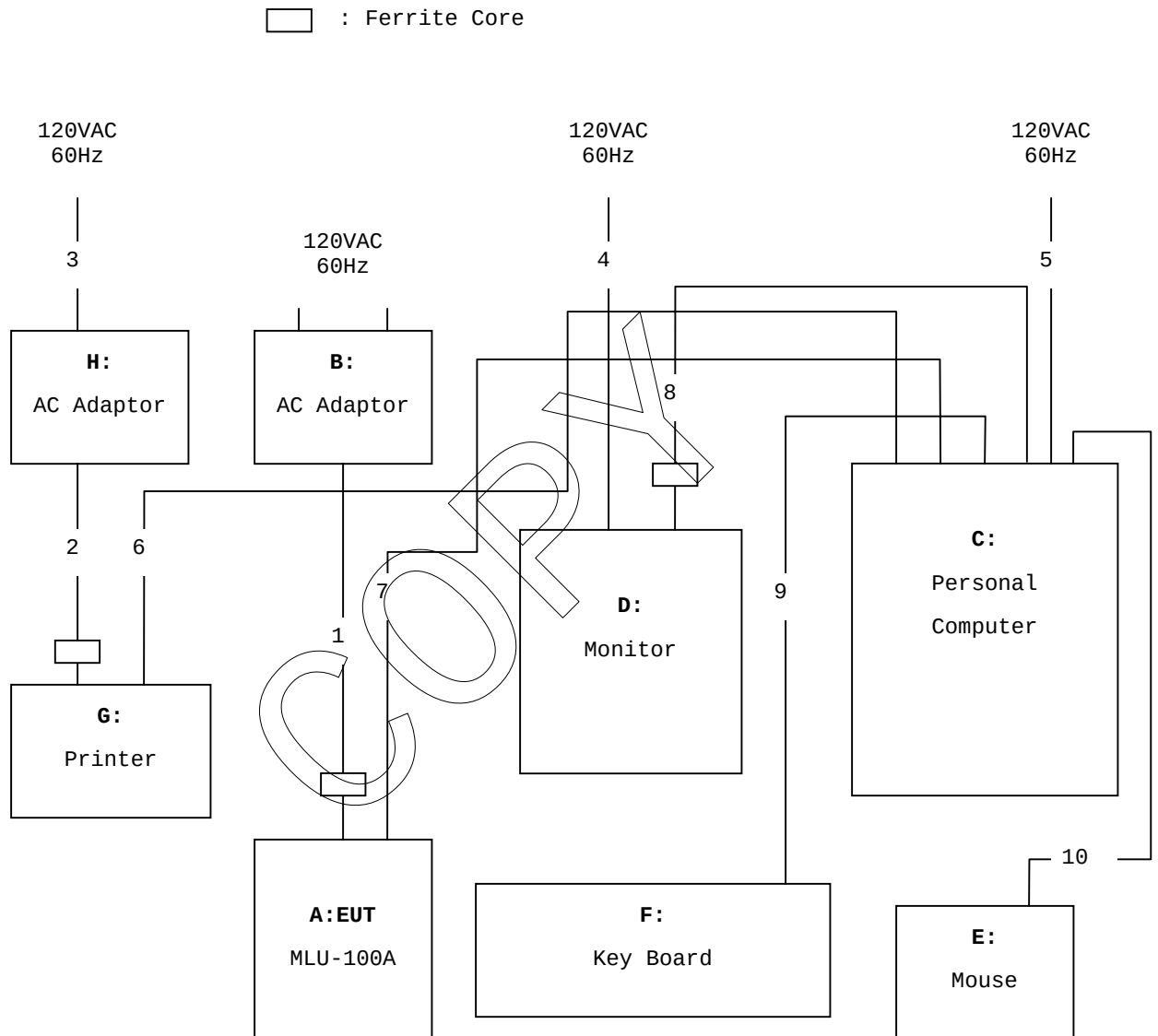
Symbol	Description	Identification (Manufacturer etc.)	Shielded YES / NO	Ferrite Core	Connector type Shielded YES / NO	Length (m)
1	AC Adaptor Cable(for EUT)	Sony Corporation	NO	YES	NO	2.0
2	AC Adaptor Cable(for Printer)	Hewlett Packard	YES	YES	NO	2.0
3	AC Adaptor Cable(for Printer)	Hewlett Packard	NO	NO	NO	1.7
4	AC Power Cable(for Monitor)	Hirakawa Hewtech	NO	NO	NO	2.4
5	AC Power Cable(for Computer)	Hirakawa Hewtech	NO	NO	NO	2.4
6	Printer Cable	Hewlett Packard	YES	NO	YES	1.8
7	RS-232C Cable	Sanwa Supply	YES	NO	YES	2.0
8	Monitor Cable	TTL	YES	YES	YES	1.8
9	Key Board Cable	Dell Computer	YES	NO	YES	1.8
10	Mouse Cable	Microsoft	YES	NO	YES	1.9

1.7.2 Operating condition

Power supply Voltage : 120 VAC, 60Hz(for AC Adaptor)

The tests have been carried out under the transmitting condition.

1.8 EUT ARRANGEMENT (DRAWINGS)



1.9 PRELIMINARY TEST AND TEST-SETUP (DRAWINGS)

1.9.1 AC Power Line Conducted Emission (450 kHz - 30 MHz) :

According to description of ANSI C63.4-1992 sec.13.1.3.1, the AC power line preliminary conducted emissions measurements were carried out.

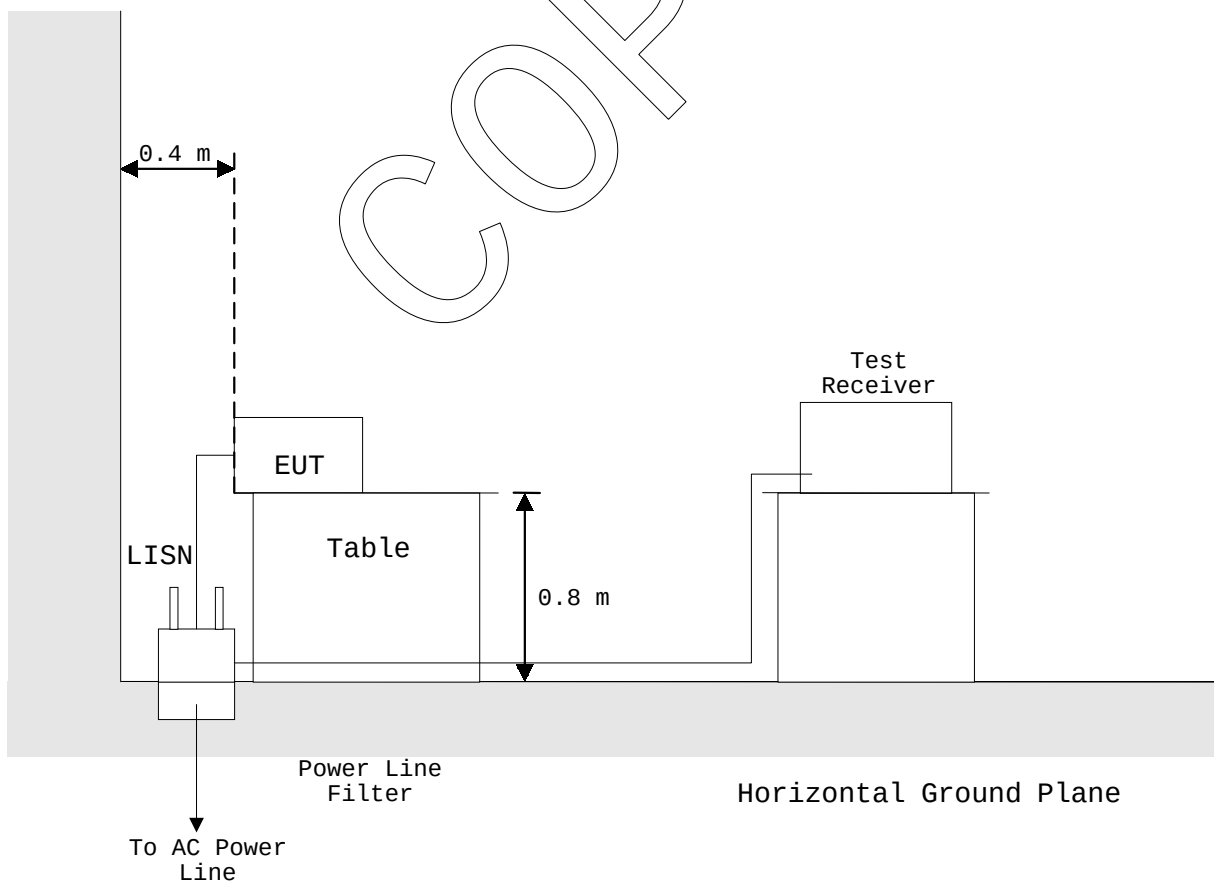
The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements.

Shielded Enclosure

- Side View -

Vertical
Ground
Plane

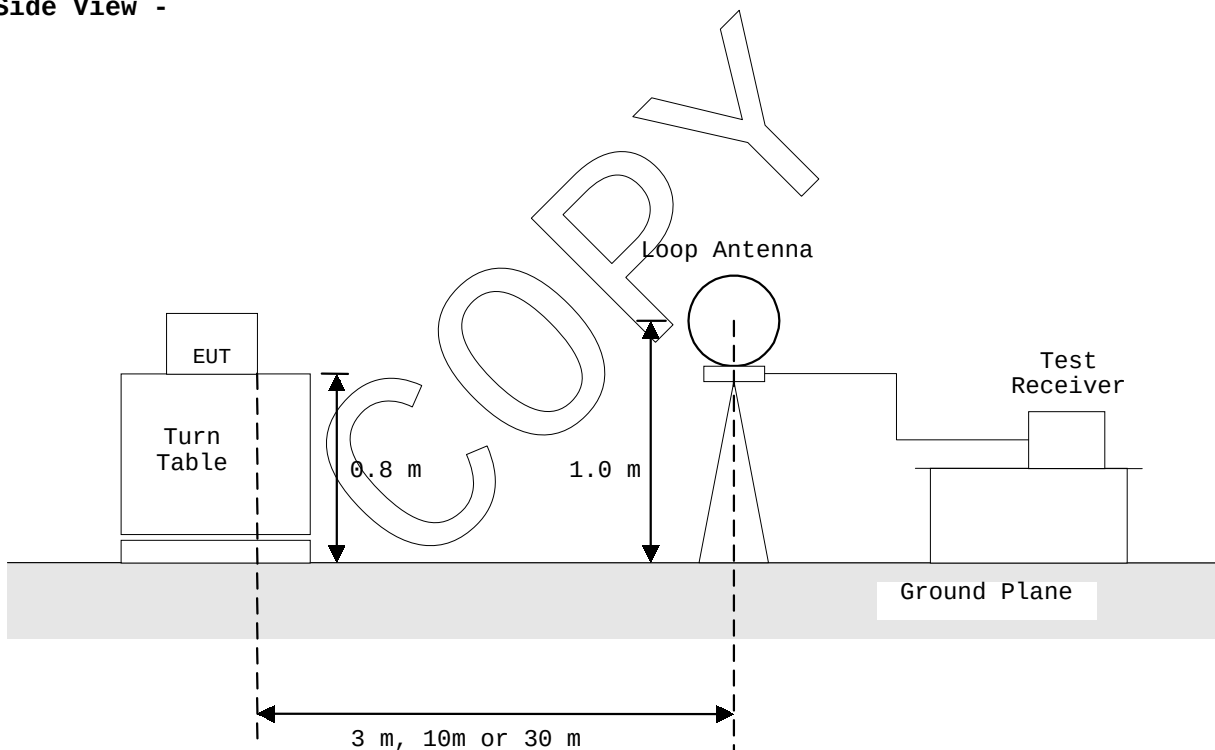


1.9.2 Radiated Emission (9 kHz - 30 MHz) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

- Side View -



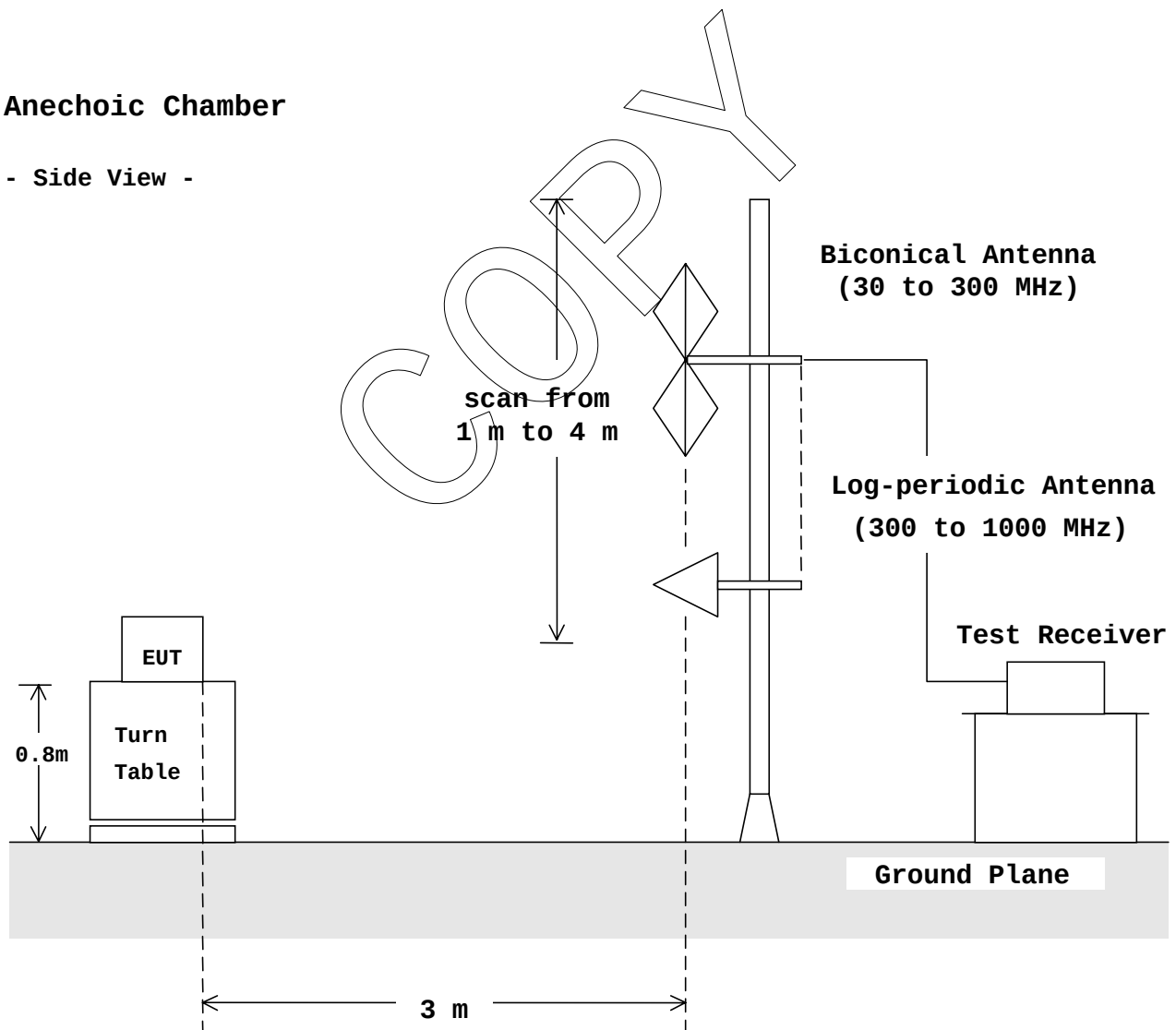
1.9.3 Radiated Emission (30 MHz - 1000 MHz) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber

- Side View -



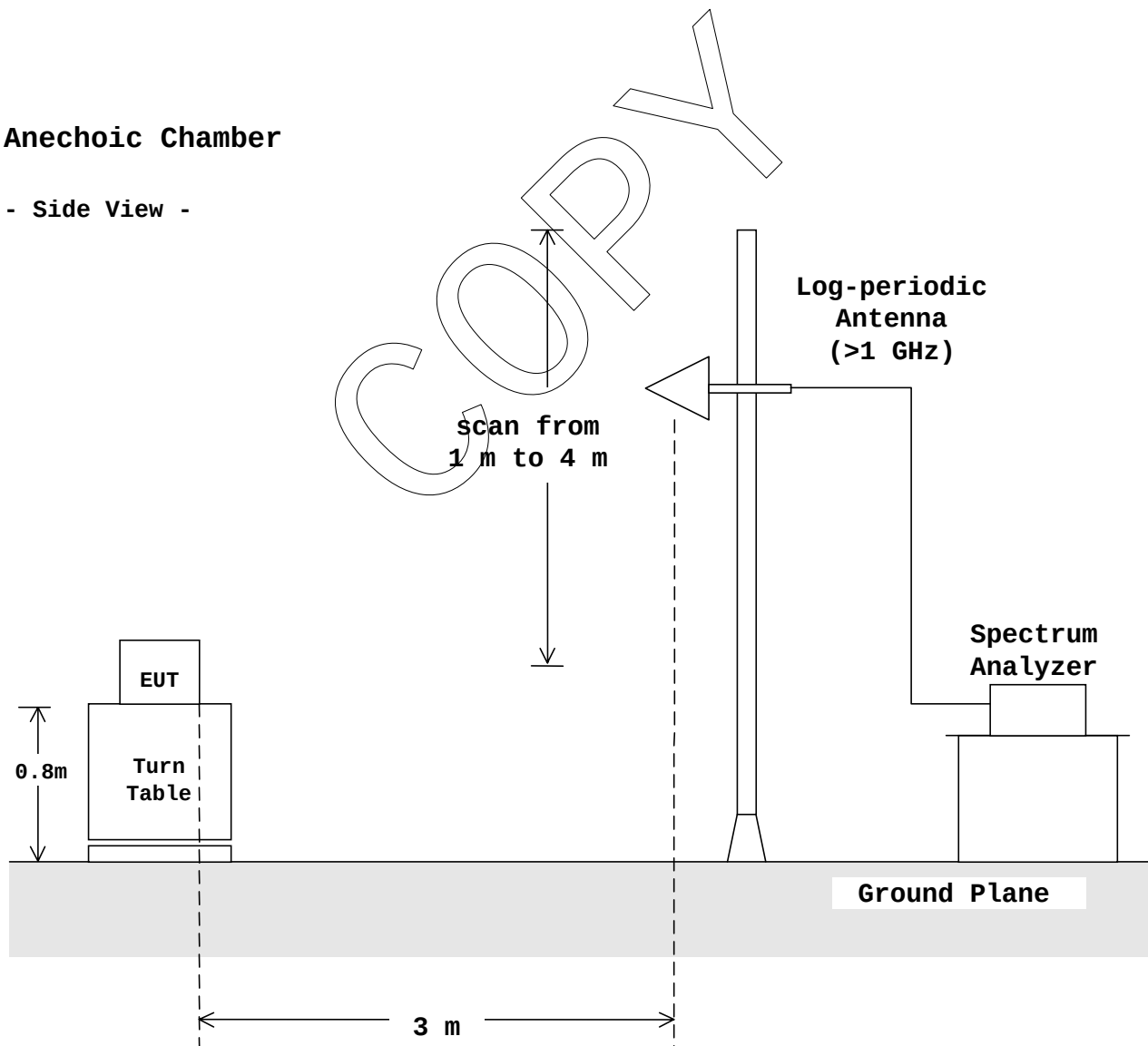
1.9.4 Radiated Emission (Above 1 GHz) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurements were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber

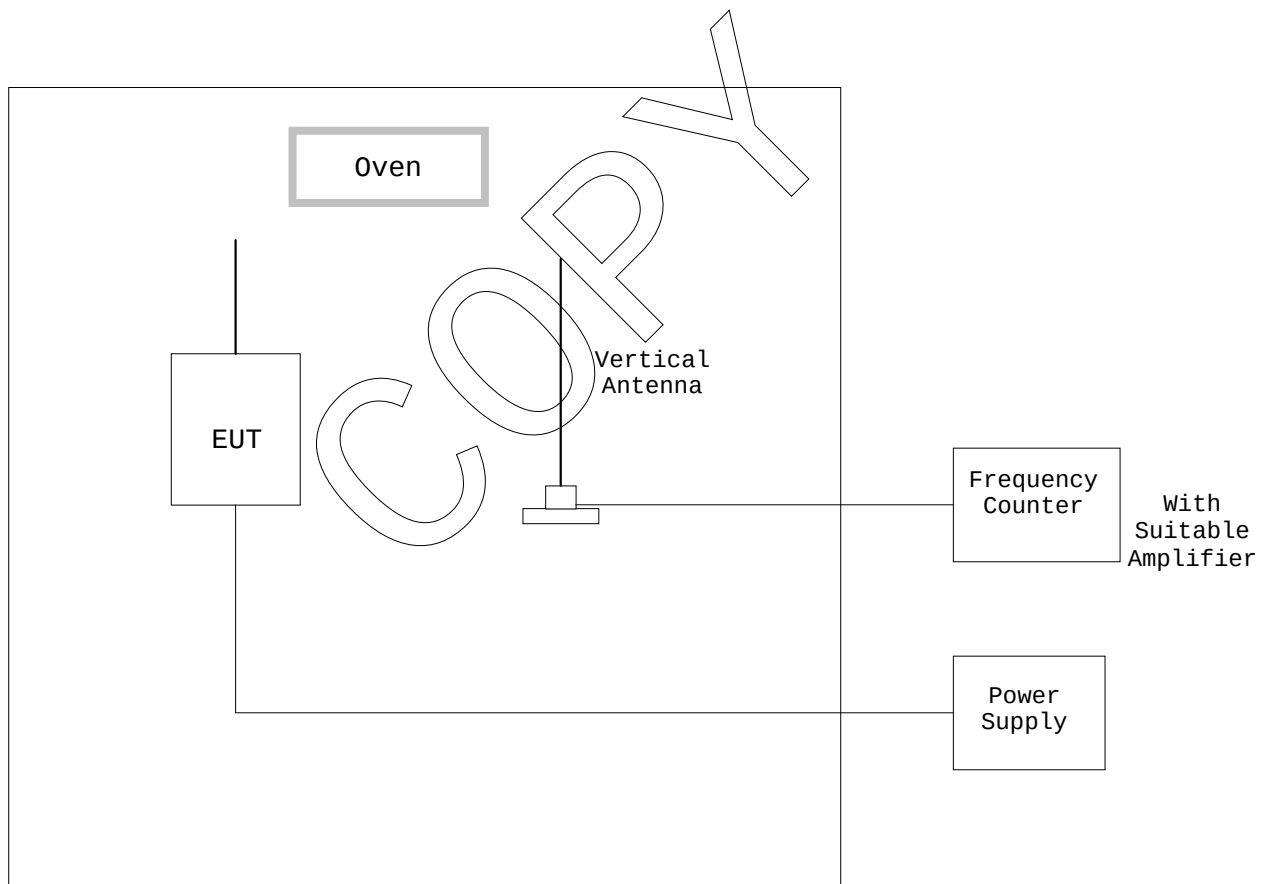
- Side View -



1.9.5 Frequency Stability :

According to description of ANSI C63.4-1992 sec.13.1.5 and sec.13.1.6, the frequency stability measurements were carried out. By using frequency counter with suitable RF amplifier, the carrier frequency of the transmitter under test was measured with a temperature variation of -20°C to $+50^{\circ}\text{C}$ at the normal supply voltage, and if required, with a variation in the primary voltage from 85 % to 115 % the rated supply voltage at the temperature of $+20^{\circ}\text{C}$.

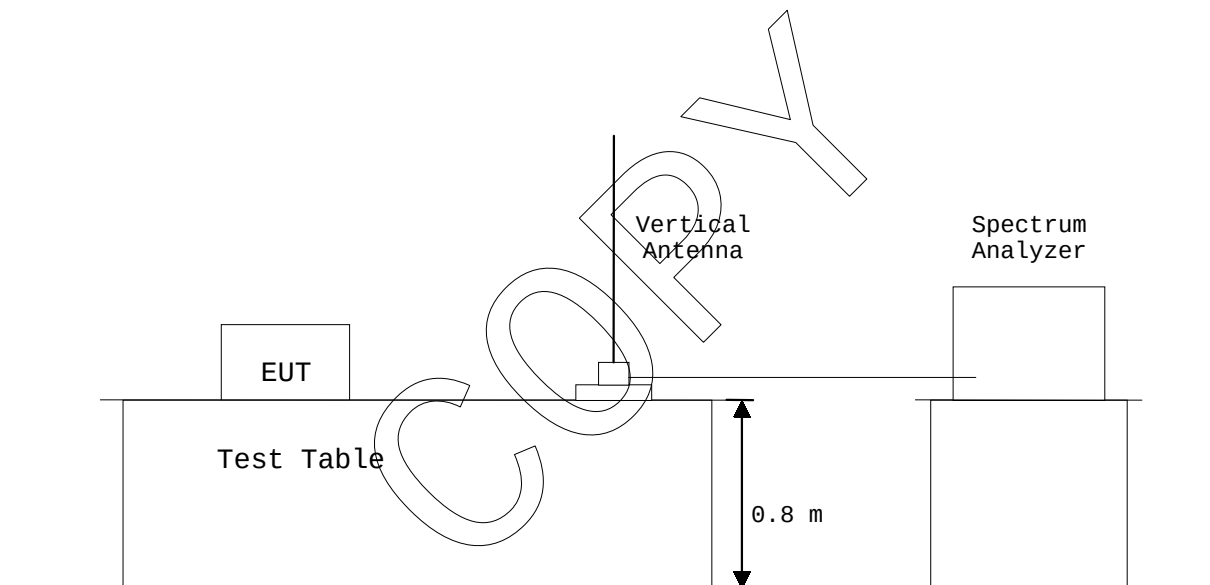
These measurements were carried out after allow sufficient time (approximately 1 hour) for the temperature of the chamber to stabilize.



1.9.6 Occupied Bandwidth :

According to description of ANSI C63.4-1992 sec.13.1.7, the occupied bandwidth measurements were carried out. By using a spectrum analyzer with a vertical antenna for picking up the signal, the measurements of the emission were made under the transmitting modes of the EUT.

The resolution bandwidth of spectrum analyzer was set to the value specified in sec.13.1.7.



1.10 TEST ARRANGEMENT (PHOTOGRAPHS)

PHOTOGRAPHS OF EUT CONFIGURATION FOR AC POWER LINE CONDUCTED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission

- Front View -



- Side View -



PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission
- Front View -



- Rear View -



TEST DATA

2.1 AC Power Line Conducted Emission Measurement(0.45 MHz - 30 MHz)

Date : April 26, 2000

Temp.: 22 °C Humi.: 46 %

Frequency (MHz)	LISN Factor (dB)	Meter Reading (dBuV)				Limits (dBuV)		Emission Level (dBuV)		Margins (dB)	
		V-A		V-B		Q.P	AVE	Q.P	AVE	Q.P	AVE
		Q.P	AVE	Q.P	AVE						
4.72	0.2	12.5	-	14.8	-	48.0	-	15.0	-	33.0	-
5.06	0.2	13.7	-	15.9	-	48.0	-	16.1	-	31.9	-
5.86	0.2	12.0	-	14.2	-	48.0	-	14.4	-	33.6	-
6.30	0.2	15.6	-	17.8	-	48.0	-	18.0	-	30.0	-
7.42	0.2	12.7	-	14.8	-	48.0	-	15.0	-	33.0	-
8.66	0.2	14.9	-	16.9	-	48.0	-	17.1	-	30.9	-
9.00	0.2	14.8	-	16.7	-	48.0	-	16.9	-	31.1	-
9.33	0.2	15.6	-	17.3	-	48.0	-	17.5	-	30.5	-
9.67	0.2	19.8	-	21.3	-	48.0	-	21.5	-	26.5	-
10.80	0.2	24.5	-	25.5	-	48.0	-	25.7	-	22.3	-
11.02	0.2	25.9	-	26.8	-	48.0	-	27.0	-	21.0	-
12.48	0.3	11.4	-	10.3	-	48.0	-	11.7	-	36.4	-
13.56	0.3	40.3	-	39.0	-	48.0	-	40.6	-	7.4	-
14.95	0.3	13.3	-	12.8	-	48.0	-	13.6	-	34.4	-
26.59	0.5	14.0	-	14.7	-	48.0	-	15.2	-	32.8	-
27.12	0.5	37.2	-	37.8	-	48.0	-	38.3	-	9.7	-
27.22	0.5	32.3	-	32.9	-	48.0	-	33.4	-	14.6	-

Notes : 1) The spectrum was checked from 0.45 MHz to 30 MHz.

2) The cable loss is included in the LISN factor.

3) The symbol of "<"means "or less".

4) The symbol of ">"means "or greater".

5) The symbol of "-"means "Not applicable".

6) V-A : One end & Ground V-B : The other end & Ground

7) Q.P : Quasi-peak AVE : Average

8) A sample calculation was made at 4.72 (MHz).

$$Lf + Mr = 0.2 + 14.8 = 15(\text{dBuV})$$

Lf = LISN Factor

Mr = Meter Reading

Tested by :



Shigeru Osawa

Testing Engineer

AC POWER LINE CONDUCTED EMISSION MEASUREMENT

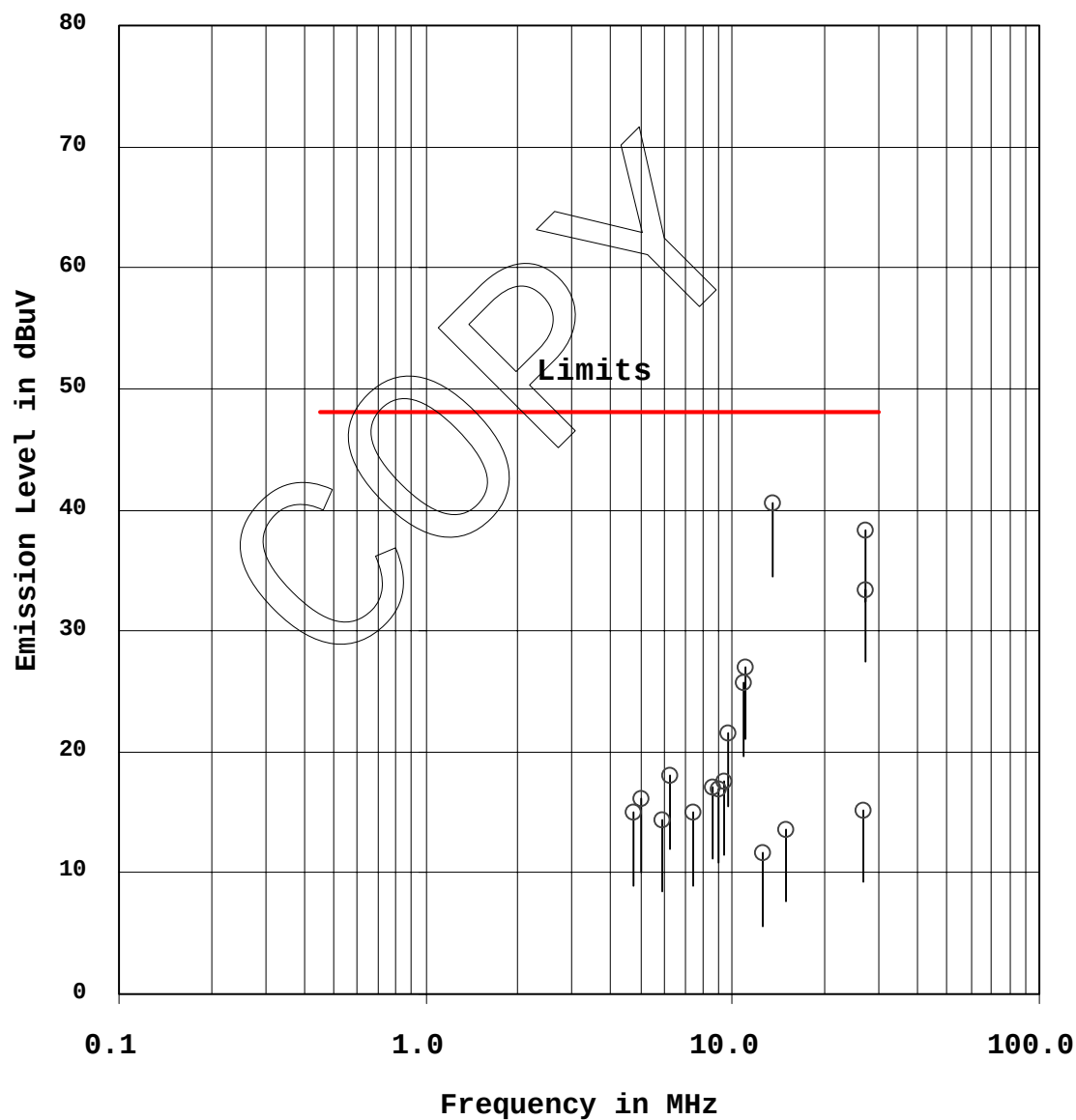
Model No. : MLU-100A

Standard : CFR 47 FCC Rules Part 15

Category : Class B

o Quasi-peak

x Average



2.2 Radiated Emissions Measurement(9 kHz - 1000 MHz)

Date : May 12, 2000

Operating Frequency : 13.56 MHz
Distance of Measurement : 10 meters

Frequency (MHz)	Field Strength (dBμV/m)
Fundamental 13.56	< 27.0
Harmonic Frequency 27.12	< 27.0

The distance of measurements was reduced to 3 meters.

Operating Frequency : 13.56 MHz
Distance of Measurement : 3 meters

Frequency (MHz)	Field Strength (dBμV/m)
Fundamental 13.56	46.7
Harmonic Frequency 27.12	33.7

Note: 1. Meter reading value shows field strength, because the value includes antenna factor.

2. The symbol of "<" means "or less".

3. Measuring Instrument Setting:

Detector Function : CISPR Quasi-peak Peak
IF Band width : 9 kHz

For fundamental, the measured field strength was extrapolated to distance 30 meters, using the formula that field strength varies as the inverse distance square(40 dB per decade of distance).

Calculation :

$$46.7 \text{ dB}\mu\text{V/m} - 20\log_{10}((30/3)^2) = 32.3 - 40.0 \\ = 6.7 \text{ dB}\mu\text{V/m at 30 meters}$$

Limits for fundamental(§15.225(a)) = $20\log_{10}(10000) = 80 \text{ dB}\mu\text{V/m}$

Date : April 26, 2000

Temp.: 22 °C Humi.: 53 %

Operating Frequency : 13.560 MHz

Distance of Measurement : 3.0 meters

Frequency (MHz)	Antenna Factor (dB)	Meter Reading (dBuV)		Limits (dBuV/m)	Emission Levels (dBuV/m)		Margins (dB)	
		Horiz.	Vert.		Horiz.	Vert.	Horiz.	Vert.
40.68	14.4	0.5	7.1	40.0	14.9	21.5	25.1	18.5
54.24	10.0	5.9	9.0	40.0	15.9	19.0	24.1	21.0
81.36	7.9	13.2	13.0	40.0	21.1	20.9	18.9	19.1
108.48	12.3	9.6	12.0	43.5	21.9	24.3	21.6	19.2
135.60	15.0	11.1	10.3	43.5	26.1	25.3	17.5	18.3
216.96	18.5	5.1	< 0.0	46.0	23.6	< 18.5	22.4	> 27.5
244.08	19.4	20.9	12.3	46.0	40.3	31.7	5.7	14.3
271.20	20.2	14.9	10.2	46.0	35.1	30.4	10.9	15.6
298.32	21.7	9.2	3.3	46.0	30.9	25.0	15.1	21.0
800.04	25.6	4.2	0.3	46.0	29.8	25.9	16.3	20.2
827.16	25.9	2.4	0.2	46.0	28.3	26.1	17.7	19.9
854.28	26.2	2.3	1.5	46.0	28.5	27.7	17.5	18.3
881.40	26.6	0.5	0.8	46.0	27.1	27.4	19.0	18.7

Notes : 1) The spectrum was checked from 30 MHz to 1000 MHz.
2) The cable loss is included in the antenna factor.

3) The symbol of "<" means "or less".

4) The symbol of ">" means "or greater".

5) A sample calculation was made at 40.68 (MHz).

$Af + Mr = 14.4 + 7.1 = 21.5$ (dBuV/m)

Af = Antenna Factor

Mr = Meter Reading

Tested by :



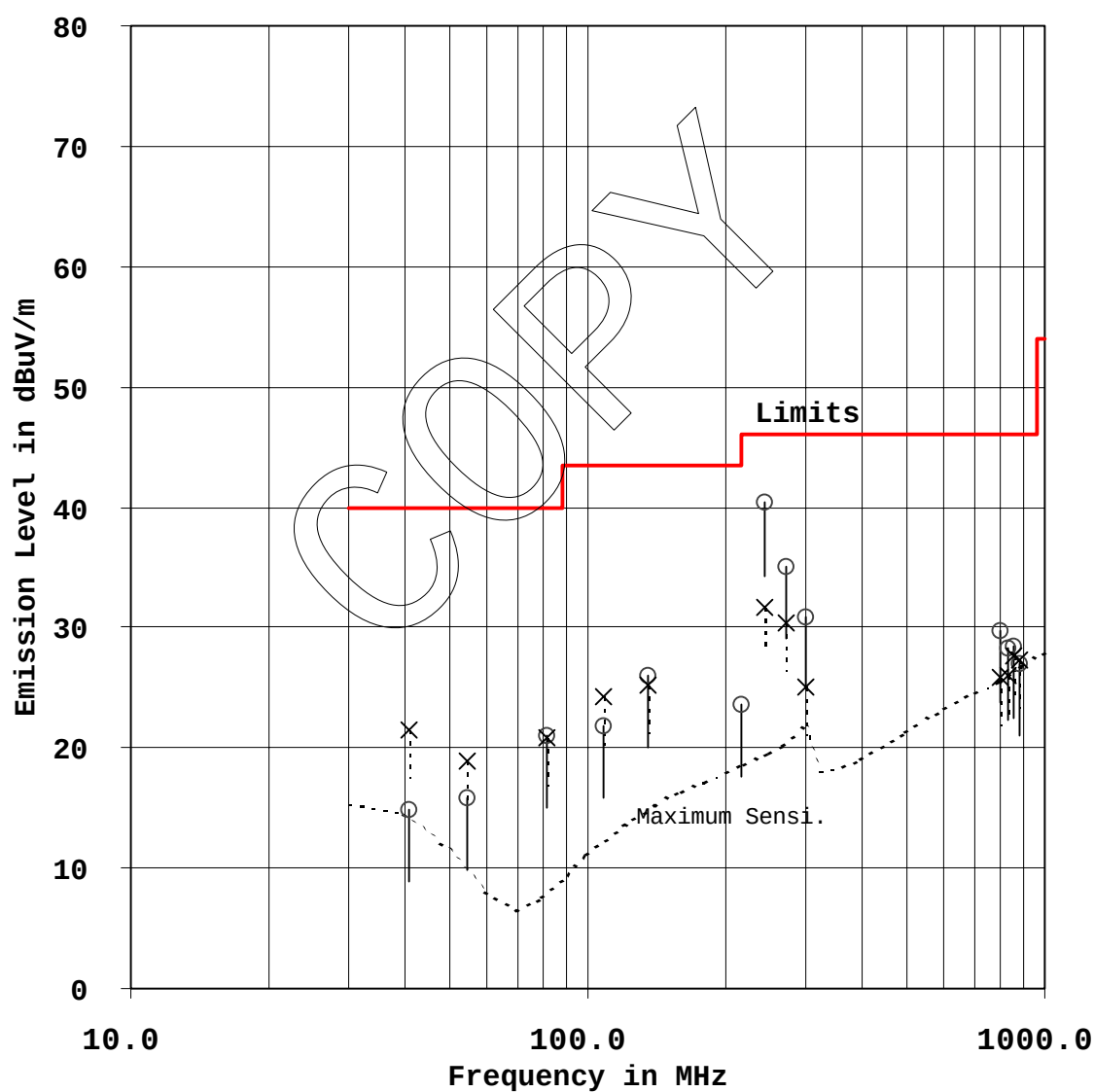
Shigeru Osawa

Testing Engineer

RADIATED EMISSION MEASUREMENT

Model No. : MLU-100A

Standard : CFR 47 FCC Rules Part 15
 0 Horizontal
 X Vertical



2.3 Frequency Stability Measurement

Date : May 9, 2000

OPERATING FREQUENCY : 13.56 MHz

Ambient Temperature (°C)	Frequency tolerance with time elapse(%)			
	0 minute	2 minutes	5 minutes	10 minutes
-20	-0.00106	-0.00074	-0.00058	-0.00048
+50	-0.00011	-0.00002	+0.00008	+0.00017

Primary Supply Voltage (V)		Frequency tolerance with time elapse(%)			
		0 minute	2 minutes	5 minutes	10 minutes
at 20°C	102 (85%)	-0.00018	-0.00012	-0.00013	-0.00014
	120 (100%)	-0.00018	-0.00012	-0.00013	-0.00014
	138 (115%)	-0.00018	-0.00012	-0.00013	-0.00014

Specified Limit $\pm 0.01\%$

Tested by :



Shigeru Osawa
Testing Engineer



JQA Application No. :400-00071

Model No.

:MLU-100A

Standard

:CFR 47 FCC Rules Part 15

FCC ID :AK8MLU100A

Issue Date :May 26, 2000

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2.4 Occupied Bandwidth Measurement

Date : May 19, 2000

Temp.: 25 °C Humi.: 50 %

Measurements Results : Refer to the attached graphs.

Tested by :

Shigeru Osawa

Shigeru Osawa

Testing Engineer

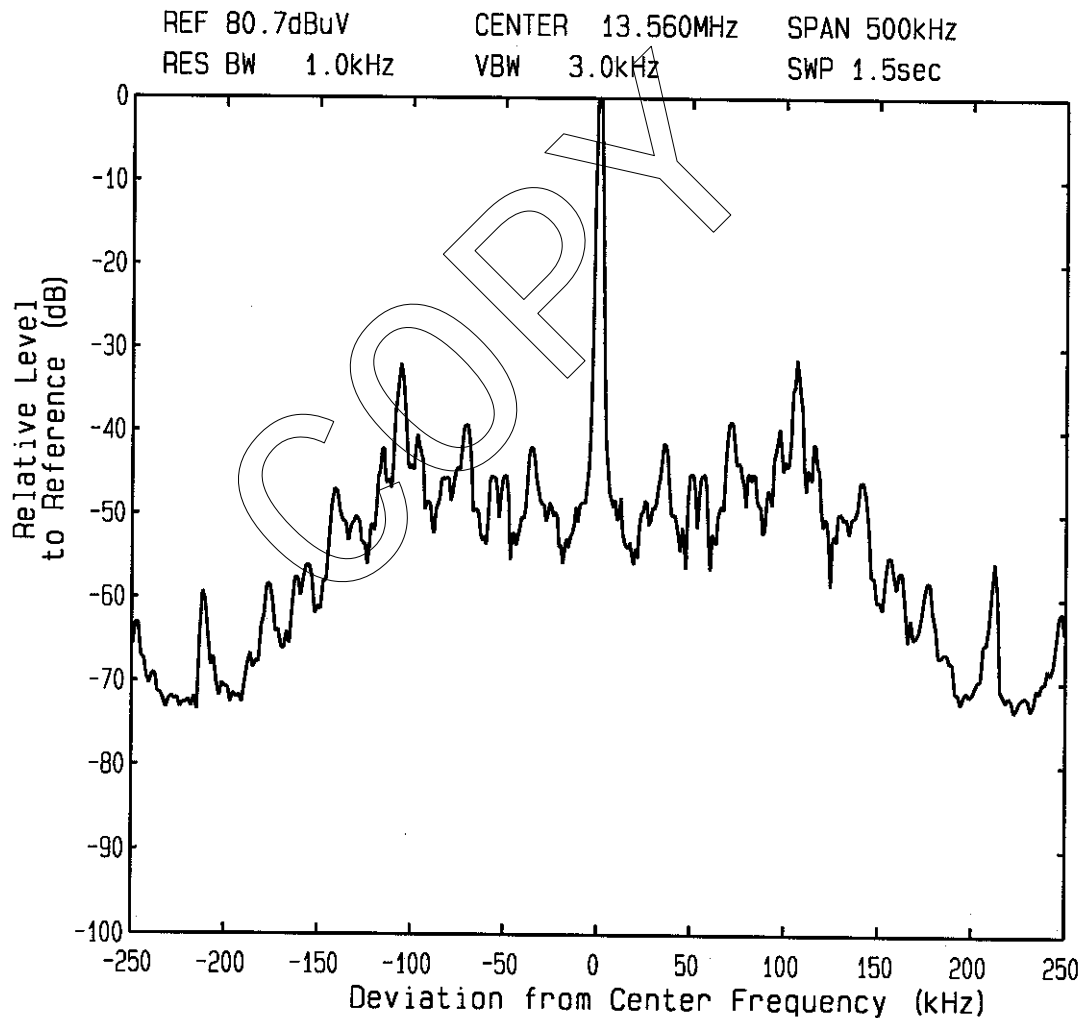
COPY

Emission Limitation

FCC ID : AK8MLU100A

Model : MLU-100A

Mode of EUT : Transmit



Emission Limitation

FCC ID : AK8MLU100A

Model : MLU-100A

Mode of EUT : Transmit

