

Designated by Ministry of international Trade and industry

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

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Corporate Juridical Person

IKOMA TESTING LABORATORY
12128 TAKAYAMA-CHO
IKOMA-CITY NARA 630-0101 JAPAN

TEST REPORTReport No.A-034-99-C

Date: 8 October 1999

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.

All 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

Type of Device : TV Interface Device

Kind of Equipment Authorization : ☐: DoC ☒: Certification ☐: Verification

FCC ID : A7RM4C6B

Device Name : VIDEO CASSETTE PLAYER

Trade Name : ORION

Model Number : VP-L1

Serial Number : ID-112-1260 ☐: Prototype ☒: Pre-production ☐: Production

Date of Manufacture : September 1999

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

☒: without deviation, ☐: with deviation(details are found inside of this report)**4. Date of Test**

Receipt of Test Sample : 16 September 1999

Test Completed on : 4 October 1999

Fumitoshi Nagaoka
Associate Director/ Ikoma Testing Laboratory

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0. NVLAP ACCREDITATION AND MEASUREMENT UNCERTAINTY

0.1. NVLAP Accreditation

KEC is accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code: 200207-0.

When a test report concerns with the NVLAP Accreditation test, the first page of the test report is signed by NVLAP Approved Signatory together with the expression.

The report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

0.2. Measurement Uncertainty

The result of a measurement is only an approximation or estimate of the value of a specific quantity. And thus the measurand is complete only when a statement of uncertainty is given.

KEC quotes Measurement Uncertainty (U)

of +/- 4.9 dB for Radiated Emissions

of +/- 2.2 dB for Conducted Emissions

of +/- 1.5 dB for Output Signal Level

of +/- 2.6 dB for Output Terminal Conducted Spurious Emission and

of +/- 2.2 dB for Transfer Switch Measurement.

1. CERTIFICATION OF THE COMPLIANCE

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.

KEC evaluation criteria for compliance:

The Product complies, if

the measured results are below the specification limit by a margin more than or equal to

1/2 U (2.5 dB) for Radiated Emissions

U (2.2 dB) for Conducted Emissions

U (1.5 dB) for Output Signal Level

U (2.6 dB) for Output Terminal Conducted Spurious Emission and

U (2.2 dB) for Transfer Switch Measurement.

2. GENERAL INFORMATION

2.1. Product Description

The ORION Model No.VP-L1 (referred to as the EUT in this report) is a Video Cassette Player containing RF modulator.

(1) Specification

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

(2) Provided terminal

- ANT Input Terminal
- ANT Output Terminal
- A/V Input Terminal
- A/V Output Terminal
- AC Input
- DC Input

(3) Used Oscillating Frequencies

- 10 MHz : System Control/Servo Control Microcomputer Clock
- 3.579545 MHz : Chrominance Subcarrier Oscillator
- 180 kHz – 300 kHz : Switching Frequency of Power Supply

(4) Rated Power Supply : AC 120 V, 60 Hz / DC 13.2 V

2.2. Description for Equipment Authorization

(1) Type of device	: ☒ TV Interface Device
(2) Reference Rule and Specification	: FCC Rule Part 15 ☒ Section 15.107 (a) ☒ Section 15.109 (a)(c) and Section 15.115 (a) ☒ Section 15.115 (b)(1)(ii),(b)(2)(ii) and(c)(1)(ii)
(3) Kind of Equipment Authorization	: ☐ DoC ☒ Certification ☐ Verification
(4) Procedure of Application	: ☒ Original Equipment ☐ Modification
(5) Highest Frequency used in the Device	: 71.75 MHz
(6) Upper Frequency of Radiated Emission Measurement Range	: ☒ 1000 MHz ☐ 2000 MHz ☐ 5000 MHz

2.3. Test Facility

All tests described in this report were performed by:	
Name:	KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC) IKOMA TESTING LABORATORY
Open Area Test Site	☐ No.1 ☐ No.2 ☐ No.3 ☐ No.4
EMC M.C. Anechoic Chamber	☒ No.1
Shielded Room	☐ No.2 ☒ No.4 ☐ EMC M.C. Shielded Room
Address:	12128, Takayama-cho Ikoma-city, Nara, 630-0101 Japan
These test facilities have been filed with the FCC under the criteria of ANSI C63.4-1992. The Open Area Test Site No.4, EMC MC. Anechoic Chamber No.1, Shielded Room No.4 and EMC MC. Shielded Room have 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 International, (UK), TUV Product Service (GER) and TUV Rheinland (GER) based on their criteria for testing laboratory (EN45001).	

3. TESTED SYSTEM

3.1. Test Mode

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

Test of External Signal Input Mode is not performed. Because, the signal injected in A/V Input Terminal is only fed to A/V Output Terminal, and is not fed to RF Modulator.

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

3.2. Operation of EUT System

Playback mode

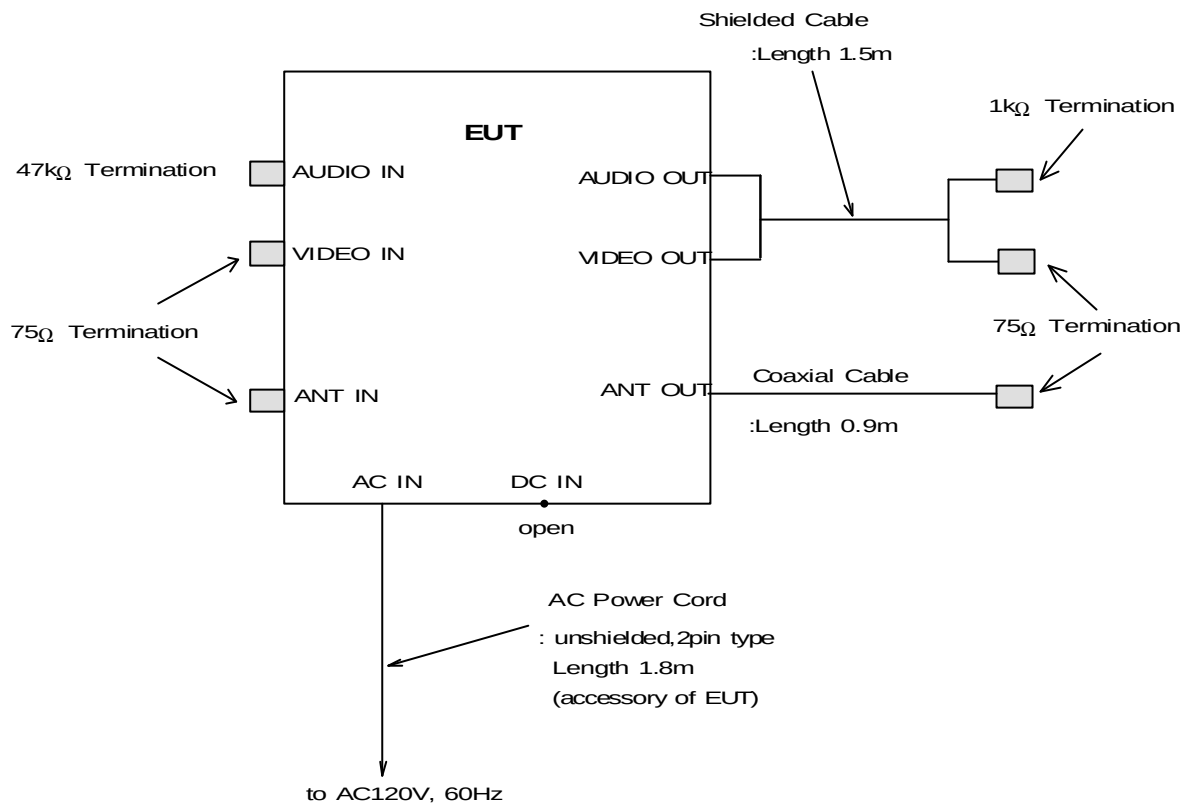
Playback the video tape that is recorded 1V peak-to-peak VITS signal.

3.3. Characterization and condition of EUT System

☒ : normal , ☐ : not normal (that is)

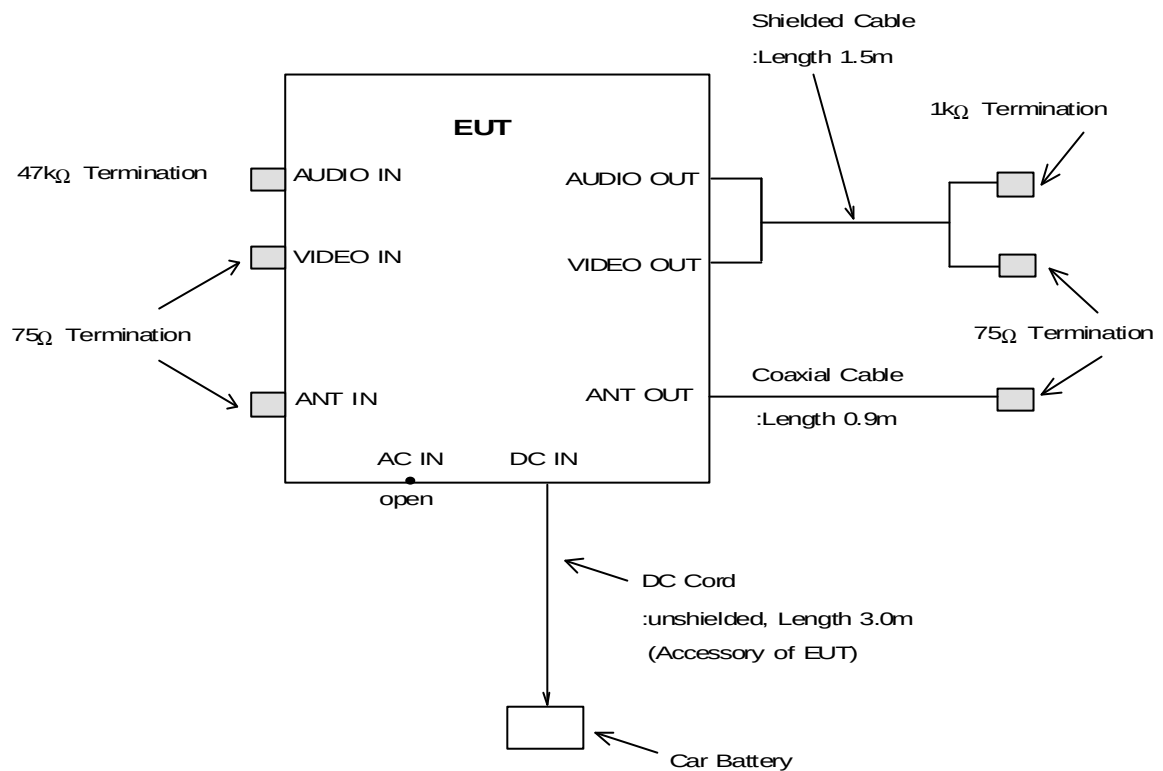
3.4. Block Diagram of EUT System (for Conducted and Radiated Emission Measurements)

AC Power Operation Mode



- Continued -

DC Power Operation Mode
(Excluding conducted Emission Measurement)



4. AC POWER LINE CONDUCTED EMISSION MEASUREMENT

4.1. Test Procedure

(1) (2) (3) (4) (5) (6) (7) (8) (9)	Configure the EUT System in accordance with ANSI C63.4-1992 section 7. ☒: without deviation, ☐: with deviation(details are found below) See also the block diagram and the photographs of EUT System configuration in this report. Connect the EUT's AC power cord to one Line Impedance Stabilization Network (LISN). Any other power cord of other equipment is connected to a LISN different from the LISN used for the EUT. Warm up the EUT System. Activate the EUT System and run the software prepared for the test, if necessary. Connect the spectrum analyzer (*1) to the measuring port of the LISN for the EUT, using a calibrated coaxial cable. To find out an EUT System condition, which produces the maximum emission, the configuration of EUT System, the position of the cables, and the operation mode, are changed under normal usage of the EUT. The spectrums are scanned from 450 kHz to 30 MHz and collect the six highest emissions minimum on the spectrum analyzer relative to the limits in the whole range. The test receiver (*2) is connected to the LISN for the EUT, and the six highest emissions minimum recorded above are measured.
(*1) (*2)	[Note] Spectrum Analyzer Set Up Conditions Frequency range : 450 kHz - 30 MHz Resolution bandwidth : 10 kHz Video bandwidth : 1 MHz Detector function : Peak mode Test Receiver Set Up Conditions Detector function : Quasi-Peak/ Average (if necessary) IF bandwidth : 10 kHz

4.2. Test Results

Measured Frequency (MHz)	LISN Factor (dB)	Meter Reading		Maximum RF Voltage (dBm V)	Limits (dBm V)	Margin for Limits (dB)
		Va (dBm V)	Vb (dBm V)			
0.450	0.3	33.3	32.9	33.6	48.0	14.4
1.254	0.3	22.2	22.2	22.5	48.0	25.5
1.910	0.3	31.1	35.1	35.4	48.0	12.6
7.251	0.5	25.5	27.0	27.5	48.0	20.5
28.250	1.3	28.0	32.8	34.1	48.0	13.9
29.999	1.3	31.1	34.2	35.5	48.0	12.5

[Calculation method]

Maximum RF Voltage (dBμV)

= Meter Reading (at maximum level of Va, Vb) + LISN Factor (dB)

[Note]

- (1) LISN Correction Factor includes the cable loss.
- (2) The emissions at channel #3 were nearly equal to channel #4.
- (3) The spectrum was checked in each test mode and operation mode, and the data of the maximum EUT operation was reported.

[Environment]

Temperature 23°C

Humidity 62%

[Tested Date / Tester]

4 October 1999

Signature



Yoshiko Kotani

4.3. Photographs of EUT System Configuration

FRONT VIEW



REAR VIEW



5. RADIATED EMISSION MEASUREMENT

5.1. Test Procedure

(1) (2) (3) (4) (5) (6) (7) (8)	Configure the EUT System in accordance with ANSI C63.4-1992 section 8. ☒: without deviation, ☐: with deviation(details are found below) See also the block diagram and the photographs of EUT System configuration in this report. If the EUT system is connected to a public power network, all power cords for the EUT System are connected the receptacle on the turntable. Warm up the EUT System. Activate the EUT System and run the prepared software for the test, if necessary. 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) and the broad band antenna. In the frequency above 1 GHz, it is performed using the spectrum analyzer (*2) and the horn antenna. To find out an EUT System condition, which produces the maximum emission, the configuration of EUT System, the position of the cables, and the operation mode, are changed under normal usage of the EUT. The spectrums are scanned from 30 MHz to the upper frequency of measurement range, and collect the six highest emissions minimum on the spectrum analyzer relative to the limits in the whole range. In final compliance test, the six highest emissions minimum, recorded above, are measured at the specified distance using the broad band antenna or the tuned dipole antenna and the test receiver (*3). In the frequency above 1 GHz, the measurements are performed by the horn antenna and ☐ the test receiver (*4). ☐ the spectrum analyzer(*2) with pre-amplifier.
[Note] (*1) (*2) (*3) (*4)	Spectrum Analyzer Set Up Conditions Frequency range : 30 - 1000 MHz Resolution bandwidth : 100 kHz Detector function : Peak mode Spectrum Analyzer Set Up Conditions Frequency range : 1 GHz - Upper frequency of measurement range Resolution bandwidth : 1 MHz Video bandwidth : 1 MHz Attenuator : 10 dB Detector function : Peak mode Test Receiver Set Up Conditions Frequency range : 30 - 1000 MHz Detector function : Quasi-Peak IF bandwidth : 120 kHz Test Receiver Set Up Conditions Frequency range : 1 GHz - Upper frequency of measurement range Detector function : Average IF bandwidth : 1 MHz

5.2. Test Results

Measurement Distance ☒: 3m ☐: 10m

Measured Frequency	Antenna Factor	Meter Reading		Maximum Field Strength	Limits	Margin for Limits
		Horizontal	Vertical			
(MHz)	(dB)	(dBuV)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)
Test Channel #3						
61.25	10.0	<0.0	0.8	10.8	40.0	29.2
65.75	9.5	<0.0	<0.0	<9.5	40.0	>30.5
122.50	16.0	<0.0	<0.0	<16.0	43.5	>27.5
245.00	21.7	<0.0	<0.0	<21.7	46.0	>24.3
Test Channel #4						
67.25	9.3	5.4	2.1	14.7	40.0	25.3
71.75	8.9	9.6	8.5	18.5	40.0	21.5
134.50	17.2	<0.0	<0.0	<17.2	43.5	>26.3
201.75	20.7	<0.0	<0.0	<20.7	43.5	>22.8
Other emissions						
32.64	18.1	<0.0	7.3	25.4	40.0	14.6
42.95	14.3	8.9	14.4	28.7	40.0	11.3
47.88	12.7	<0.0	11.9	24.6	40.0	15.4
50.00	12.1	<0.0	8.6	20.7	40.0	19.3
74.49	8.9	15.1	15.1	24.0	40.0	16.0
85.90	10.1	10.1	18.6	28.7	40.0	11.3
97.27	12.6	3.5	11.7	24.3	43.5	19.2
183.25	20.0	6.2	2.6	26.2	43.5	17.3
200.44	20.7	5.6	1.0	26.3	43.5	17.2
214.78	21.0	8.0	1.1	29.0	43.5	14.5
229.10	21.3	7.0	1.2	28.3	46.0	17.7

[Note]

- (1) Antenna Factor includes the cable loss.
 (2) * mark in Measured Frequency : Measured with the tuned dipole antenna.
 no mark in Measured Frequency : Measured with the broadband antenna.
 (3) The spectrum was checked in each test mode and operation mode, and the data of the maximum EUT operation was reported.

[Calculation method]

Maximum Field Strength (dBuV/m)
 = Meter Reading (at maximum level of Horizontal or Vertical) (dBuV) + Antenna Factor (dB)

[Environment]

Temperature: 27°C

Humidity: 63%

[Tested Date/ Tester]

1 October 1999

Signature

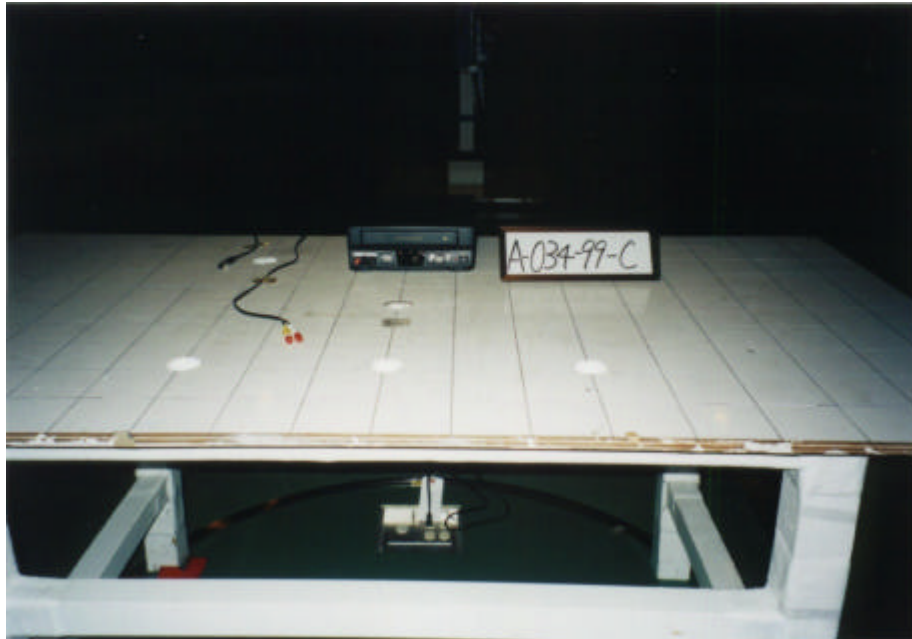


Yoshiko Kotani

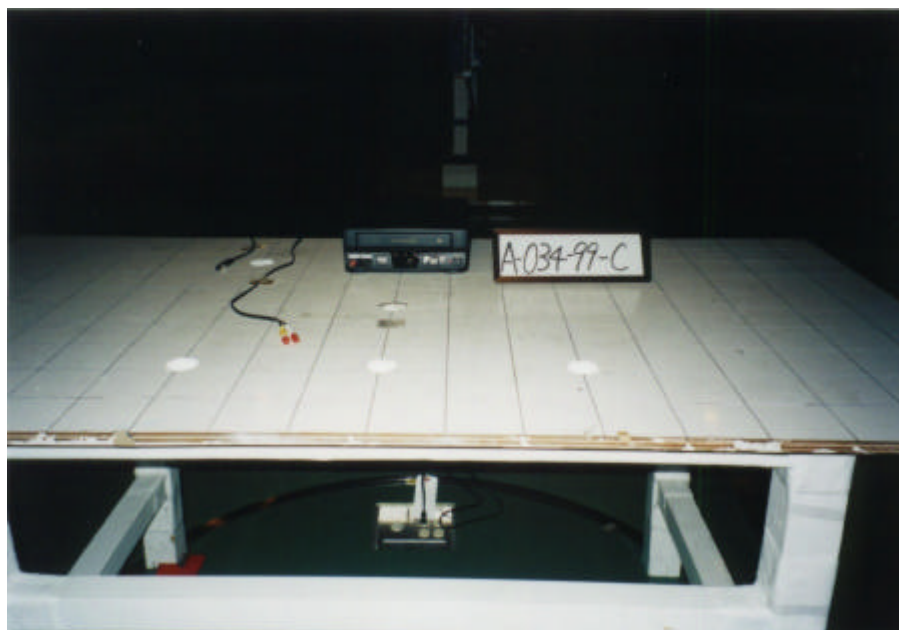
5.3. Photographs of EUT System Configuration

AC Power Operation Mode

FRONT VIEW



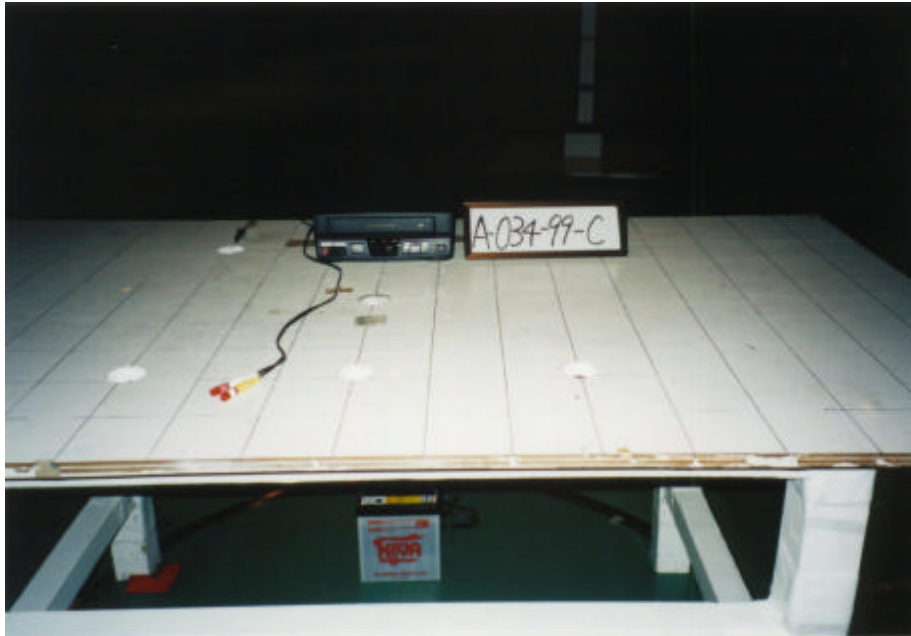
REAR VIEW



- Continued -

DC Power Operation Mode

FRONT VIEW



REAR VIEW



6. OUTPUT SIGNAL LEVEL MEASUREMENT

6.1. Test Procedure

- | | |
|-----|--|
| (1) | Configure the EUT System in accordance with ANSI C63.4-1992 section 12.2.
☒ : without deviation, ☐ : with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration in this report. |
| (2) | Unused RF input/output terminals are terminated in the proper impedance. |
| (3) | Activate the EUT system. |
| (4) | Set the spectrum analyzer as follows.
<div style="margin-left: 100px;">Frequency Span : 1 MHz
Resolution bandwidth : 100 kHz
Video bandwidth : 3 MHz
Detector function : Peak mode</div> |
| (5) | The RF output terminal is connected to the spectrum analyzer through the matching transformer with a calibrated 50 Ω coaxial cable. |
| (6) | Then, the RF output signal level is measured under the EUT condition produced the maximum signal level. |

6.2. Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBμV/50Ω]	Maximum Signal Level [dBμV/75Ω]	Limits [dBμV/75Ω]
<u>Test Channel #3</u>				
61.25	6.1	59.1	65.2	69.5
65.75	6.1	42.9	49.0	56.5
<u>Test Channel #4</u>				
67.25	6.1	59.0	65.1	69.5
71.75	6.1	42.5	48.6	56.5

[Note]

- (1) The correction factor consist of the voltage loss of the impedance matching transformer and the coaxial cable used for the test.
- (2) The spectrum was checked in each test mode and operation mode, and the data of the maximum EUT operation was reported.
- (3) The spectrum was checked in each test mode and operation mode, and the data of the maximum EUT operation was reported.

[Calculation method]

Maximum Signal Level (dBμV/75Ω)

= Meter Reading (dBμV/50Ω) + Correction Factor (dB)

[Environment]

Temperature: 23°C

Humidity: 62%

[Summary of Test Results]

Minimum margin was 4.3 dB at 61.25 MHz, test channel #3

[Tested Date/ Tester]

4 October 1999

Signature

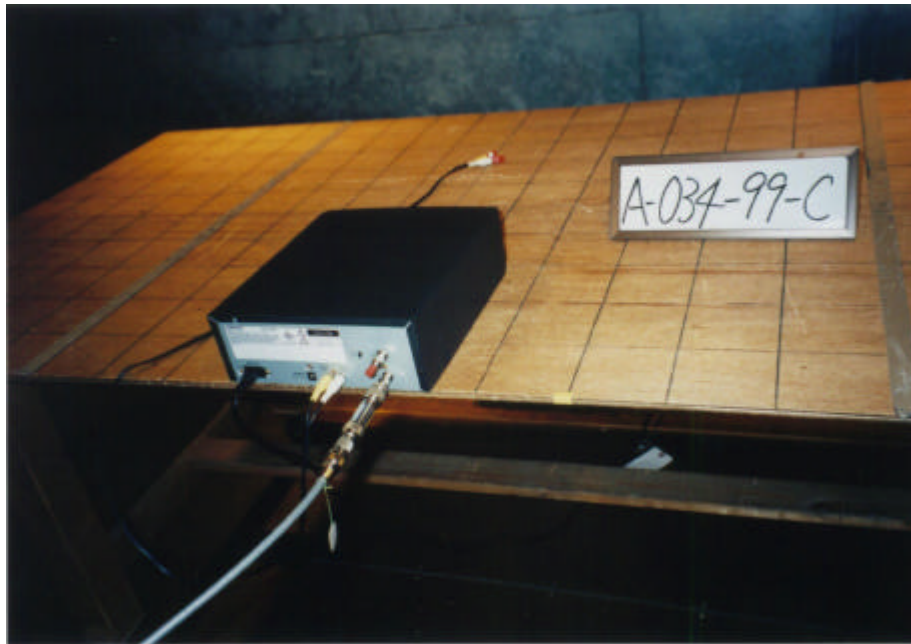


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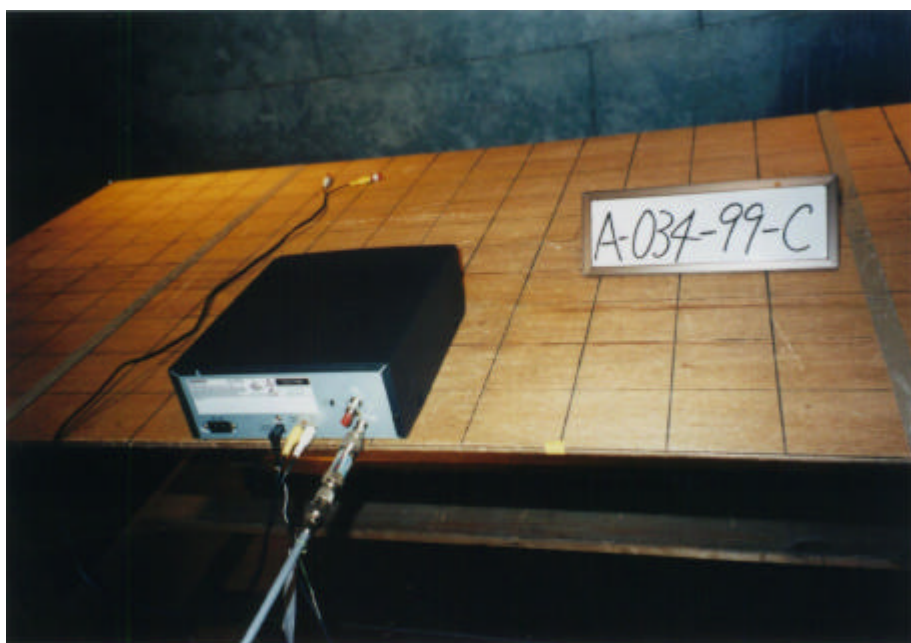
6.3. Photographs of EUT System Configuration

REAR VIEW

AC Power Operation Mode



DC Power Operation Mode



7. OUTPUT TERMINAL CONDUCTED SOURIOUS EMISSION MEASUREMENT

7.1. Test Procedure

- (1) Configure the EUT System in accordance with ANSI C63.4-1992 section 12.2.
☒ : without deviation, ☐ : with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration in this report.
- (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 Ω coaxial cable.
- (6) 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.
- (7) Then, the RF output terminal conducted spurious emission level is measured under the EUT condition produced the maximum signal level.

7.2. Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBμV/50Ω]	Maximum Signal Level [dBμV/75Ω]	Limits [dBμV/75Ω]
<u>Test Channel #3</u>				
47.78	6.1	12.7	18.8	39.5
52.28	6.1	6.5	12.6	39.5
56.65	6.1	28.9	35.0	39.5
70.29	6.1	7.3	13.4	39.5
74.79	6.1	11.4	17.5	39.5
122.50	6.1	17.9	24.0	39.5
** 56.65	6.1	<0.0	<6.1	39.5
<u>Test Channel #4</u>				
53.80	6.1	12.5	18.6	39.5
58.30	6.1	6.6	12.7	39.5
62.65	6.1	27.0	33.1	39.5
76.30	6.1	8.0	14.1	39.5
80.80	6.1	10.0	16.1	39.5
134.61	6.1	13.3	19.4	39.5
** 62.65	6.1	<0.0	<6.1	39.5

[Note]

- (1) **: 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.
- (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.
- (3) The spectrum was checked in each test mode and operation mode, and the data of the maximum EUT operation was reported.
- (4) The spectrum was checked in each test mode and operation mode, and the data of the maximum EUT operation was reported.

[Calculation method]

Maximum Signal Level (dBμV/75Ω)

= Meter Reading (dBμV/50Ω) + Correction Factor (dB)

[Environment]

Temperature: 23°C

Humidity: 62%

[Summary of Test Results]

Minimum margin was 15.5 dB at 122.50 MHz, test channel #3

[Tested Date/ Tester]

4 October 1999

Signature



Yoshiko Kotani

7.3. Photographs of EUT System Configuration

The tested device configuration is the same as the output signal level measurement.
(See 6.3 Photographs of EUT System Configuration.)

8. TRANSFER SWITCH MEASUREMENT

8.1. Test Procedure

- | | |
|-----|---|
| (1) | Configure the EUT System in accordance with ANSI C63.4-1992 section 12.2.
☒ : without deviation, ☐ : with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration
In this report. |
| (2) | Unused RF input/output terminals are terminated in the proper impedance. |
| (3) | Activate the EUT system. |
| (4) | Set the spectrum analyzer as follows.
<div style="margin-left: 100px;">Frequency Span : 1 MHz
Resolution bandwidth : 100 kHz
Video bandwidth : 3 MHz
Detector function : Peak mode</div> |
| (5) | The antenna input terminal is connected to the input of pre-amplifier through the matching transformer with a calibrated 50 Ω 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. |

8.2. Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBμV/50Ω]	Maximum Signal Level [dBμV/75Ω]	Limits [dBμV/75Ω]
<u>Test Channel #3</u>				
61.25	2.0	3.8	5.8	9.5
<u>Test Channel #4</u>				
67.25	2.1	2.0	4.1	9.5

[Note]

- (1) 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.
- (2) The spectrum was checked in each test mode and operation mode, and the data of the maximum EUT operation was reported.

[Calculation method]

Maximum Signal Level (dBμV/75Ω)

= Meter Reading (dBμV/50Ω) + Correction Factor (dB)

[Environment]

Temperature: 23°C

Humidity: 62%

[Summary of Test Results]

Minimum margin was 3.7 dB at 61.25 MHz, test channel #3

[Tested Date/ Tester]

4 October 1999

Signature

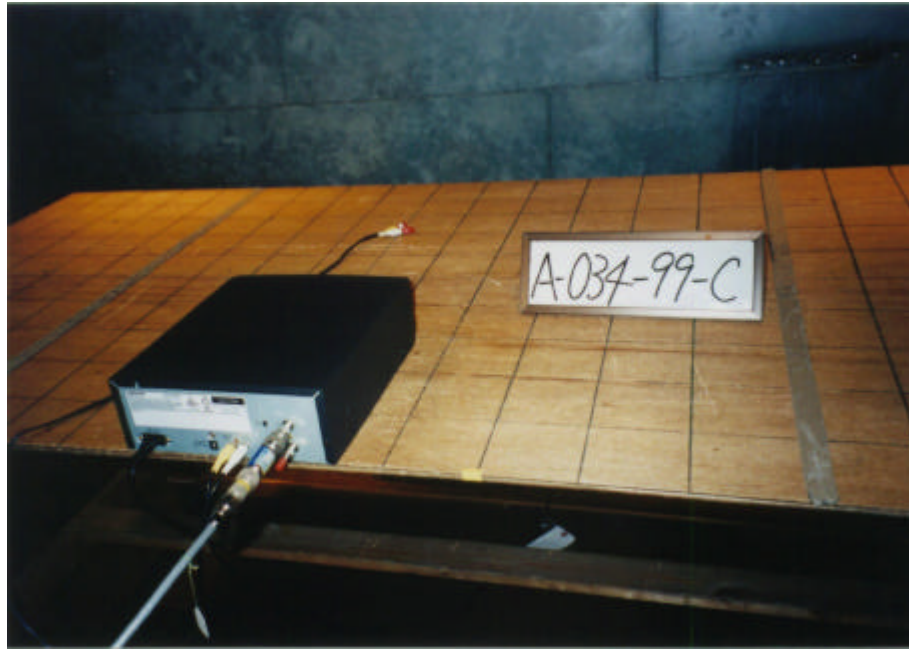


Yoshiko Kotani

8.3. Photographs of EUT System Configuration

REAR VIEW

AC Power Operation Mode



DC Power Operation Mode



9. LIST OF TEST EQUIPMENTS

Equipment	Manufacturer	Model No.	Specifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESH3	Frequency Range 9kHz-30MHz	FS-48-2	1	1999/9	2000/6
		ESVS10	Frequency Range 20MHz-1GHz	FS-60	2	1999/6	2000/6
Spectrum Analyzer	Rohde & Schwarz	FSA	Frequency Range 100 Hz-1.8 GHz	SA-35	2	1999/7	2000/7
	Hewlett Packard	8568B	Frequency Range 100 Hz-1.5 GHz	FS-46-3	1,3,4,5	1999/6	2000/6
Pre-amplifier	Anritsu	MH648A	Frequency Range 100 Hz-1.2 GHz	AM-28	4,5	1999/6	2000/6
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30MHz-300MHz	AN-219	2	1999/2	2000/2
Log-Periodic Antenna	Schwarzbeck	UHALP9108 A	Frequency Range 300MHz-1GHz	AN-218	2	1999/2	2000/2
Tuned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Range 25MHz-500MHz	AN-132	N/A	1999/3	2000/3
		KBA-611S	Frequency Range 500MHz-1GHz	AN-115	N/A	1999/3	2000/3
LISN	Kyoritsu	KNW-407	Frequency Range 150kHz-30MHz	FL-107	1	1999/4	2000/4
Impedance Transformer	NMC	MB-009	Frequency Range 10MHz-2GHz 50Ω: 75Ω	AX-61	3,4	1999/8	2000/8
Matching Transfomer	Anritsu	MG614A	Frequency Range 10MHz-1.2GHz 50Ω: 75Ω	AX-28-4	5	1998/12	1999/12

[Note]

Test Item (*):

- 1: Conducted Emission Measurement
- 2: Radiated Emission Measurement
- 3: Output Signal level Measurement
- 4: Output Terminal Conducted Spurious Measurement
- 5: Transfer Switch Measurement

N/A: Not Applicable

The overall program of calibration and verification of equipment is designed and operated so as to ensure that measurements made by KEC are traceable to national standards of measurement or equivalent abroad.