

Designated by Ministry of International Trade and Industry

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

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*Corporate Juridical Person***ENGINEERING TEST REPORT**Report No. A-006-99-C

Date : March 19, 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 : Sharp Corporation, Audio-Visual Systems Group,
Video Systems Division, Overseas Technology Development Department

Mailing Address : 174, Hayakawa-cho, Yaita-shi, Tochigi 329-2193, Japan

2. Identification of Tested Device

FCC ID : APYTGC037
Device Name : Video Cassette Recorder
Trade Name : SHARP
Model Number : VC-H998U
Serial Number : 902000001 prototype pre-production production
Date of Manufacture : February, 1999

3. Test Items Procedure, Reference Rule and Specification

- (1) AC Power Line Conducted Emission Measurement : Section 15.107(a)
- (2) Radiated Emission Measurement : Section 15.109 (a), (c) and Section 15.115(a)
- (3) Output Signal Level Measurement : Section 15.115 (b) (1) (ii)
- (4) Output Terminal Conducted Spurious Emission Measurement : Section 15.115 (b) (2) (ii)
- (5) Transfer Switch Measurement : Section 15.115 (c) (1) (ii)

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

4. Date of Test

Receipt of Test Sample : February 20, 1999
Test Completed on : March 12, 1999

Fumitoshi Nagaoka
Associate Director of Ikoma Testing Laboratory



ENGINEERING TEST REPORT

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

The SHARP Model No.VC-H998U (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 Ω (Unbalanced)

(2) Provided terminal

- ANT Input Terminal
- RF Output Terminal
- A/V Input Terminal (rear side and front side)
- A/V Output Terminal

(3) Used Oscillating Frequencies

- 390 MHz : Remote Control Locator (FCC ID : APYTGC037)
- 4 MHz : Microcomputer System clock

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



ENGINEERING TEST REPORT

1.2 Description for Equipment Authorization

(1) Rules Part(s) under which Equipment operated

FCC Rule Part 15, Subpart B; TV Interface Device in Unintentional Radiator

(2) Highest Frequency used in the Device : 71.75 MHz

Upper Frequency of Radiated measurement Range is 1000 MHz

1.3 Test Facility

All tests described in this report were performed by:

Name : KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC)
IKOMA TESTING LABORATORY
EMC Measurement Center Anechoic Chamber No.1
Shielded Room No.2 and No.4

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 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 International, UK), TUV Product Service (GER) and TUV Rheinland (GER) based on their criteria for testing laboratory (EN45001).

ENGINEERING TEST REPORT**2. TESTED SYSTEM****2.1 Test Mode**

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

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

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(rear side) terminal.

c. Record mode (5V VITS Signal Input)

5V peak-to-peak VITS signal is supplied through the VIDEO IN 1(rear side) terminal.

d. Record mode (1V VITS Signal Input)

1V peak-to-peak VITS signal is supplied through the VIDEO IN 1(front side) terminal.

e. Record mode (5V VITS Signal Input)

5V peak-to-peak VITS signal is supplied through the VIDEO IN 1(front side) terminal.

f. 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.

g. 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.

In each mode, the spectrum was checked and the data of the maximum EUT operation was reported.

ENGINEERING TEST REPORT**2.2 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.

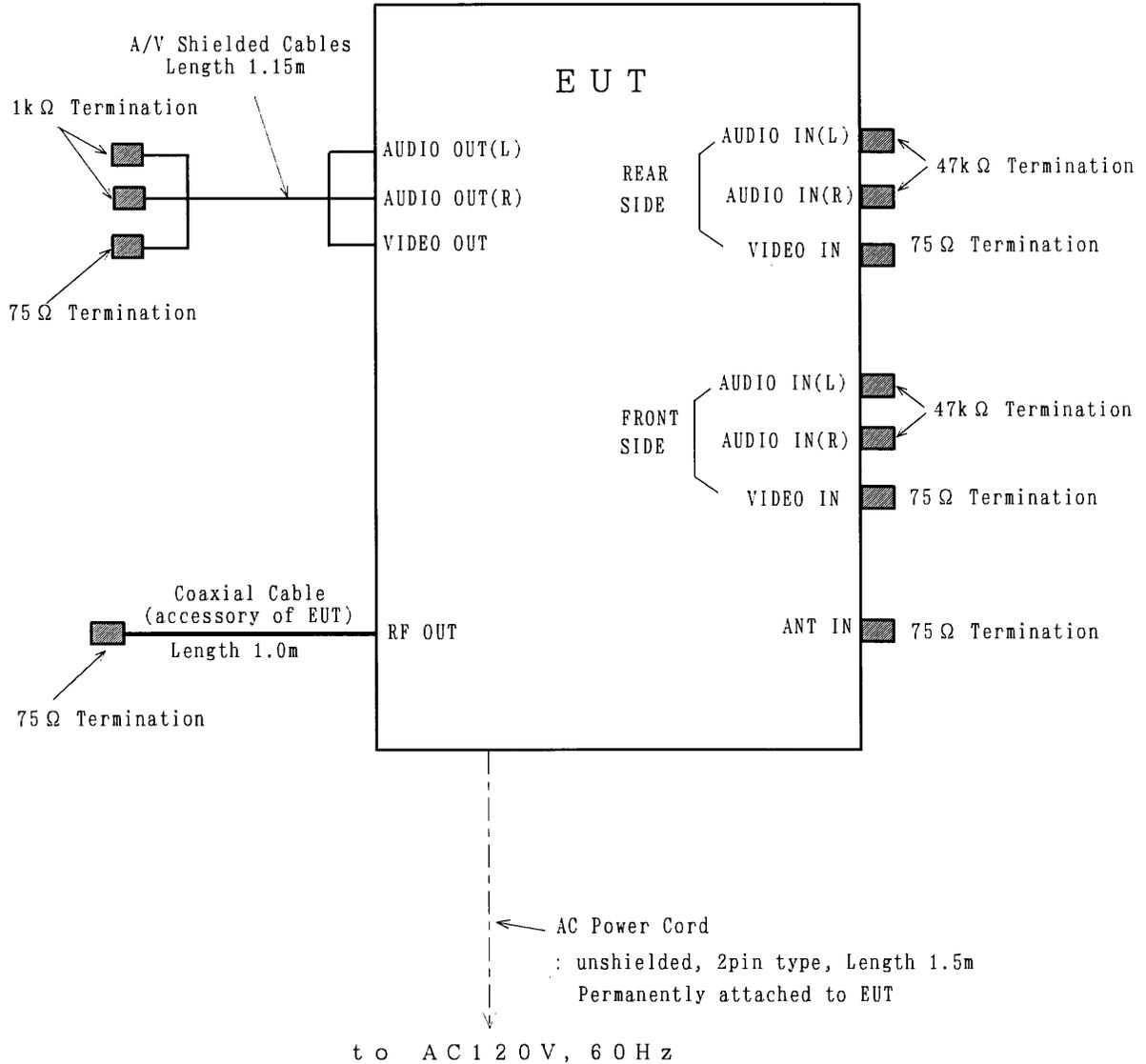
(3) Record mode (0 dBmV / 25 dBmV NTSC TV Signal Input)

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

ENGINEERING TEST REPORT

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

a. Playback mode

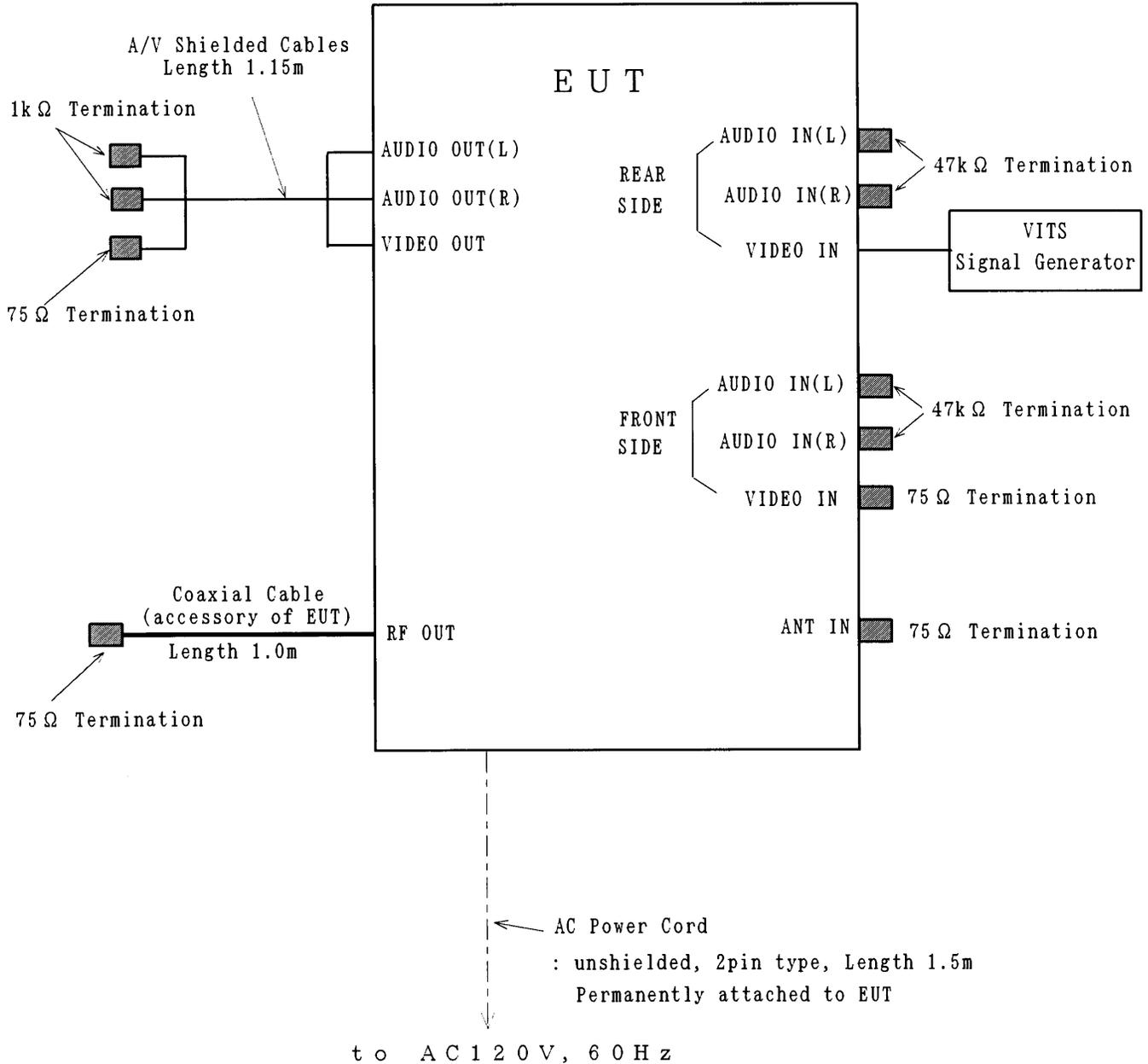


ENGINEERING TEST REPORT

- Continued -

b. Record mode (1V VITS Signal Input)

c. Record mode (5V VITS Signal Input)

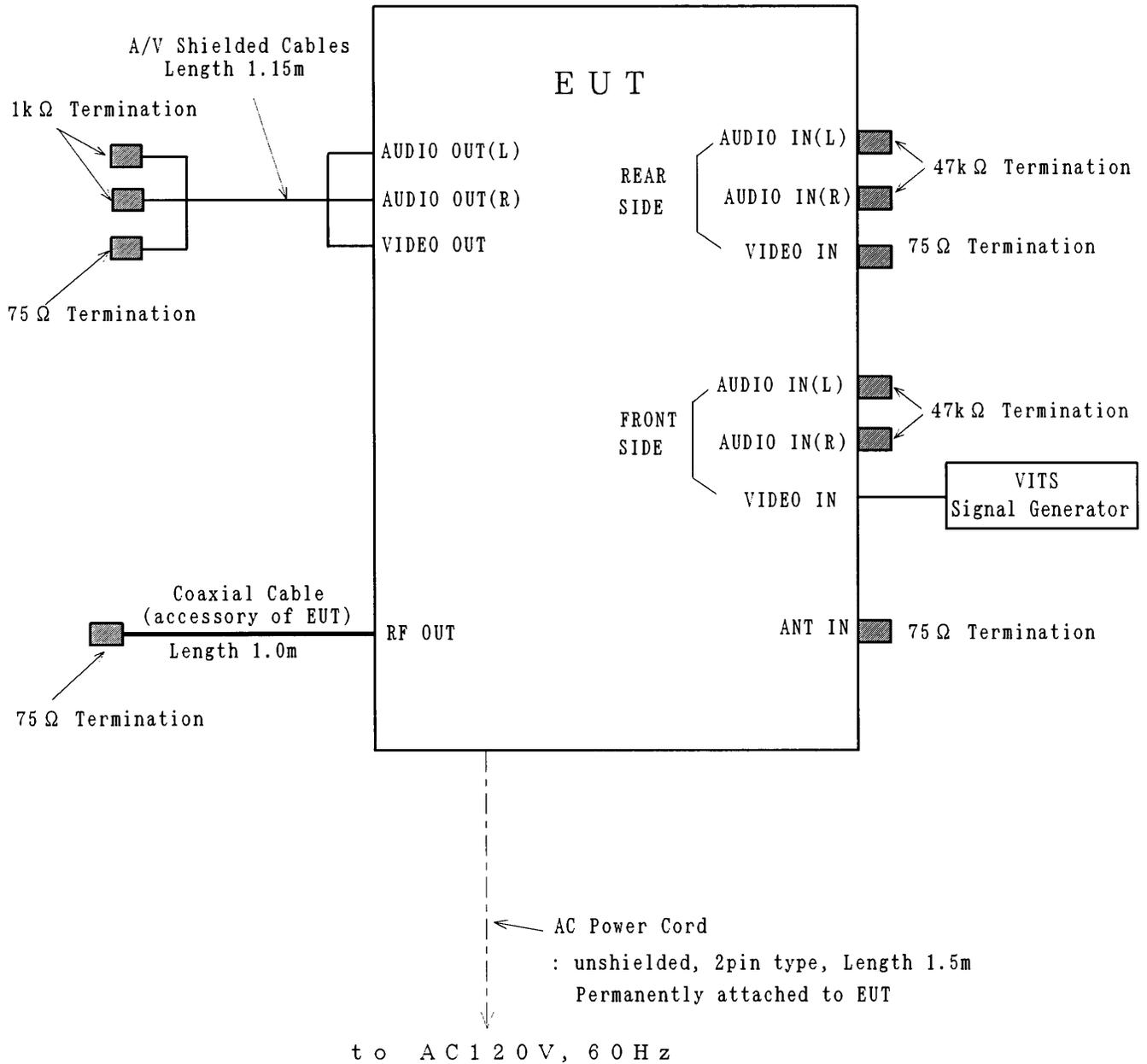


ENGINEERING TEST REPORT

- Continued -

d. Record mode (1V VITS Signal Input)

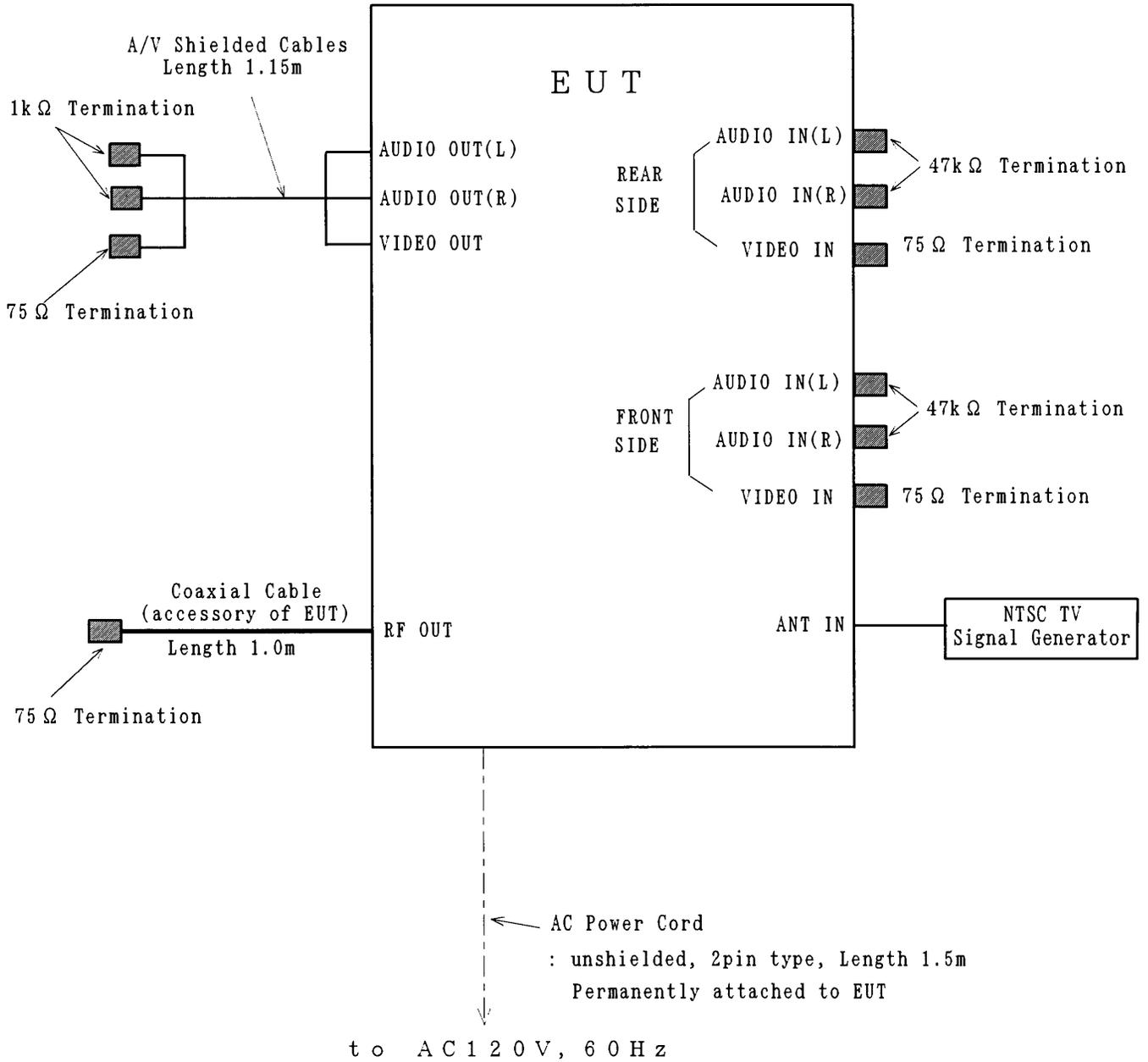
e. Record mode (5V VITS Signal Input)



ENGINEERING TEST REPORT

- Continued -

- f. Record mode (0 dBmV NTSC TV Signal Input)
- g. Record mode (25 dBmV NTSC TV Signal Input)



ENGINEERING TEST REPORT

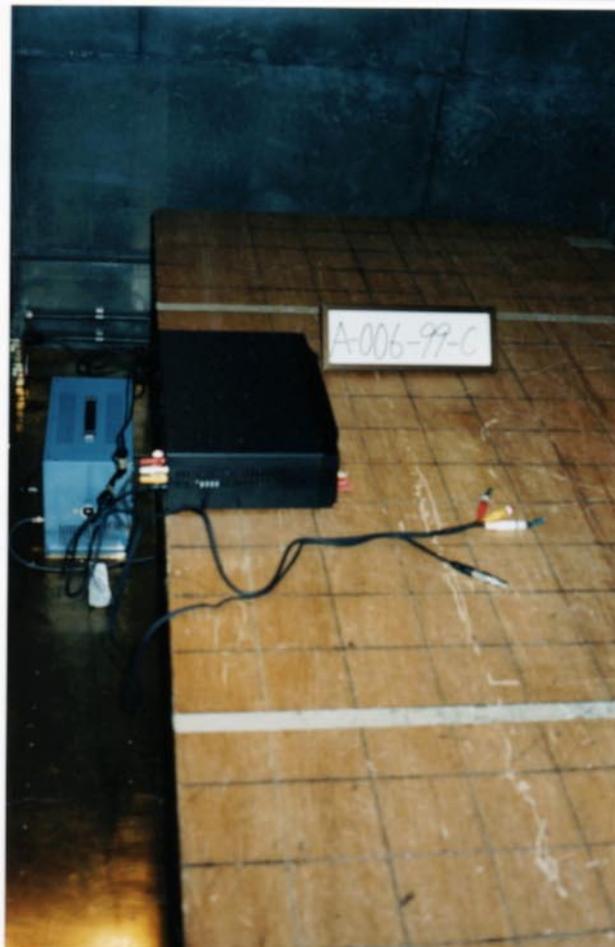
3. AC POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1 Photographs of EUT System Configuration

a. Playback Mode



FRONT VIEW



SIDE VIEW

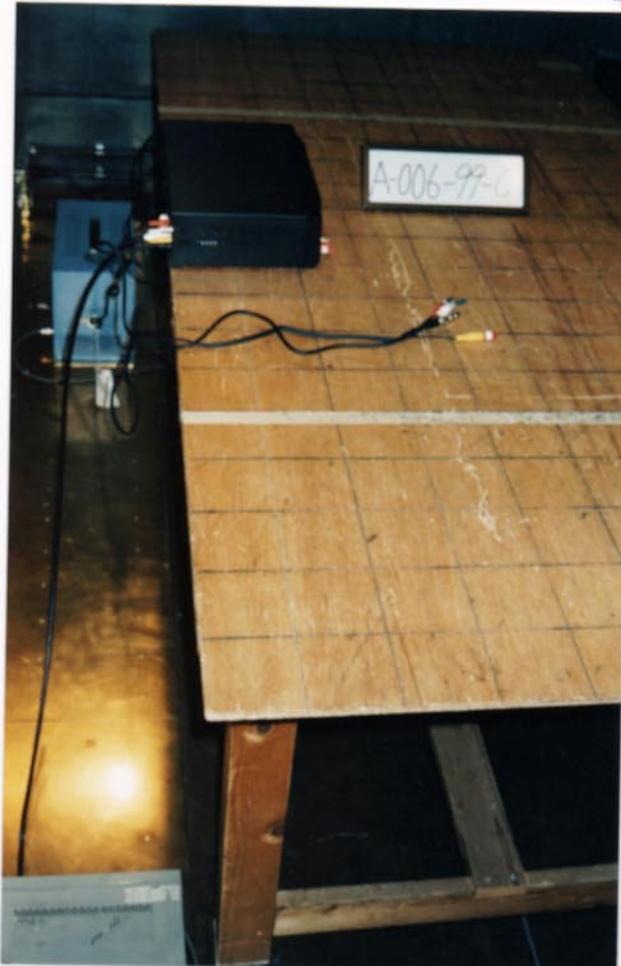
ENGINEERING TEST REPORT

- Continued -
- b. Record mode (1V VITS Signal Input)
- c. Record mode (5V VITS Signal Input)



FRONT VIEW

SIDE VIEW



ENGINEERING TEST REPORT

- Continued -

d. Record mode (1V VITS Signal Input)

e. Record mode (5V VITS Signal Input)

FRONT VIEW



SIDE VIEW



ENGINEERING TEST REPORT

- Continued -

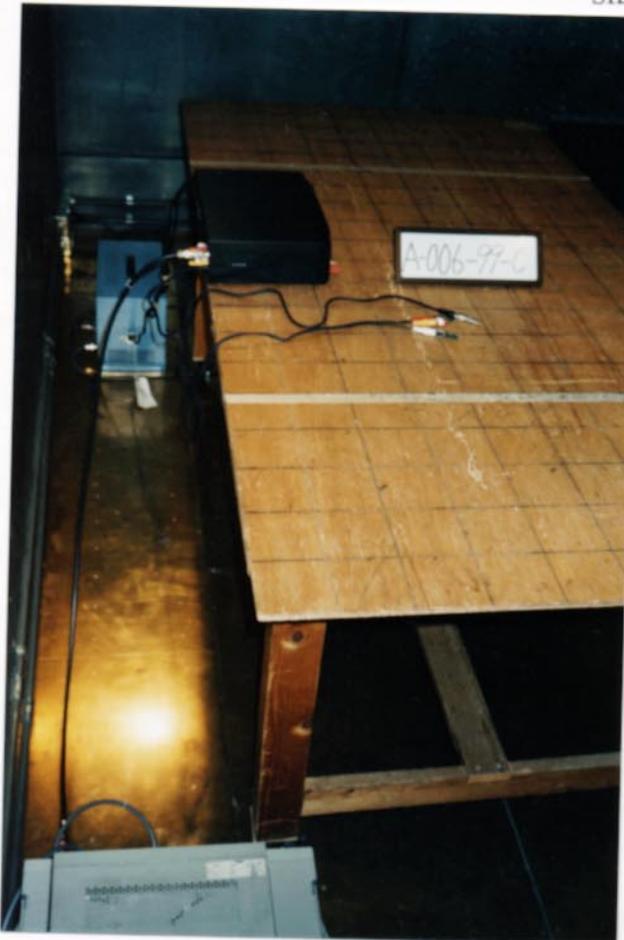
f. Record mode (0 dBmV NTSC TV Signal Input)

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



FRONT VIEW

SIDE VIEW





ENGINEERING TEST REPORT

3.2 Test Results

(1) Measurement with the quasi-peak detector and the average detector.

Emission Frequency [MHz]	LISN Corr. Factor [dB]	Meter Reading [dB μ V]		Maximum RF Voltage [dB μ V]	Limits [dB μ V]
		One-end to Ground	Other-end to Ground		
* 0.4500	0.1	48.5	48.6	48.7	48.0
13.28	0.5	32.3	32.2	32.8	48.0
20.63	0.9	33.9	32.9	34.8	48.0
22.64	1.0	36.1	35.6	37.1	48.0
24.43	1.1	41.7	41.2	42.8	48.0
25.86	1.2	37.4	31.5	38.6	48.0
Additional measurement with the average detector at * marked frequencies					
0.4500	0.1	17.7	17.7	17.8	-

[Attention]

The measurement data(*) with quasi-peak detector is higher(more than 6dB) than the measured data with the average detector.

Therefore, in accordance with ANSI C63.4-1992 section 11.5.2, the 13 dB reduced quasi-peak mode level is shown.

(2) The 13dB reduced quasi-peak mode level

Emission Frequency [MHz]	LISN Corr. Factor [dB]	Meter Reading (13 dB reduced quasi-peak mode level) [dB μ V]		Maximum RF Voltage [dB μ V]	Limit [dB μ V]
		One-end to Ground	Other-end to Ground		
0.4500	0.1	35.5	35.6	35.7	48.0

ENGINEERING TEST REPORT

[Note]

LISN Correction Factor includes the cable loss.

[Environment]

Temperature : 16°C Humidity : 43%

[Sample Calculation]

(1) Measurement with the quasi-peak detector

Frequency	:	0.4500	[MHz]	
Meter Reading	:	48.6	[dB μ V] (at Other-end to Ground)	
LISN Corr. Factor	:	0.1	[dB]	

Then, RF voltage is calculated as follows.

$$\text{RF Voltage} = 48.6 + 0.1 = 48.7 \text{ [dB}\mu\text{V]}$$

(3) Quasi-peak RF voltage is compared with average detector at 0.4500 MHz

Quasi-peak RF voltage - Average RF voltage = 48.7 - 17.8 = 30.9 [dB μ V] > 6 [dB]
 Therefore, 13 dB reduced Quasi-peak mode level is shown as follows,

Frequency	:	0.4500	[MHz]	
Meter Reading	:	35.6	[dB μ V] (at Other-end to Ground)	
LISN Corr. Factor	:	0.1	[dB]	

Then, RF voltage is calculated as follows.

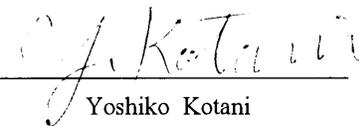
$$\text{RF Voltage} = 35.6 + 0.1 = 35.7 \text{ [dB}\mu\text{V]}$$

[Summary of Test Results]

Minimum margin was 5.2 dB at 24.43 MHz, one-end to ground.

Tested Date : March 11, 1999

Signature


 Yoshiko Kotani

ENGINEERING TEST REPORT

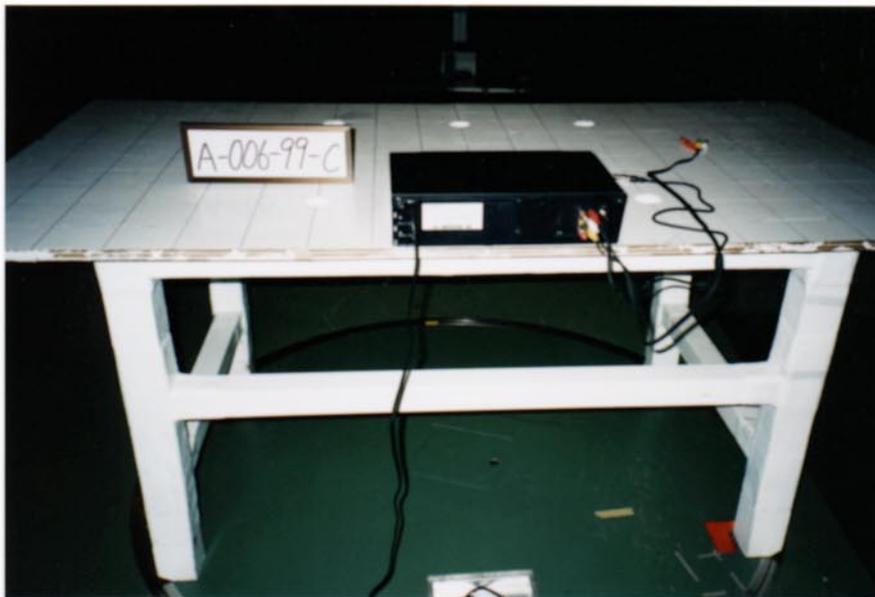
4. RADIATED EMISSION MEASUREMENT

4.1 Photographs of EUT System Configuration

a. Playback Mode



FRONT VIEW



REAR VIEW

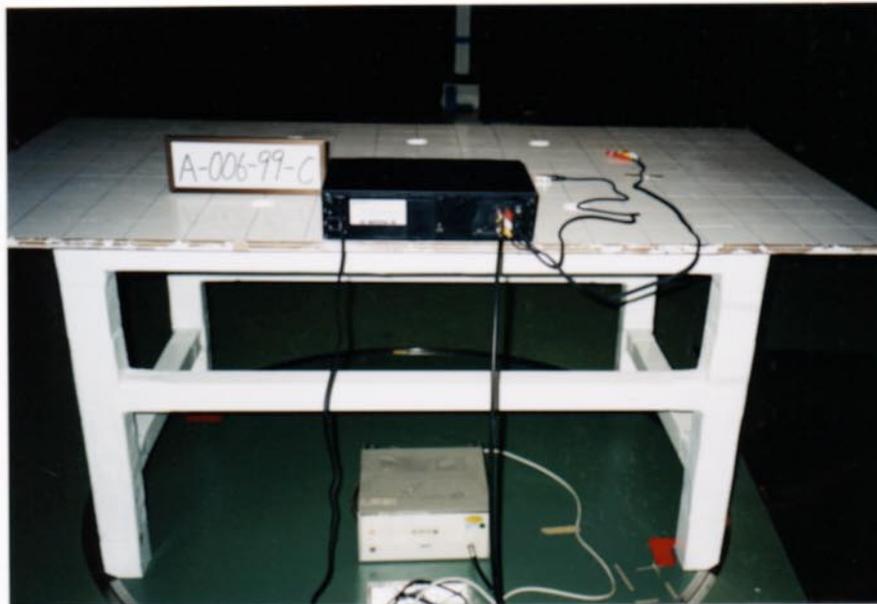
ENGINEERING TEST REPORT

- Continued -

- b. Record mode (1V VITS Signal Input)
- c. Record mode (5V VITS Signal Input)



FRONT VIEW



REAR VIEW

ENGINEERING TEST REPORT

- Continued -

- d. Record mode (1V VITS Signal Input)
- e. Record mode (5V VITS Signal Input)



FRONT VIEW



REAR VIEW

ENGINEERING TEST REPORT

- Continued -

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

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



FRONT VIEW



REAR VIEW

ENGINEERING TEST REPORT

4.2 Test Results

[Distance : 3m]

Emission Frequency [MHz]	Antenna Factor [dB]	Meter Reading [dB μ V]		Maximum Field Strength [dB μ V/m]	Limits [dB μ V/m]
		Horizontal Polarization	Vertical Polarization		
Test Channel #3					
61.25	10.3	12.6	15.8	26.1	40.0
65.75	9.8	11.2	11.7	21.5	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	7.4	7.5	17.1	40.0
71.75	9.4	10.1	8.0	19.5	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					
42.33	14.6	5.8	19.2	33.8	40.0
57.28	10.9	24.2	26.6	37.5	40.0
71.60	9.4	25.1	19.6	34.5	40.0
78.74	9.4	23.3	21.0	32.7	40.0
85.93	10.5	15.4	23.7	34.2	40.0
93.07	11.9	14.5	20.0	31.9	43.5
100.23	13.4	8.5	15.3	28.7	43.5
157.51	19.3	11.0	8.3	30.3	43.5
186.15	20.8	14.8	8.0	35.6	43.5
193.31	21.1	10.7	5.6	31.8	43.5
214.79	21.8	13.6	7.7	35.4	43.5
329.30	21.8	8.7	5.4	30.5	46.0
372.26	23.2	4.0	4.2	27.4	46.0

ENGINEERING TEST REPORT

- Continued -

[Note]

Antenna Factor includes the cable loss.

[Environment]

Temperature : 22°C

Humidity : 43%

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)

Meter Reading : 15.8 dB μ V (at Vertical Polarization)

Antenna Factor : 10.3 dB/m

Then, Field Strength is calculated as follows.

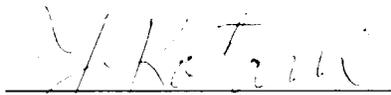
$$\text{Field Strength} = 15.8 + 10.3 = 26.1 \text{ dB}\mu\text{V/m}$$

[Summary of Test Results]

Minimum margin was 2.5 dB at 57.28 MHz, (Other emissions) vertical polarization.

Tested Date : March 12, 1999

Signature



Yoshiko Kotani

ENGINEERING TEST REPORT

5. Output Signal Level Measurement

5.1 Photographs of EUT System Configuration

a. Playback Mode



REAR VIEW

b. Record mode (1V VITS Signal Input)

c. Record mode (5V VITS Signal Input)



REAR VIEW

ENGINEERING TEST REPORT

- Continued -

- d. Record mode (1V VITS Signal Input)
- e. Record mode (5V VITS Signal Input)



REAR VIEW

- f. Record mode (0 dBmV NTSC TV Signal Input)
- g. Record mode (25 dBmV NTSC TV Signal Input)



REAR VIEW

ENGINEERING TEST REPORT

5.2 Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dB μ V/50 Ω]	Maximum Signal Level [dB μ V/75 Ω]	Limits [dB μ V/75 Ω]
Test Channel #3				
61.25	2.0	65.0	67.0	69.5
65.75	2.1	49.3	51.4	56.5
Test Channel #4				
67.25	2.1	65.4	67.5	69.5
71.75	2.1	49.7	51.8	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.

[Environment]

Temperature : 23 °C

Humidity : 25 %

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
 Meter Reading : 65.0 dB μ V/50 Ω
 Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

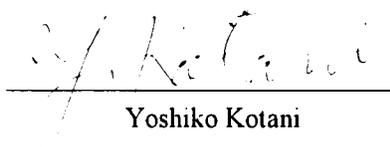
$$\text{Signal Level} = 65.0 + 2.0 = 67.0 \text{ dB}\mu\text{V}/75\Omega$$

[Summary of Test Results]

Minimum margin was 2.0 dB at 67.25 MHz test channel #4.

Tested Date : February 22, 1999

Signature


Yoshiko Kotani

ENGINEERING TEST REPORT**6. Output Terminal Conducted Spurious Emission Measurement****6.1 Photographs of EUT System Configuration**

the tested device configuration is the same as the output signal level measurement.

(See 5.1 Photographs of EUT System Configuration.)

ENGINEERING TEST REPORT

6.2 Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dB μ V/50 Ω]	Maximum Signal Level [dB μ V/75 Ω]	Limits [dB μ V/75 Ω]
Test Channel #3				
52.32	2.0	25.9	27.9	39.5
55.93	2.0	32.2	34.2	39.5
56.65	2.0	36.4	38.4	39.5
70.26	2.1	25.8	27.9	39.5
122.59	2.2	19.5	21.7	39.5
183.87	2.4	19.6	22.0	39.5
** 56.65	2.0	19.5	21.5	39.5
Test Channel #4				
58.28	2.0	26.4	28.4	39.5
61.90	2.0	32.4	34.4	39.5
62.65	2.0	38.2	40.2	39.5
76.27	2.1	25.7	27.8	39.5
134.56	2.3	19.7	22.0	39.5
201.83	2.4	22.6	25.0	39.5
** 62.65	2.0	20.9	22.9	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.

[Environment]

Temperature : 23 °C

Humidity : 25 %

[Sample Calculation]

Frequency : 52.32 MHz (Test Channel #3)
 Meter Reading : 25.9 dB μ V/50 Ω
 Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

$$\text{Signal Level} = 25.9 + 2.0 = 27.9 \text{ dB}\mu\text{V}/75\Omega$$

[Summary of Test Results]

Minimum margin was 5.1 dB at 61.90 MHz, test channel #4.

Tested Date : February 22, 1999

Signature



Yoshiko Kotani

ENGINEERING TEST REPORT

7. Transfer Switch Measurement

7.1 Photographs of EUT System Configuration

a. Playback Mode



REAR VIEW

b. Record mode (1V VITS Signal Input)

c. Record mode (5V VITS Signal Input)



REAR VIEW

ENGINEERING TEST REPORT

- Continued -

- d. Record mode (1V VITS Signal Input)
- e. Record mode (5V VITS Signal Input)



REAR VIEW

ENGINEERING TEST REPORT

7.2 Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dB μ V/50 Ω]	Maximum Signal Level [dB μ V/75 Ω]	Limits [dB μ V/75 Ω]
Test Channel #3 61.25	2.0	1.0	3.0	9.5
Test Channel #4 67.25	2.1	0.8	2.9	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.

[Environment]

Temperature : 23 °C

Humidity : 25 %

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
 Meter Reading : 1.0 dB μ V/50 Ω
 Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

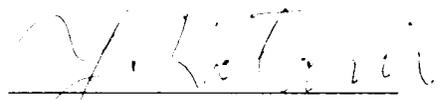
$$\text{Signal Level} = 1.0 + 2.0 = 3.0 \text{ dB}\mu\text{V}/75\Omega$$

[Summary of Test Results]

Minimum margin was 6.5 dB, at 61.25 MHz, test channel #3.

Tested Date : February 22, 1999

Signature



Yoshiko Kotani

ENGINEERING TEST REPORT

8. List of Test Equipments

Instrument	Manufacturer	Model No.	Specifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESHS10	Frequency Range 9 kHz – 30 MHz	(S/N) 846860/012	1	1999/2	2000/2
		ESVS10	Frequency Range 20 MHz – 1 GHz	FS-60	2	1998/5	2000/5
Spectrum Analyzer	Hewlett Packard	8568B	Frequency Range 100 Hz – 1.5 GHz	FS-46-3	1,3,4,5	1998/6	1999/6
	Rohde & Schwarz	FSA	Frequency Range 100 Hz – 1.8 GHz	SA-35	2	1998/6	1999/6
Pre-amplifier	Anritsu	MH648A	Frequency Range 100 kHz – 1.2 GHz	AM-28	4,5	1998/6	1999/6
Line Impedance Stabilization Network	Kyoritsu	KNW-407	Frequency Range: 150 kHz - 30 MHz Impedance: 50 Ω / 50 μH Capacity: AC250V, 15A	FL-107	1	1998/4	1999/4
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30 MHz – 300 MHz	AN-219	2	1999/2	2000/2
Log-Periodic Antenna	Schwarzbeck	UHALP9108A	Frequency Range 300 MHz – 1 GHz	AN-218	2	1999/2	2000/2
Tuned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Range 25 MHz – 500 MHz	AN-132	—	1999/3	2000/3
		KBA-611S	Frequency Range 500 MHz – 1 GHz	AN-8-11	—	1999/3	2000/3

ENGINEERING TEST REPORT

- Continued -

Instrument	Manufacturer	Model No.	Specifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
Video Part Signal Generator	Anritsu	MG3601A	Frequency Range 100 kHz - 1.04 GHz	SG-41	1,2,3,4	1998/9	1999/9
Audio Part Signal Generator	Anritsu	MG3601A	Frequency Range 100 kHz - 1.04 GHz	SG-48	1,2,3,4	1998/9	1999/9
Multiburst Signal Generator	Anritsu	MG318A	According to ANSI C63.4(1992) Section 12 Fig 15	MG-35	1,2,3,4,5	1998/12	1999/12
Matching Trans-former	Anritsu	MG614A	Frequency Range 10 MHz - 1.2 GHz	AX-28-4	3,4,5	1998/12	1999/12
				AX-28-2	1,2,3,4	1998/11	1999/11
Four-Port Junction Pad	Anritsu	MP659A	Frequency Range 40 MHz - 1 GHz	AX-16	1,2,3,4	1998/11	1999/11

- [Note] Test Item(*) :
1. AC Power Line Conducted Emission Measurement
 2. Radiated Emission Measurement
 3. Output Signal Level Measurement
 4. Output Terminal Conducted Spurious Emission Measurement
 5. Transfer Switch Measurement