

Designated by Ministry of international Trade and industry

**KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER**

HEAD OFFICE

6-8-7 NISHITENMA

KITA-KU OSAKA 530-0047 JAPAN



Corporate Juridical Person

IKOMA TESTING LABORATORY

12128 TAKAYAMA-CHO

IKOMA-CITY NARA 630-0101 JAPAN

**TEST REPORT**Report No. A-022-99-C

Date: 6 August 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, TAKAFU-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 : A7RM4C8D

Device Name : VIDEO CASSETTE RECORDER

Trade Name : MEMOREX

Model Number : MVR2040A

Serial Number : ID-112-1249 ☐: Prototype ☒: Pre-production ☐: Production

Date of Manufacture : June 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 : 6 July, 1999

Test Completed on : 28 July, 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 MEMOREX Model No.MVR2040A (referred to as the EUT in this report) is a VIDEO CASSETTE RECORDER containing RF modulator and Tuner.

#### (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  $\Omega$  (Unbalanced)

#### (2) Provided terminal

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

#### (3) Used Oscillating Frequencies

- 10 MHz : SYSTEM CONTROL / SERVO CONTROL  
MICROCOMPUTER CLOCK
- 3.579545 MHz : CHROMINANCE SUBCARRIER OSCILLATOR
- 120~290 kHz : SWITCHING FREQUENCY OF POWER SUPPLY

#### (4) Rated Power Supply : AC 120 V, 60Hz

## 2.2. Description for Equipment Authorization

(1) Type of device	: <input checked="" type="checkbox"/> TV Interface Device
(2) Reference Rule and Specification	: FCC Rule Part 15 <input checked="" type="checkbox"/> Section 15.107 (a) <input checked="" type="checkbox"/> Section 15.109 (a)(c) and Section 15.115 (a) <input checked="" type="checkbox"/> Section 15.115 (b)(1)(ii), (b)(2)(ii) and (c)(1)(ii)
(3) Kind of Equipment Authorization	: <input type="checkbox"/> DoC <input checked="" type="checkbox"/> Certification <input type="checkbox"/> Verification
(4) Procedure of Application	: <input checked="" type="checkbox"/> Original Equipment <input type="checkbox"/> Modification
(5) Highest Frequency used in the Device	: 71.75 MHz
(6) Upper Frequency of Radiated Emission Measurement Range	: <input checked="" type="checkbox"/> 1000 MHz <input type="checkbox"/> 2000 MHz <input type="checkbox"/> 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	<input type="checkbox"/> No.1 <input type="checkbox"/> No.2 <input type="checkbox"/> No.3 <input type="checkbox"/> No.4		
EMC M.C. Anechoic Chamber	<input checked="" type="checkbox"/> No.1		
Shielded Room	<input type="checkbox"/> No.2 <input checked="" type="checkbox"/> No.4 <input type="checkbox"/> EMC M.C. Shielded Room		
Address:	12128, Takayama-cho Ikoma-city, Nara, 630-0101 Japan		
<p>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 M.C. Anechoic Chamber No.1, Shielded Room No.4 and EMC M.C. Shielded Room have been accredited by the NVLAP (Lab. Code: 200207-0) based on ISO/IEC Guide 25.</p> <p>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).</p>			

### 3. TESTED SYSTEM

#### 3.1. Test Mode

In each measurement (excluding antenna transfer switch measurement), the compliance tests were performed under following five EUT operation modes.

In transfer switch measurement, it was done under three modes ( a ~ c ).

- a. Playback mode  
Playback the video tape that is recorded 1V peak-to-peak VITS signal.
- b. Record mode (1V VITS Signal Input)  
1V peak-to-peak VITS signal is supplied through the VIDEO IN 1(front side) terminal.
- c. Record mode (5V VITS Signal Input)  
5V peak-to-peak VITS signal is supplied through the VIDEO IN 1(front side) terminal.
- d. Record mode (0 dBmV NTSC TV Signal Input)  
NTSC TV U.S. channel 13 (consist of visual carrier and aural carrier) is supplied through the ANTENNA IN terminal.

[ Note ]

- 1) Visual Carrier (0 dBmV at 211.25 MHz) is modulated by 1V peak-to-peak VITS signal.
- 2) Aural Carrier (-10 dBmV at 215.75 MHz) is not modulated.

- e. Record mode (25 dBmV NTSC TV Signal Input)  
NTSC TV U.S. channel 13 (consist of visual carrier and aural carrier) is supplied through the ANTENNA IN terminal.

[ Note ]

- 1) Visual Carrier (25 dBmV at 211.25 MHz) is modulated by 1V peak-to-peak VITS signal.
- 2) Aural Carrier (15 dBmV at 215.75 MHz) is not modulated.

### 3.2. Operation of EUT System

1) Playback mode

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

2) Record mode (1V / 5V VITS Signal Input)

1V/5V peak-to-peak VITS signal is supplied through the VIDEO IN terminal, if applicable.

3) Record mode (0 dBmV / 25 dBmV NTSC TV Signal Input)

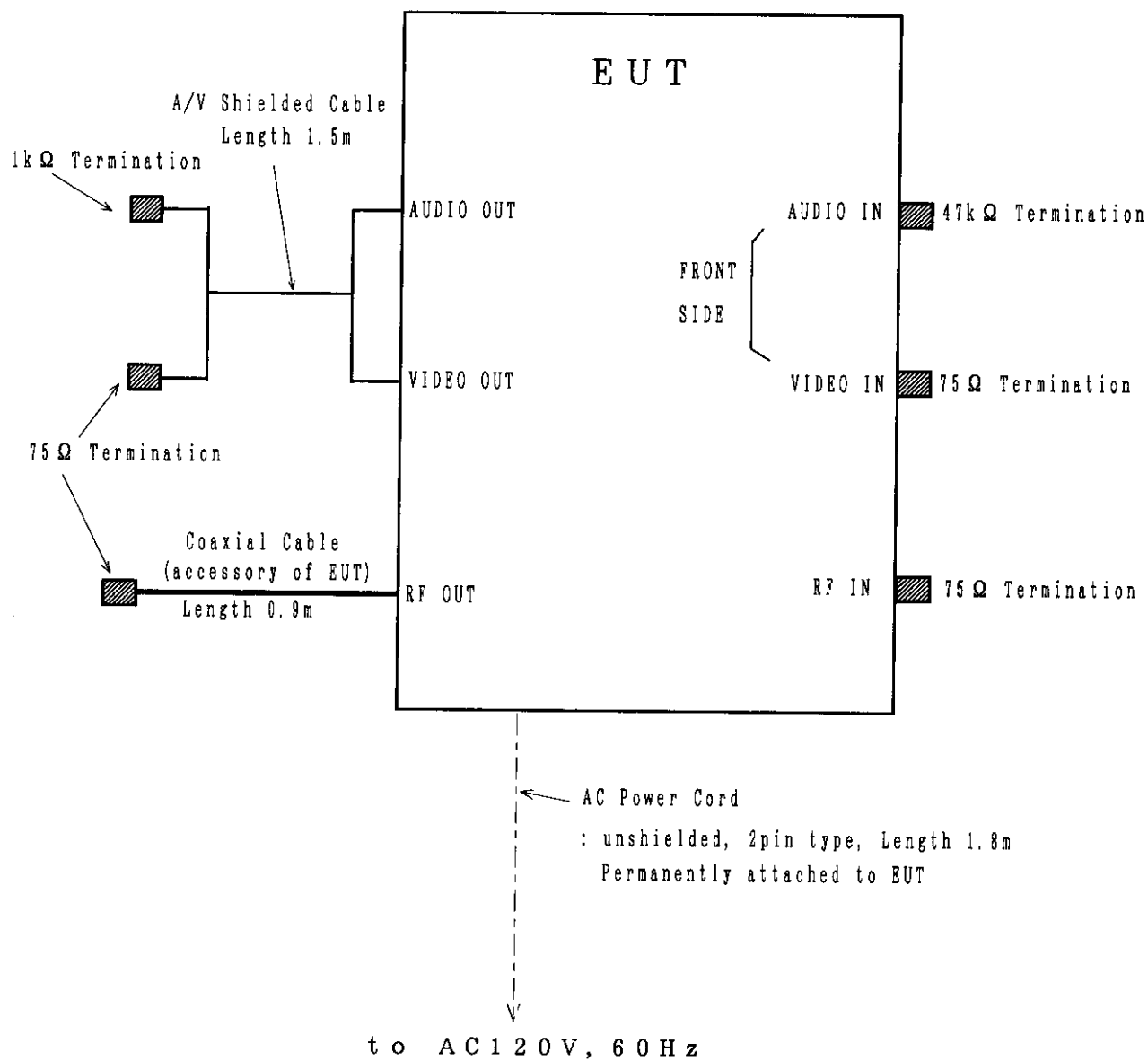
NTSC TV U.S. channel 13 (consist of visual carrier and aural carrier) is supplied through the ANTENNA IN terminal, if applicable.

### 3.3. Characterization and condition of EUT System

☒ : normal , ☐ : not normal (that is )

### 3.4. BlockDiagram of EUT System (for Conducted and Radiated Emission Measurements)

#### a. Playback mode

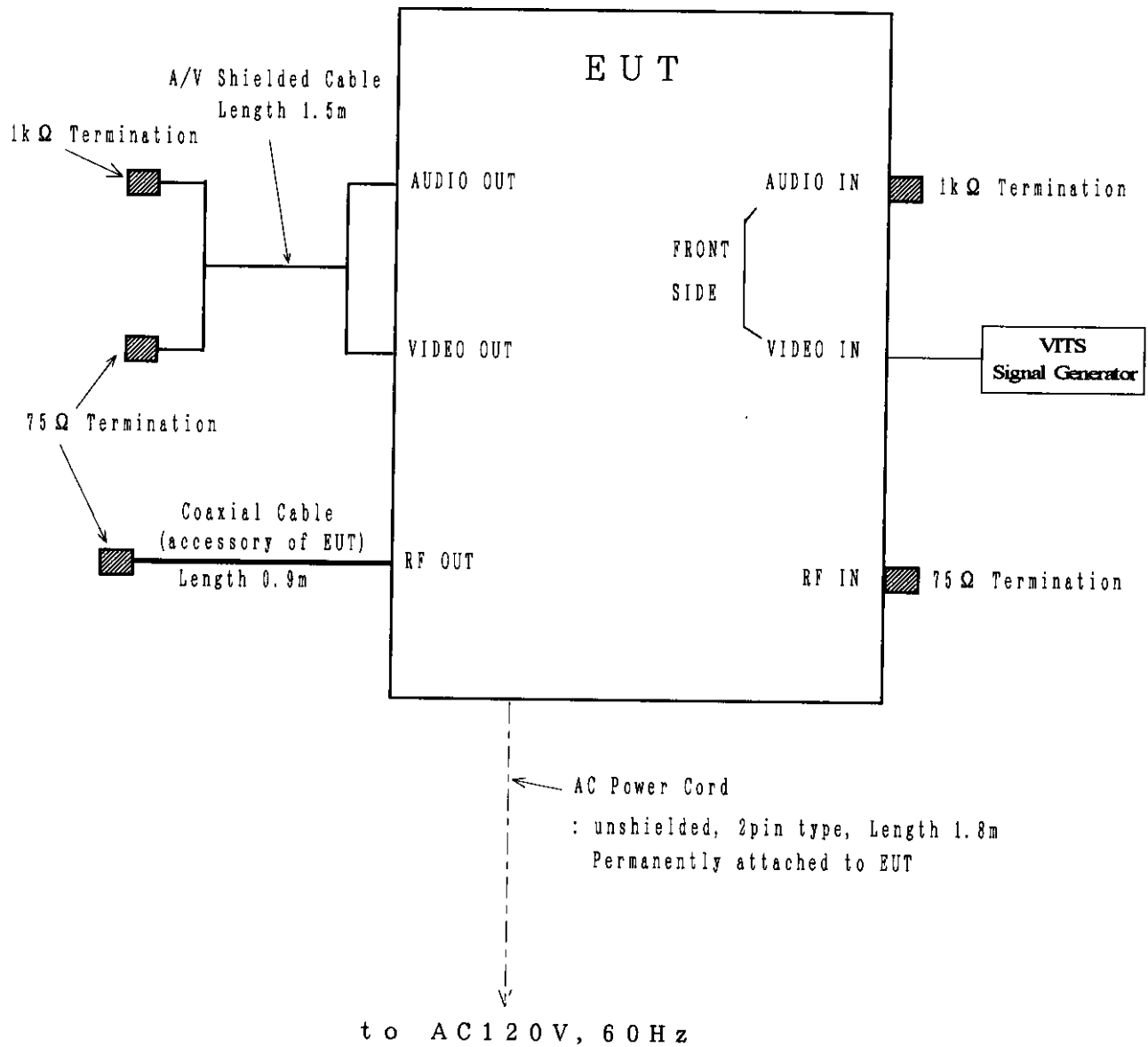




- Continued -

b. Record mode (1V VITS Signal Input)

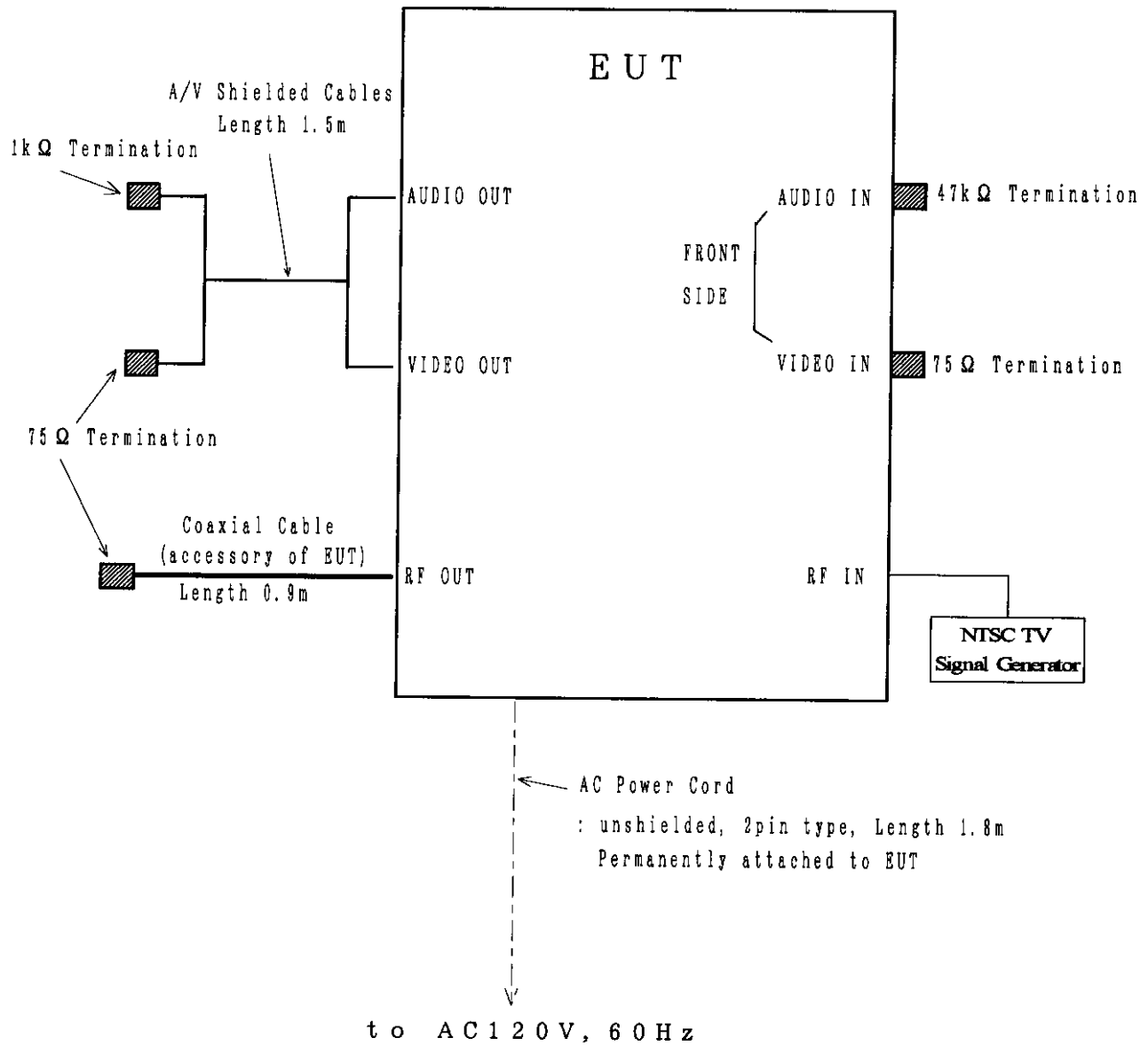
c. Record mode (5V VITS Signal Input)



- Continued -

d. Record mode (0 dBmV NTSC TV Signal Input)

e. Record mode (25 dBmV NTSC TV Signal Input)



#### 4. AC POWER LINE CONDUCTED EMISSION MEASUREMENT

##### 4.1. Test Procedure

(1)	Configure the EUT System in accordance with ANSI C63.4-1992 section 7. <input checked="" type="checkbox"/> : without deviation, <input type="checkbox"/> : with deviation(details are found below) 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 power cord of other equipment is 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 necessary.
(6)	Connect the spectrum analyzer (*1) to the measuring port of the LISN for the EUT, using a calibrated coaxial cable.
(7)	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.
(8)	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.
(9)	The test receiver (*2) is connected to the LISN for the EUT, and the six highest emissions minimum 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

## 4.2. Test Results

Measured Frequency ( MHz )	LISN Factor ( dB )	Meter Reading		Maximum RF Voltage ( dBuV )	Limits ( dBuV )	Margin for Limits ( dB )
		Va ( dBuV )	Vb ( dBuV )			
0.540	0.3	34.4	34.6	34.9	48.0	13.1
0.573	0.3	34.0	29.4	34.3	48.0	13.7
0.755	0.3	27.9	28.6	28.9	48.0	19.1
0.866	0.3	30.9	31.2	31.5	48.0	16.5
1.199	0.3	29.3	29.8	30.1	48.0	17.9
1.512	0.3	28.6	29.3	29.6	48.0	18.4

[Calculation method]

Maximum RF Voltage (dBuV)

= 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 25°C

Humidity 75%

[ Tested Date / Tester ]

26 July, 1999

Signature



Yoshiko Kotani

## 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.

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  $\Omega$  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 [dB $\mu$ V/50 $\Omega$ ]	Maximum Signal Level [dB $\mu$ V/75 $\Omega$ ]	Limits [dB $\mu$ V/75 $\Omega$ ]
<b>Test Channel #3</b>				
61.25	6.5	58.8	65.3	69.5
65.75	6.5	42.8	49.3	56.5
<b>Test Channel #4</b>				
67.25	6.5	58.7	65.2	69.5
71.75	6.5	41.9	48.4	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 (dB  $\mu$  V/75 $\Omega$ )= Meter Reading (dB  $\mu$  V/50 $\Omega$ ) + Correction Factor (dB)

## [Environment]

Temperature: 25°C

Humidity: 75%

## [Summary of Test Results]

Minimum margin was 4.2 dB at 61.25 MHz, test channel #3

## [Tested Date/ Tester]

28 July 1999

Signature


  
Yoshiko Kotani

## 5. RADIATED EMISSION MEASUREMENT

### 5.1. Test Procedure

(1)	Configure the EUT System in accordance with ANSI C63.4-1992 section 8. <input checked="" type="checkbox"/> : without deviation, <input type="checkbox"/> : with deviation(details are found below) 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 turntable.
(3)	Warm up the EUT System.
(4)	Activate the EUT System and run the prepared software for the test, if necessary.
(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) and the broad band antenna. In the frequency above 1 GHz, it is performed using the spectrum analyzer (*2) and the horn antenna.
(6)	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.
(7)	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.
(8)	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 <input type="checkbox"/> the test receiver (*4). <div style="text-align: center;"><input type="checkbox"/> the spectrum analyzer(*2) with pre-amplifier.</div>
[Note]	
(*1)	Spectrum Analyzer Set Up Conditions Frequency range : 30 - 1000 MHz Resolution bandwidth : 100 kHz Detector function : Peak mode
(*2)	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
(*3)	Test Receiver Set Up Conditions Detector function : Quasi-Peak IF bandwidth : 120 kHz
(*4)	Test Receiver Set Up Conditions 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	3.4	7.0	17.0	40.0	23.0
65.75	9.5	2.6	2.0	12.1	40.0	27.9
122.50	16.0	8.8	4.2	24.8	43.5	18.7
245.00	21.7	<0.0	<0.0	<21.7	46.0	>24.3
Test Channel #4						
67.25	9.3	8.0	5.4	17.3	40.0	22.7
71.75	8.9	3.5	3.5	12.4	40.0	27.6
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						
39.24	15.7	1.0	12.8	28.5	40.0	11.5
42.95	14.3	<0.0	13.0	27.3	40.0	12.7
57.29	10.7	8.5	25.2	35.9	40.0	4.1
67.50	9.2	18.0	14.0	27.2	40.0	12.8
78.53	8.9	14.7	18.5	27.4	40.0	12.6
85.92	10.1	15.1	19.1	29.2	40.0	10.8
128.77	16.7	10.7	9.3	27.4	43.5	16.1
143.18	17.9	13.5	10.0	31.4	43.5	12.1
171.83	19.3	9.1	5.1	28.4	43.5	15.1
200.47	20.7	9.0	7.5	29.7	43.5	13.8

## [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) Turntable Angle: defined as 0° when EUT system on the Turn Table faces to the receiving antenna, and the Angle increases when turned clockwise (in case of EMC M. C. Anechoic Chamber No.1: clockwise should be read as counter clockwise).
- (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 Field Strength (dB/μV/m)

= Meter Reading (at maximum level of Horizontal or Vertical) (dB/μV) + Antenna Factor (dB)

## [Environment]

Temperature: 24°C

Humidity: 56%

## [Tested Date/ Tester]

26 July 1999

Signature

  
 Yoshiko Kotani



## 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  $\Omega$  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 [dB $\mu$ V/50 $\Omega$ ]	Maximum Signal Level [dB $\mu$ V/75 $\Omega$ ]	Limits [dB $\mu$ V/75 $\Omega$ ]
<b>Test Channel #3</b>				
38.72	6.5	6.3	12.8	39.5
47.72	6.5	12.2	18.7	39.5
56.24	6.5	10.1	16.6	39.5
56.65	6.5	36.6	43.1	39.5
74.72	6.5	10.7	17.2	39.5
122.45	6.5	3.7	10.2	39.5
183.66	6.5	12.4	18.9	39.5
** 56.65	6.5	14.9	21.4	39.5
<b>Test Channel #4</b>				
44.73	6.5	6.1	12.6	39.5
53.73	6.5	11.7	18.2	39.5
62.25	6.5	9.7	16.2	39.5
62.65	6.5	35.6	42.1	39.5
80.73	6.5	8.9	15.4	39.5
134.46	6.5	5.2	11.7	39.5
201.69	6.5	10.0	16.5	39.5
** 62.65	6.5	12.8	19.3	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 described 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 (dB $\mu$ V/75 $\Omega$ )= Meter Reading (dB $\mu$ V/50 $\Omega$ ) + Correction Factor (dB)

## [Environment]

Temperature: 25°C

Humidity: 75%

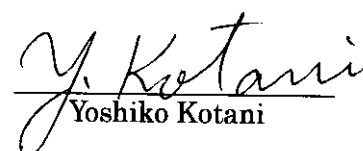
## [Summary of Test Results]

Minimum margin was 18.1 dB at 56.65 MHz(\*\*), test channel #3

## [Tested Date/ Tester]

28 July 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.

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  $\Omega$  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.

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## 8.2. Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dB $\mu$ V/50 $\Omega$ ]	Maximum Signal Level [dB $\mu$ V/75 $\Omega$ ]	Limits [dB $\mu$ V/75 $\Omega$ ]
<b>Test Channel #3</b> 61.25	2.0	5.3	7.3	9.5
<b>Test Channel #4</b> 67.25	2.1	2.3	4.4	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 described 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 (dB  $\mu$  V/75 $\Omega$ )= Meter Reading (dB  $\mu$  V/50 $\Omega$ ) + Correction Factor (dB)

## [Environment]

Temperature: 25°C

Humidity: 75%

## [Summary of Test Results]

Minimum margin was 2.2 dB at 61.25 MHz, test channel #3

## [Tested Date/ Tester]

28 July 1999

Signature

*Y. Kotani*  
Yoshiko Kotani