

Designated by Ministry of International Trade and Industry

ATTACHMENT I

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

HEAD OFFICE
6-8-7, NISHITEMMA
KITA-KU, OSAKA, 530 JAPAN



IKOMA
TESTING LABORATORY
10630, TAKAYAMA-CHO
IKOMA-CITY, NARA, 630-01 JAPAN

Corporate Juridical Person

ENGINEERING TEST REPORT

REPORT NO. A-014-98-C

Issued Date : May 14, 1998

This test report is to certify that the tested device properly complies with the requirements of:

FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.

The tests necessary to show compliance to the requirements were performed and these results met the specifications of requirement. The results of this report should not be construed to imply compliance of equipment other than that which was tested. Unless the laboratory permission, this report should not be copied in part.

1. Applicant

Company Name : ORION ELECTRIC CO., LTD.

Mailing Address : 41-1, IEHISA-CHO, TAKEFU-SHI, FUKUI 915-8555 JAPAN

2. Identification of Tested Device

FCC ID : A7RM4C6A
Device Name : VIDEO CASSETTE PLAYER
Trade Name : ORION
Model Number : VP-L
Serial Number : ID-112-1222 ☐ Prototype ☒ Pre-production ☐ Production
Date of Manufacture : April, 1998

3. Test Items and Procedure

☒ AC Power Line Conducted Emission Measurement
☒ Radiated Emission Measurement
☒ Output Signal Level Measurement
☒ Output Terminal Conducted Spurious Emission Measurement
☒ Transfer Switch Measurement

Above all tests were performed under : ANSI C63.4-1992

4. Date

Receipt of Test Sample : May 6, 1998

Test Completed on : May 11, 1998

CERTIFIED BY :

Eizo Hariya
General Manager of Ikoma Testing Laboratory

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ENGINEERING TEST REPORT**1. GENERAL INFORMATION****1.1 Product Description**

The ORION Model No.VP-L (referred to as the EUT in this report) is a Video Cassette Player containing RF modulator.

1) Provided Terminals

- (1) RF Input Terminal
- (2) RF Output Terminal
- (3) A/V Output Terminal
- (4) AC Input
- (5) DC Input

- 2) RF Modulator Frequency : US CH. #3 Visual Carrier 61.25 MHz,
Aural Carrier 65.75 MHz
US CH. #4 Visual Carrier 67.25 MHz,
Aural Carrier 71.75 MHz

- 3) Type of RF Output Connector : Type "F" Connector 75 Ω (Unbalanced)

- 4) Used Oscillating Frequency except Local Oscillator
10 MHz : System Control/Servo Control Microcomputer Clock
3.579545 MHz : Chrominance Subcarrier Oscillator
140 ~ 210 kHz : Switchng Frequency of Power Supply

- 5) Rated Power Supply : AC 120 V, 60 Hz
DC 12 V(Car Battery)

1.2 Description for Equipment Authorization**1) Rules Part(s) under which Equipment operated**

FCC Rule Part 15, Subpart B ; Unintentional Radiators TV Interface Device.

2) Kind of Equipment Authorization

(x) Certification () Verification

3) Procedure of Application

(x) Original Equipment () Modification

1.3 Test Facility

All tests described in this report were performed by:

N a m e : KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC)
IKOMA TESTING LABORATORY
EMC Measurement Center, Anechoic Chamber No.1
Shielded Room No.4

Address : 10630, Takayama-cho Ikoma-city, Nara, 630-0101 Japan

The test facilities have been filed with the FCC under the criteria of ANSI C63.4-1992.
The laboratory has been accredited by the NVLAP(Lab.Code:200207-0) based on ISO/IEC Guide 25.
Also the laboratory has been authorized by ITI(Interference Technology Internaitonal, UK),
TUV Product Service(GER) and TUV Rheinland(GER) based on their criteria for testing laboratory
(EN45001).

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2. TESTED SYSTEM

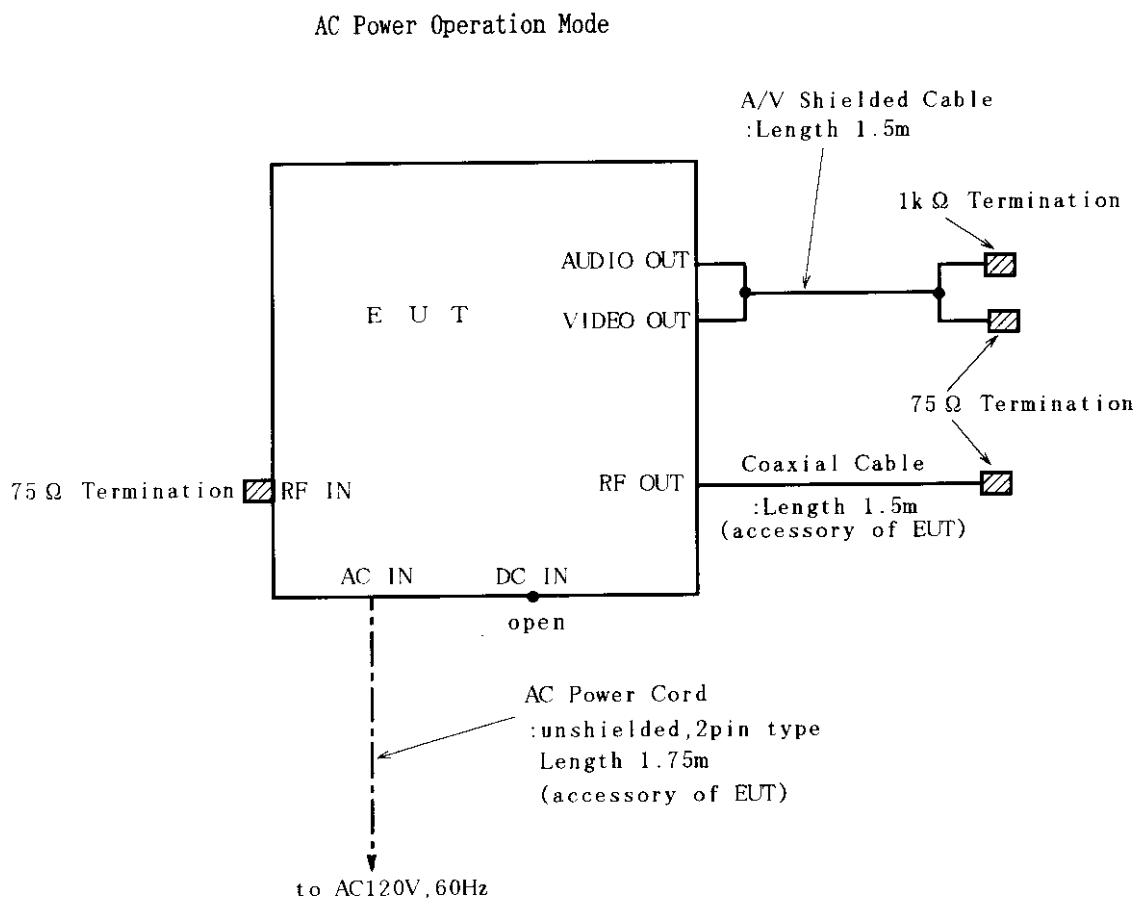
2.1 Test Mode

The EUT have not recording function, so the compliance tests were performed only under the "Playback mode".

Playback mode : Playback the video tape that is recorded 1V peak-to-peak VITS signal.

In the radiated emission measurement, the emissions were checked under the two kinds of power operations (AC/DC). As a result, the maximum emission were reported at each frequency.

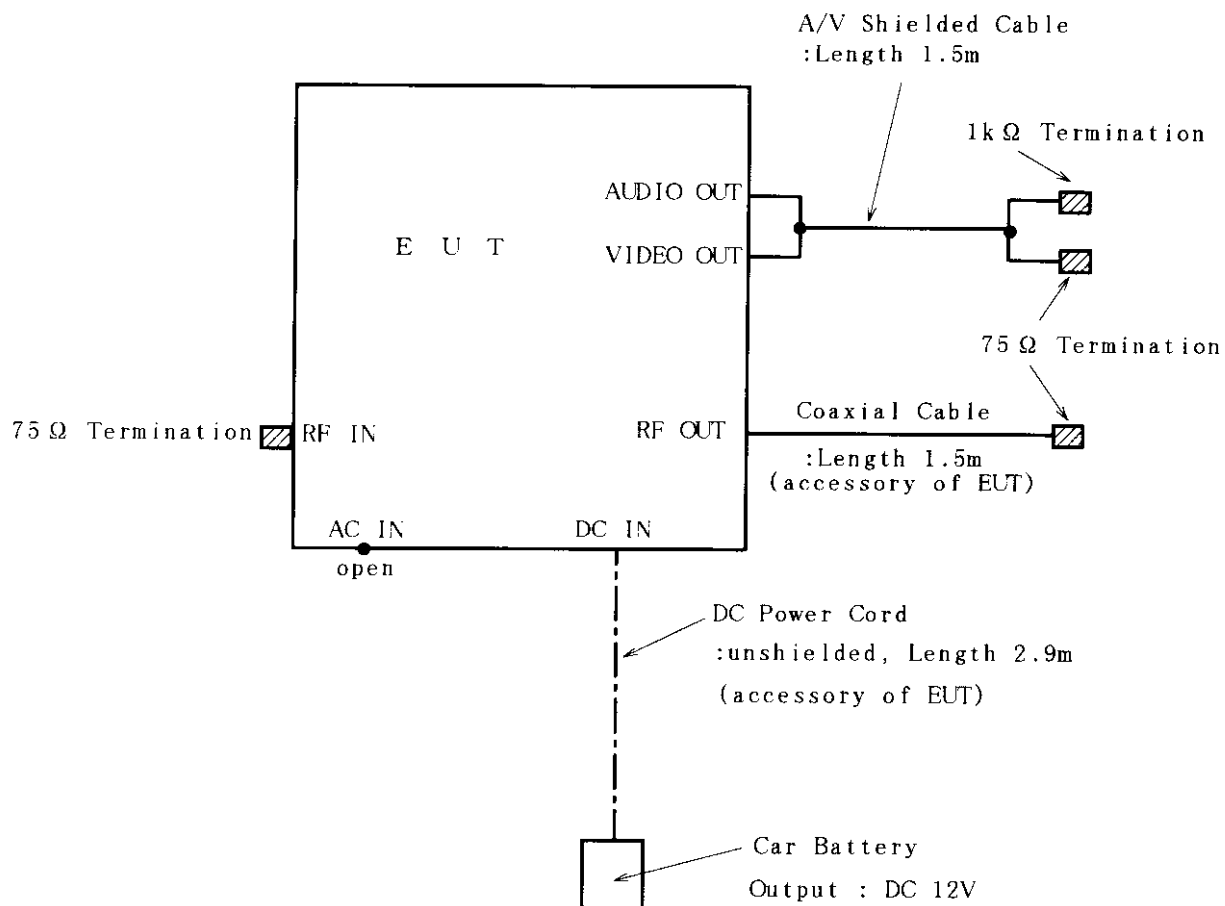
2.2 Block Diagram of EUT System for Conducted and Radiated Emission Measurements



ENGINEERING TEST REPORT

- Continued -

DC Power Operation Mode
(Only Radiated Emission Measurement)



ENGINEERING TEST REPORT**3. AC POWER LINE CONDUCTED EMISSION MEASUREMENT****3.1 Reference Rule and Specification**

FCC Rule Part 15, Section 15.107(a).

3.2 Test Procedure

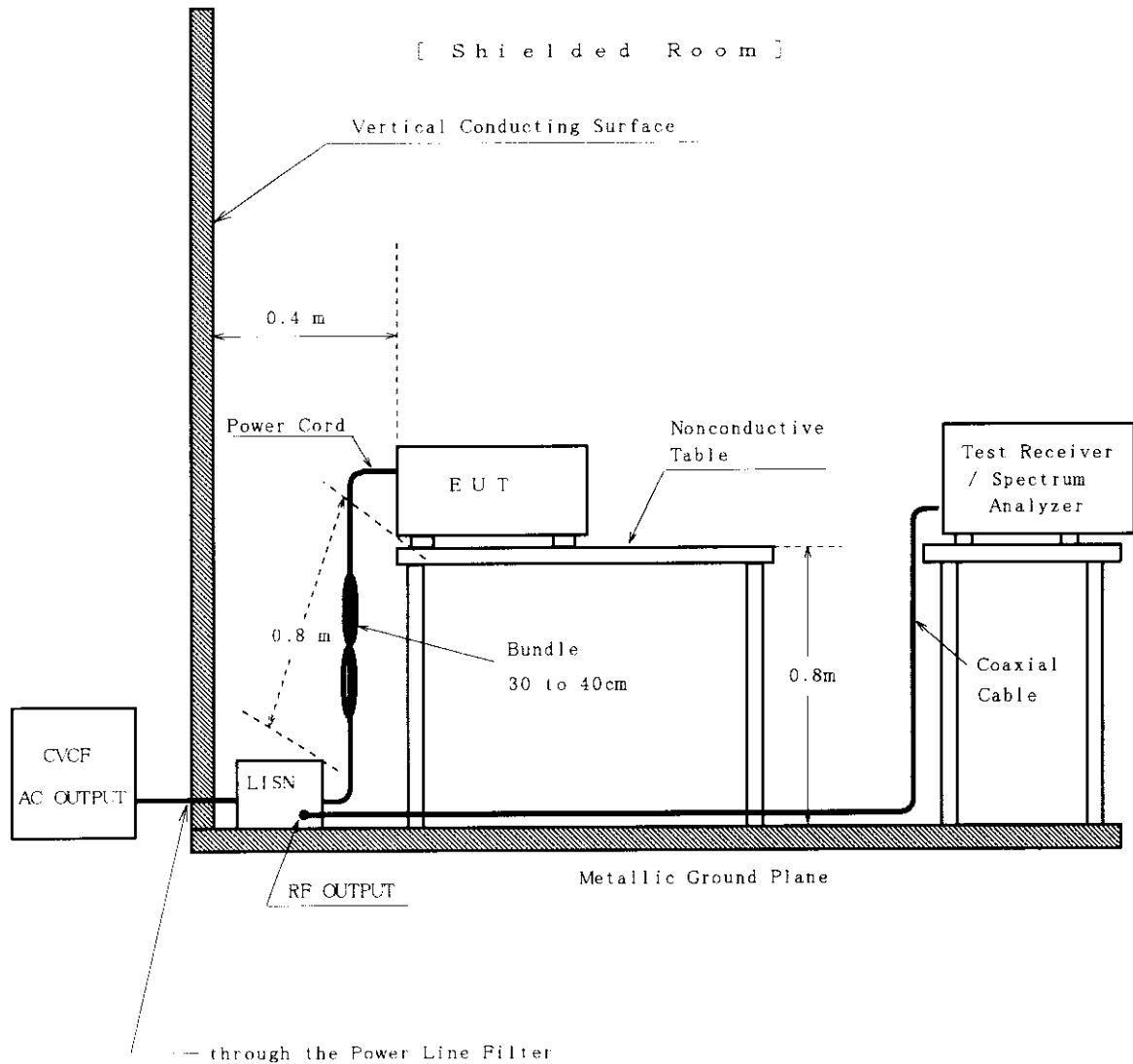
- 1) Configure the EUT System in accordance with ANSI C63.4-1992 section 7.
See also the block diagram and the photographs of EUT System configuration in this report.
- 2) Connect the EUT's AC power cord to one Line Impedance Stabilization Network(LISN).
- 3) Any other equipment power cord are connected to a LISN different from the LISN used for the EUT.
- 4) Warm up the EUT System.
- 5) Activate the EUT System and run the software prepared for the test, if require.
- 6) Using a calibrated coaxial cable, connect the spectrum analyzer(*1) to the measuring port of the LISN for the EUT.
- 7) To find out an EUT System condition produces the maximum emission, change the position of the cables, and the EUT operation mode under normal usage of the EUT.
- 8) The spectrum are scanned from 450 kHz to 30 MHz and collect the minimum six highest emissions on the spectrum analyzer relative to the total limits.
- 9) The test receiver(*2) is connected to the LISN for the EUT, and the minimum six highest emissions recorded above are measured.

[Note]**(*1) : Spectrum Analyzer Set Up Conditions**

Frequency range	: 450 kHz - 30 MHz
Resolution bandwidth	: 10 kHz
Video bandwidth	: 1 MHz
Detector function	: Peak mode

(*2) : Test Receiver Set Up Conditions

Detector function	: Quasi-Peak / Average (if necessary)
IF bandwidth	: 10 kHz

ENGINEERING TEST REPORT**3.3 Test Configuration**

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3.5 Test Results

Emission Frequency [MHz]	LISN Corr. Factor [dB]	Meter Reading		Maximum RF Voltage [dB μ V]	Limit [dB μ V]
		One-end to Ground [dB μ V]	Other-end to Ground [dB μ V]		
<u>Test Channel #3</u>					
0.5242	0.1	26.7	29.8	29.9	48.0
0.6556	0.1	24.8	29.5	29.6	48.0
0.7836	0.1	24.3	31.8	31.9	48.0
1.435	0.1	28.9	23.1	29.0	48.0
18.38	0.8	16.5	27.3	28.1	48.0
20.50	0.9	18.3	27.6	28.5	48.0

[Environment]

Temperature : 22 °C Humidity : 75 %

[Note]

- 1) LISN Correction Factor includes the cable loss.
- 2) The emissions at channel #3 were nearly equal to channel #4.

[Sample calculation]

Frequency : 0.5242 [MHz]
 Meter Reading : 29.8 [dB μ V] (at Other-end to Ground)
 LISN Corr. Factor : 0.1 [dB]

Then, RF voltage is calculated as follows.

$$\text{RF Voltage} = 29.8 + 0.1 = 29.9 \text{ [dB}\mu\text{V]}$$

[Summary of Test Results]

Minimum margin was 16.1 dB at 0.7836 MHz, other-end to ground.

Tested Date : May 11, 1998

Signature

Y. Kotani
 Yoshiko Kotani

ENGINEERING TEST REPORT**4. RADIATED EMISSION MEASUREMENT****4.1 Reference Rule and Specification**

FCC Rule Part 15, Section 15.109(a),(c) and 15.115(a).

4.2 Test Procedure

- 1) Configure the EUT System in accordance with ANSI C63.4-1992 section 8.
See also the block diagram and the photographs of EUT System configuration in this report.
- 2) If the EUT system is connected to a public power network, all power cords for the EUT System are connected the receptacle on the turn floor.
- 3) Warm up the EUT System.
- 4) Activate the EUT System and run the prepared software for the test, if require.
- 5) To find out the emissions of the EUT System, preliminary radiated measurement are performed at a closer distance than that specified for final radiated measurement using the spectrum analyzer(*1) or the spectrum monitor receiver(*2), and the broad band antenna.
- 6) To find out an EUT System condition produces the maximum emission, change the position of the cables, and the EUT operation mode under normal usage of the EUT.
- 7) The spectrum are scanned from 30 MHz to 1 GHz and collect the minimum six highest emissions on the spectrum analyzer relative to the total limits.
- 8) In final compliance test, the minimum six highest emissions recorded above are measured at the specified distance using the broad band antenna or the tuned dipole antenna and the test receiver(*3).

[Note]**(*1) : Spectrum Analyzer Set Up Conditions**

Frequency range : 30 - 1000 MHz
Resolution bandwidth : 100 kHz
Detector function : Peak mode

(*2) : Spectrum Monitor Receiver Set Up Conditions

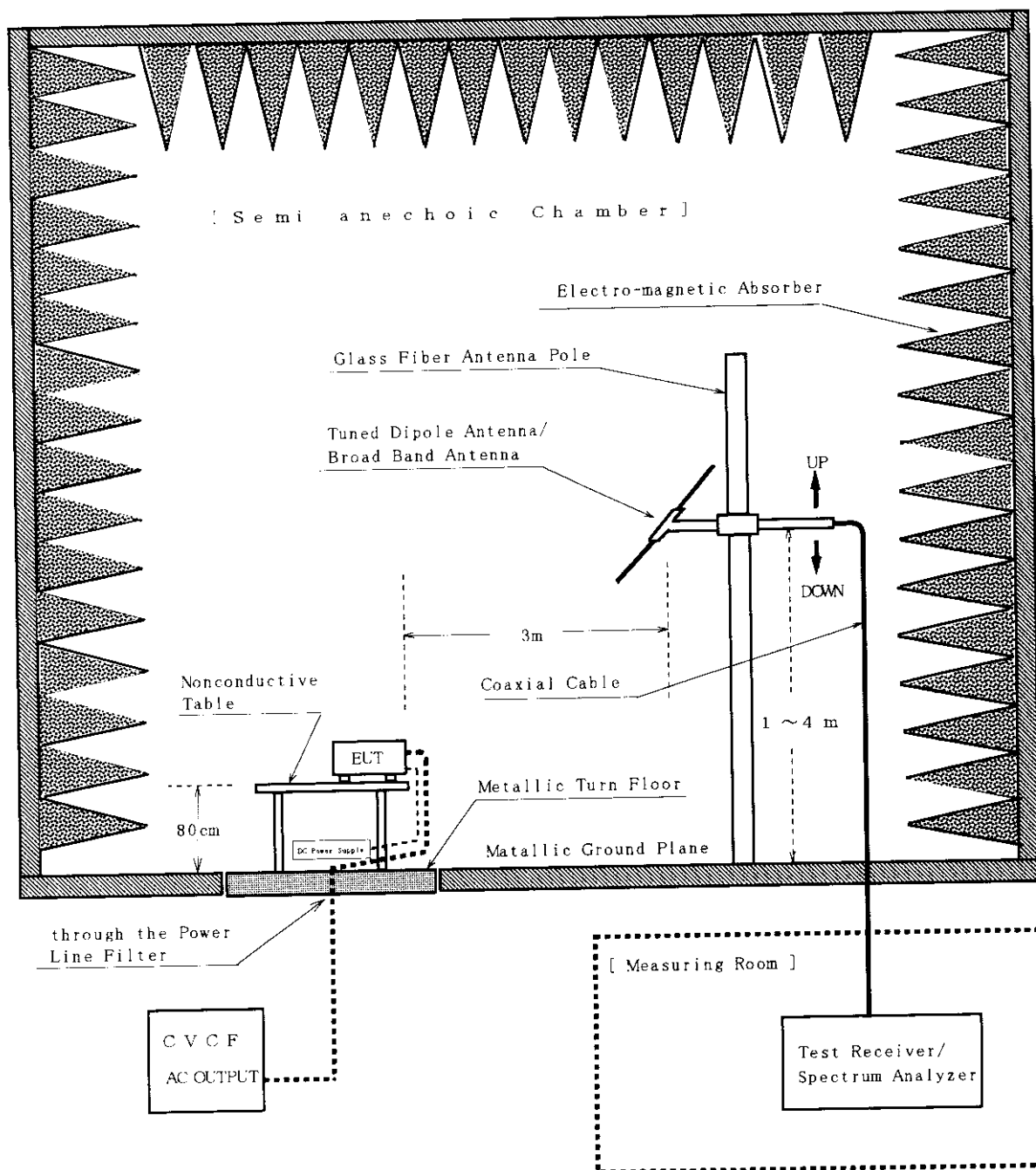
Frequency range : 30 - 1000 MHz
Function set up : RF Analysis mode

(*3) : Test Receiver Set Up Conditions

Detector function : Quasi-Peak
IF bandwidth : 120 kHz

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4.3 Test Configuration



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4.5 Test Results

[Distance : 3 m]

Emission Frequency [MHz]	Antenna	Meter Reading		Maximum Field Strength [dBμV/m]	Limits [dBμV/m]
	Factor [dB]	Horizontal Polarization [dBμV]	Vertical Polarization [dBμV]		
Test Channel #3					
61.25	10.3	3.0	<0.0	13.3	40.0
65.75	9.8	0.3	<0.0	10.1	40.0
122.50	16.7	<0.0	<0.0	<16.7	43.5
245.00	22.6	<0.0	<0.0	<22.6	46.0
Test Channel #4					
67.25	9.6	<0.0	<0.0	<9.6	40.0
71.75	9.4	<0.0	<0.0	<9.4	40.0
134.50	17.7	<0.0	<0.0	<17.7	43.5
201.75	21.5	<0.0	<0.0	<21.5	43.5
Other Emissions					
33.00	18.3	<0.0	0.4	18.7	40.0
39.30	15.8	<0.0	2.1	17.9	40.0
62.51	10.2	7.8	2.0	18.0	40.0
85.93	10.5	6.0	12.9	23.4	40.0
87.00	10.7	4.7	9.2	19.9	40.0
111.26	15.1	8.2	<0.0	23.3	43.5
114.55	15.6	11.7	6.0	27.3	43.5
143.18	18.4	3.4	<0.0	21.8	43.5
171.83	20.3	7.2	4.6	27.5	43.5

ENGINEERING TEST REPORT

- Continued -

[Environment]

Temperature : 25 °C Humidity : 61 %

[Note]

Antenna factor includes the cable loss.

[Sample calculation]

Frequency : 61.25 [MHz] (Test Channel #3)
Meter Reading : 3.0 [dB μ V] (at Horizontal Polarization)
Antenna Factor : 10.3 [dB]

Then, Field Strength is calculated as follows.

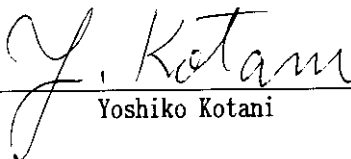
Field Strength = 3.0 + 10.3 = 13.3 [dB μ V/m]

[Summary of Test Results]

Minimum margin was 16.0 dB at 171.83 MHz, other emissions : horizon. polarization.

Tested Date : May 6, 1998

Signature


Yoshiko Kotani

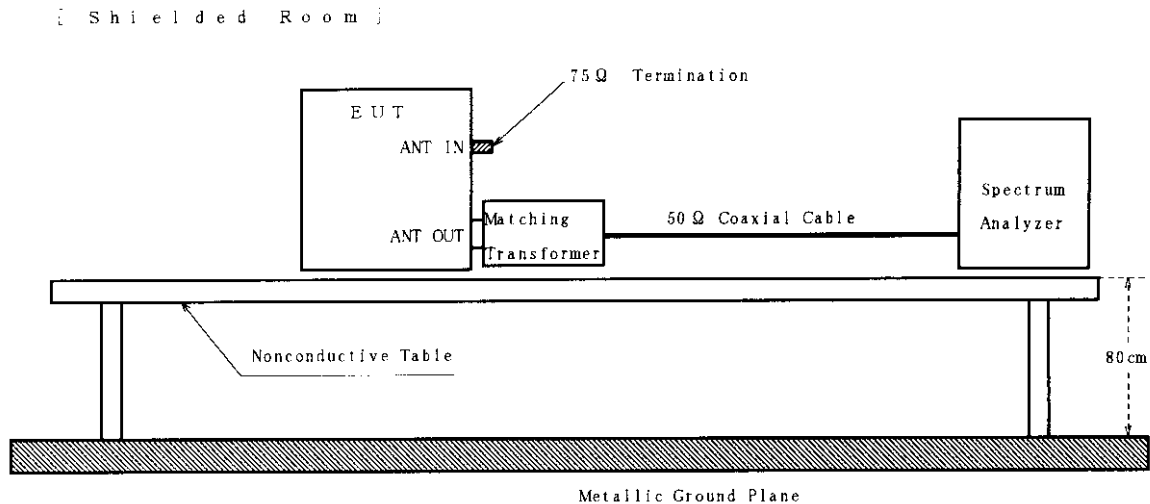
ENGINEERING TEST REPORT**5. OUTPUT SIGNAL LEVEL MEASUREMENT****5.1 Reference Rule and Specification**

FCC Rule Part 15, Section 15.115(b)(1)(ii).

5.2 Test Procedure

- 1) Configure the EUT System in accordance with ANSI C63.4-1992 section 12.2.
- 2) Unused RF input/output terminals are terminated in the proper impedance.
- 3) Activate the EUT system.
- 4) Set the spectrum analyzer as follows.

Frequency Span : 1 MHz
Resolution bandwidth : 100 kHz
Video bandwidth : 3 MHz
Detector function : Peak mode
- 5) The RF output terminal is connected to the spectrum analyzer through the matching transformer with a calibrated 50 ohms coaxial cable.
- 6) Then, the RF output signal level is measured under the EUT condition produced the maximum signal level.

5.3 Test Configuration

ENGINEERING TEST REPORT

5.5 Test Results

Emission Frequency [MHz]	Corr. Factor [dB]	Meter Reading [dB μ V/50 Ω]	Maximum Signal Level [dB μ V/75 Ω]	Limits [dB μ V/75 Ω]
<u>Test Channel #3</u>				
61.25	2.3	64.8	67.1	69.5
65.75	2.3	47.7	50.0	56.5
<u>Test Channel #4</u>				
67.25	2.3	64.6	66.9	69.5
71.75	2.3	47.0	49.3	56.5

[Environment]

Temperature : 22 °C Humidity : 75 %

[Note]

- 1) The emission were checked under two power supply mode (AC power supply and DC power supply), and maximum emission were reported at each frequencies.
- 2) The correction factor consist of the voltage loss of the impedance matching transformer and the coaxial cable used for the test.

[Sample Calculation]

Frequency : 61.25 [MHz] (Test Channel #3)
 Meter Reading : 64.8 [dB μ V/50 Ω]
 Correction Factor : 2.3 [dB]

Then, the output signal level is calculated as follows.

$$\text{Signal Level} = 64.8 + 2.3 = 67.1 \text{ [dB}\mu\text{V/75}\Omega\text{]}$$

[Summary of Test Results]

Minimum margin was 2.4 dB at 61.25 MHz, test channel #3.

Tested Date : May 11, 1998

Signature

Y. Kotani
 Yoshiko Kotani

ENGINEERING TEST REPORT**6. OUTPUT TERMINAL CONDUCTED SPURIOUS EMISSION MEASUREMENT****6.1 Reference Rule and Specification**

FCC Rule Part 15, Section 15.115(b)(2)(ii).

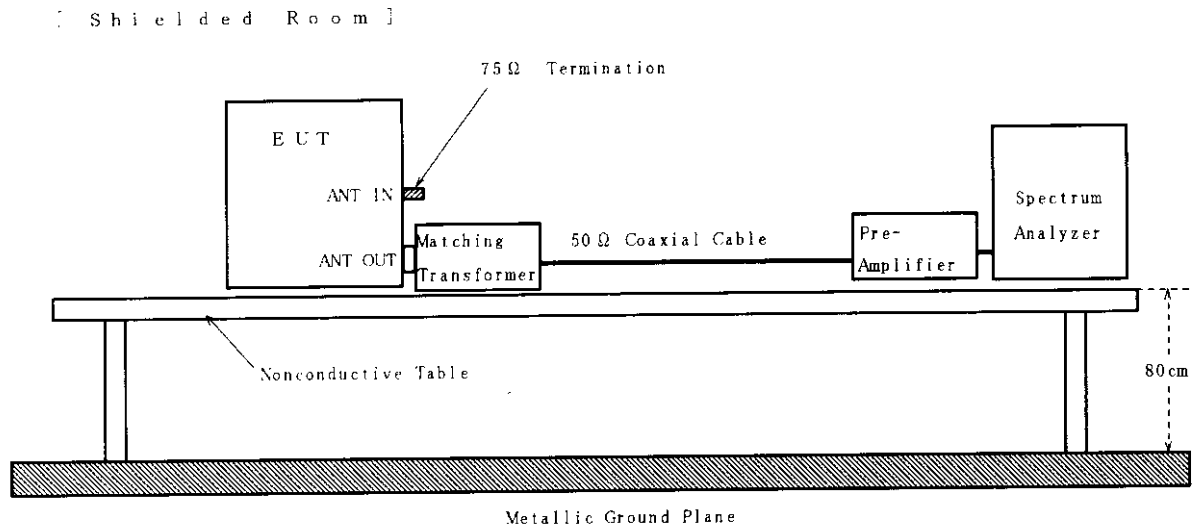
6.2 Test Procedure

- 1) The EUT system and measuring instrument are set up in the same manner of the output signal measurement.
- 2) Unused RF input/output terminals are terminated in the proper impedance.
- 3) Activate the EUT system.
- 4) The spectrum was scanned from 30 MHz to more than 4.6 MHz below the visual carrier frequency, and from more than 7.4 MHz above the visual carrier frequency to 1000 MHz, and the three highest emissions are selected under the EUT condition produced the maximum signal level at each frequency range.
- 5) The selected emissions are measured.
The spectrum analyzer is set as follow.

Frequency span	: 1 MHz
Resolution bandwidth	: 100 kHz
Video bandwidth	: 3 MHz
Detector function	: Peak mode

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6.3 Test Configuration



6.4 Photographs of EUT System Configuration

The tested device configuration is the same as the output signal level measurement. (See 5.4 Photographs of EUT System Configuration.)

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6.5 Test Results

Emission Frequency [MHz]	Corr. Factor [dB]	Meter Reading [dB μ V/50 Ω]	Maximum Signal Level [dB μ V/75 Ω]	Limit [dB μ V/75 Ω]
<u>Test Channel #3</u>				
47.79	2.3	20.1	22.4	39.5
54.13	2.3	13.0	15.3	39.5
56.65	2.3	33.4	35.7	39.5
68.65	2.3	10.9	13.2	39.5
74.79	2.3	19.0	21.3	39.5
122.58	2.3	19.0	21.3	39.5
** 56.65	2.3	8.4	10.7	39.5
<u>Test Channel #4</u>				
44.79	2.3	11.4	13.7	39.5
53.79	2.3	20.0	22.3	39.5
62.65	2.3	33.8	36.1	39.5
80.78	2.3	18.0	20.3	39.5
134.57	2.3	15.1	17.4	39.5
336.43	2.3	8.4	10.7	39.5
** 62.65	2.3	3.4	5.7	39.5

ENGINEERING TEST REPORT

- Continued -

[Environment]

Temperature : 22 °C Humidity : 75 %

[Note]

- 1) The emission were checked under two power supply mode (AC power supply and DC power supply), and maximum emission were reported at each frequencies.
- 2)** : To except the effect of lower sideband of sound sub-carrier frequency component, if set the resolution bandwidth of spectrum analyzer to 30 kHz, these interference become to this value.
- 3) The correction factor consist of the voltage loss of the impedance matching transformer and the coaxial cable used for the test. And the meter readings descrived above are corrected by the gain of pre-amplifier.

[Sample Calculation]

Frequency : 47.79 [MHz] (Test Channel #3)
Meter Reading : 20.1 [dB μ V/50 Ω]
Correction Factor : 2.3 [dB]

Then, the emission level is calculated as follows.

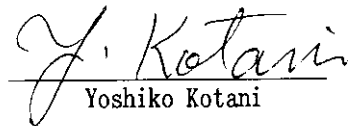
Signal Level = 20.1 + 2.3 = 22.4 [dB μ V/75 Ω]

[Summary of Test Results]

Minimum margin was 17.1 dB at 47.79 MHz, test channel #3.

Tested Date : May 11, 1998

Signature

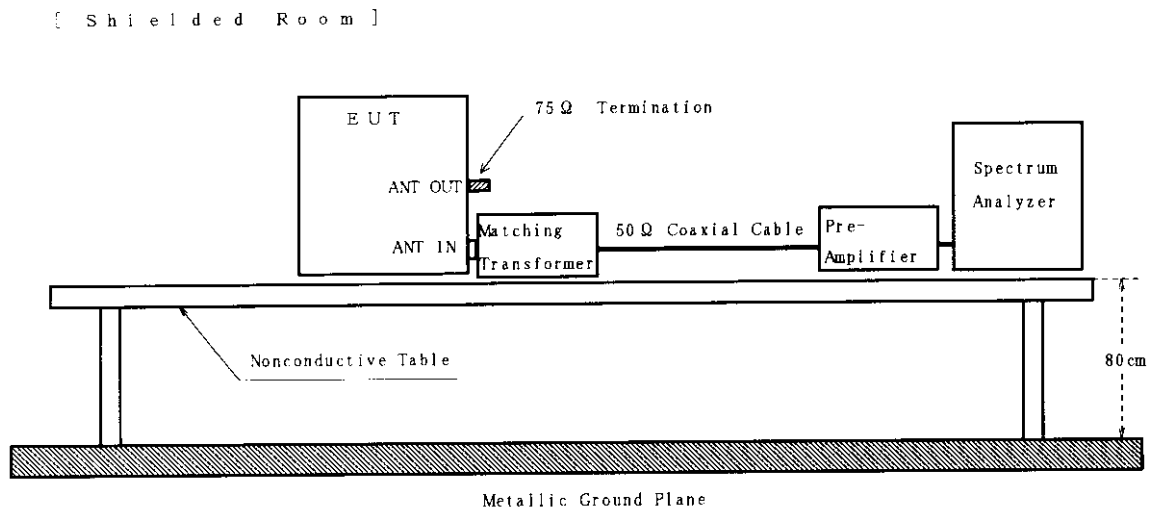

Yoshiko Kotani

ENGINEERING TEST REPORT**7. TRANSFER SWITCH MEASUREMENT****7.1 Reference Rule and Specification**

FCC Rule Part 15, Section 15.115(c)(1)(ii).

7.2 Test Procedure

- 1) Configure the EUT System in accordance with ANSI C63.4-1992 section 12.2.
- 2) Activate the EUT system.
- 3) Unused RF output terminal is terminated in the proper impedance.
- 4) Set the spectrum analyzer as follows.
 - Frequency Span : 1 MHz
 - Resolution bandwidth : 100 kHz
 - Video bandwidth : 3 MHz
 - Detector function : Peak mode
- 5) The antenna input terminal is connected to the input of pre-amplifier through the matching transformer with a calibrated 50 ohms coaxial cable. And the output of pre-amplifier is connected to the spectrum analyzer.
- 6) Then, the signal level on the antenna input terminal is measured under the EUT condition produced the maximum signal level.

7.3 Test Configuration

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7.5 Test Results

Emission Frequency [MHz]	Corr. Factor [dB]	Meter Reading [dB μ V/50 Ω]	Maximum Signal Level [dB μ V/75 Ω]	Limit [dB μ V/75 Ω]
<u>Test Channel #3</u>				
61.25	2.3	1.0	3.3	9.5
<u>Test Channel #4</u>				
67.25	2.3	0.8	3.1	9.5

[Environment]

Temperature : 22 °C Humidity : 75 %

[Note]

- 1) The emission were checked under two power supply mode (AC power supply and DC power supply), and maximum emission were reported at each frequencies.
- 2) The correction factor consist of the voltage loss of the impedance matching transformer and the coaxial cable used for the test. And the meter readings descrived above are corrected by the gain of pre-amplifier.

[Sample Calculation]

Frequency : 61.25 [MHz] (Test Channel #3)
 Meter Reading : 1.0 [dB μ V/50 Ω]
 Correction Factor : 2.3 [dB]

Then, the signal level is calculated as follows.

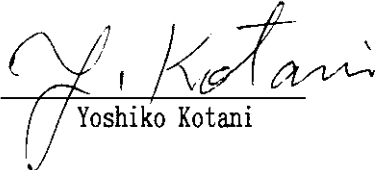
$$\text{Signal Level} = 1.0 + 2.3 = 3.3 \text{ [dB}\mu\text{V/75}\Omega\text{]}$$

[Summary of Test Results]

Minimum margin was 6.2 dB at 61.25 MHz, test channel #3.

Tested Date : May 11, 1998

Signature


 Yoshiko Kotani

ENGINEERING TEST REPORT

8. LIST OF TEST INSTRUMENTS

Instrument	Manufacturer	Model No	Specifications	KEC Control No.	Test Item	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESH3	Frequency Range 9 kHz - 30 MHz	FS-48-2	3	1997/6	1998/6
		ESVS10	Frequency Range 20 MHz - 1 GHz	FS-60	4	1997/5	1998/5
Spectrum Analyzer	Hewlett Packard	8568B	Frequency Range 50 Hz - 1.5 GHz	FS-46-3	3,5, 6,7	1997/6	1998/6
	Rohde & Schwarz	FSA	Frequency Range 100 Hz - 1.8 GHz	SA-35	4	1997/6	1998/6
Spectrum Monitor Receiver	Rohde & Schwarz	ESU2	Frequency Range 25 MHz - 1 GHz	FS-80	—	1997/6	1998/6
Pre-Amplifier	Anritsu	MH648A	Frequency Range 100 kHz - 1.2 GHz	AM-28	6,7	1997/6	1998/6
Line Impedance Stabilization Network	Kyoritsu	KNW-407	Frequency Range 150 kHz - 30 MHz Impedance 50 Ω / 50 μ H Capacity AC250V, 15A	FL-107	3	1998/4	1999/4
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30 MHz - 300 MHz	AN-219	4	1998/2	1999/2
Log-Periodic Antenna	Schwarzbeck	UHALP 9108A	Frequency Range 300 MHz - 1 GHz	AN-218	4	1998/2	1999/2
Turned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Range 25 MHz - 500 MHz	AN-132	—	1998/2	1999/2
		KBA-611S	Frequency Range 500 MHz - 1 GHz	AN-8-11	—	1998/2	1999/2
Matching Transformer	Anritsu	MG614A	Frequency Range 10 MHz - 1.2 GHz	AX-28-2	5,6,7	1997/11	1998/11