Designated by Ministry of International Trade and Industry

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

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

KEC

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

Corporate Juridical Person

ENGINEERING TEST REPORT

REPORT NO. A-005-99-C1 Issued Date : March 25, 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.

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 : MITSUBISHI ELECTRIC CORP.
Audio-Visual Systems Business Division
Imageing Storage Products Department

Mailing Address : 1 Baba-Zusyo Nagaokakyo-City Kyoto 617-8550 Japan

2. Identification of Tested Device

Device Name : Video Cassette Recorder
Trade Name : MITSUBISHI
Model Number : HS-U795
Serial Number : P012 ☒ Prototype ☐ Pre-production ☐ Production
Date of Manufacture : December, 1998

3. Test Items and 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)(f)
(3) Antenna Power Conduction Measurement : Section 15.111(a)
(4) Picture Sensitivity Measurement : Section 15.117(f)
(5) Noise Figure Measurement : Section 15.117(g)

Above all tests were performed under :
ANSI C63.4-1992, FCC/OET MP-2
IEEE Std 187-1990, IEEE Std 190 and IEEE Std 213-1987

4. Date

Receipt of Test Sample : January 26, 1999
Test Completed on : March 19, 1999

CERTIFIED BY : _____
Fumitoshi Nagaoka
Associate Director of Ikoma Testing Laborator

ENGINEERING TEST REPORT

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1. GENERAL INFORMATION

1.1 Product Description

The MITSUBISHI Model No.HS-U795 (referred to as the EUT in this report) is a Video Cassette Recorder containing RF modulator and Tuner.

1) Provided Terminals

- ANT Input Terminal
- ANT Output Terminal
- A/V Input Terminals (rear side and front side)
- A/V Output Terminals
- S-VIDEO Input Terminals
- S-VIDEO Output Terminal
- ACTIVE AV NETWORK Input Terminal
- ACTIVE AV NETWORK Output Terminal
- CONVERTER BOX CONTROL Terminal
- EDIT JACK IN/OUT Terminal

2) Tuning Range and Local Oscillating Frequencies

TV : VHF/2～13ch(101-257 MHz), UHF/14～69ch(517-847 MHz).
CATV : VHF/5A(119 MHz), LOW/A-5～A-1(137-161 MHz), MID/A～I(167-215 MHz), SUPER/J～W(263-341 MHz),HYPER/W+1～W+58(347-689 MHz), W+59～W+84(695-845 MHz).

3) Type of Circuit

Superheterodyne, IF : 45.75 MHz/Picture and 41.25 MHz/Sound

4) Type of Antenna Input Connector : Type "F" Connector 75Ω (Unbalanced)

5) Rated Power Supply : AC 120 V, 60 Hz

1.2 Description for Equipment Authorization

1) Rules Part(s) under which Equipment operated

FCC Rule Part 15, Subpart B : TV Broadcast Receiver in Unintentional Radiators.

2) Kind of Equipment Authorization

( ) Certification (x) Verification

3) Procedure of Application

(x) Original Equipment ( ) Modification

1.3 Test Facility

N a m e : KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC)
IKOMA TESTING LABORATORY
Open Test Site No.1
Shielded Room 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.
Also the laboratory has been authorized by ITI(Interference Technology Internaitonal, UK).

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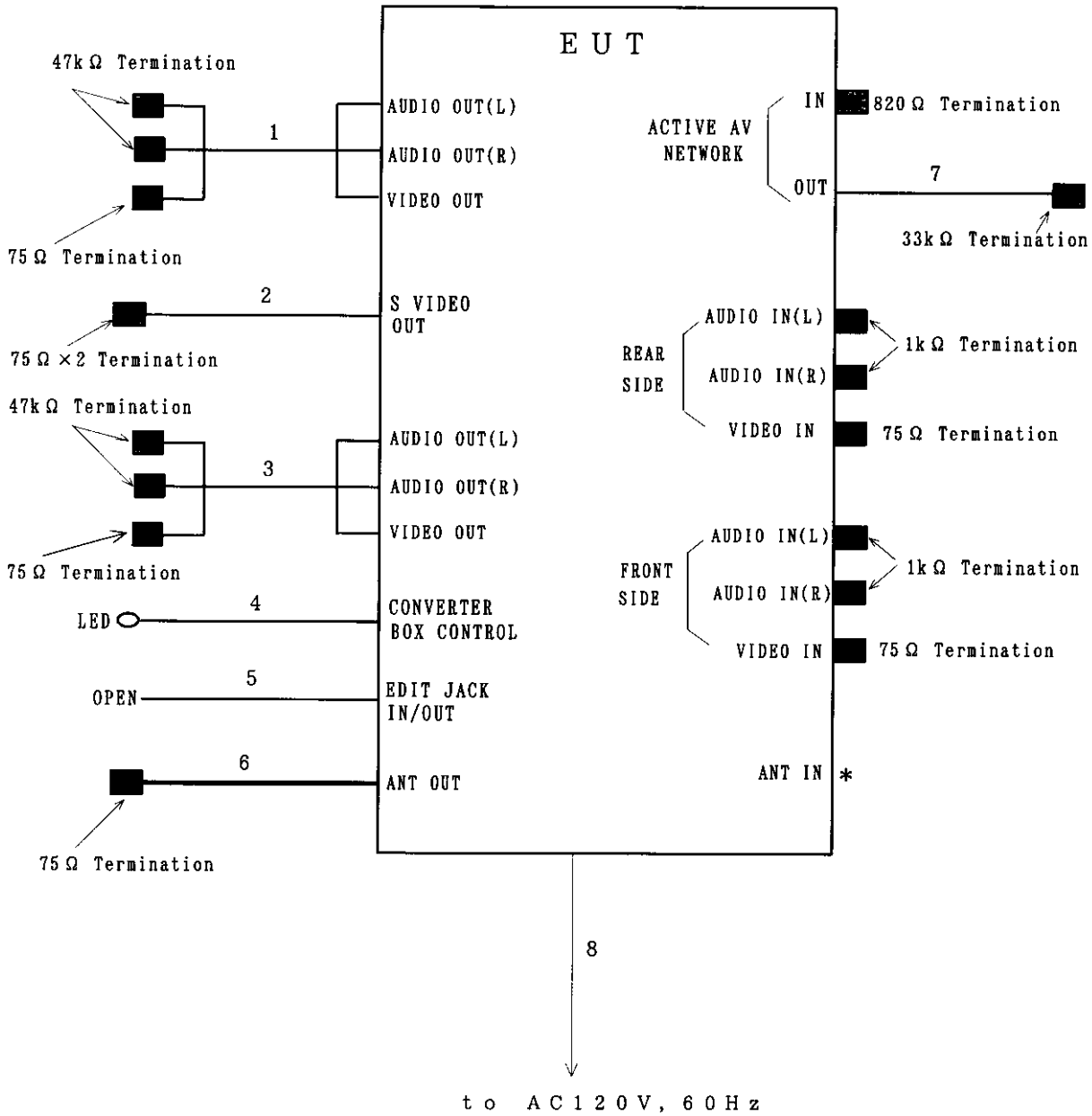
2. TESTED SYSTEM

2.1 Test Planning and Test Mode

Tests were performed with the accessories normally marketed with the device.

2.2 Block Diagram of EUT System



[Note]

1) * : See 2.3 Connection of EUT System
2) See 2.4 List of Cables

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2.3 Connection of EUT System

(1) AC Power Line Conducted Emission Measurement

ANT IN : TV signal generator (US #13, 64dBμV)

(2) Radiated Emission Measurement

ANT IN : 75Ω termination

(3) Antena Power Conduction Measurement

ANT IN : Test Receiver or Spectrum Analyzer

2.4 List of Cables

No	Cable Name	Model Number (Trade Name)	Shielded (Y/N)	Length (m)	Note	Remark
1	A/V Cables		Y	1.45	RCA Plug	1)
2	S-VIDEO Cable		Y	1.45		1)
3	A/V Cables		Y	1.5	RCA Plug	
4	CONVERTER BOX CONTROL Cables		Y	1.9	Permanently attached to LED one- end mini jack plug	1)
5	EDIT JACK IN/OUT Cable		Y	1.0	RCA Plug	
6	ANT OUT Cable		Y	1.45	Caoxical type	1)
7	ACTIVE NETWORK Out Cable		Y	1.5	mini jack plug	
8	AC Power Cord		N	1.85	2-wires type, permanently attached to EUT	

[Remark]

1) : Accessory cable of EUT

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3.2 Test Results

Emission Frequency [MHz]	LISN Corr. Factor [dB]	Meter Reading [dBμV]		Maximum RF Voltage [dBμV]	Limits [dBμV]
		One-end to Ground	Other-end to Ground		
0.4769	0.1	38.7	39.0	39.1	48.0
16.12	0.7	18.2	16.7	18.9	48.0
17.62	0.8	24.0	26.2	27.0	48.0
19.87	0.9	22.3	20.4	23.2	48.0
21.74	1.0	21.4	20.4	22.4	48.0
23.99	1.1	32.2	31.0	33.3	48.0

[Note]

LISN Correction Factor includes the cable loss.

[Environment]

Temperature : 18 ℃ Humidity : 56 %

[Sample Calculation]

Frequency : 0.4769 [MHz]
Meter Reading : 39.0 [dBμV] (at Other-end to Ground)
LISN Corr. Factor : 0.1 [dB]

Then, RF voltage is calculated as follows.

RF Voltage = 39.0 + 0.1 = 39.1 [dBμV]

[Summary of Test Results]

Minimum margin was 8.9 dB at 0.4769 MHz, other-end to ground.

Tested Date : March 9, 1999 Signature Y. Kotani
Yoshiko Kotani

ENGINEERING TEST REPORT

4.2 Test Results

[ON AIR CHANNEL --- below 1GHz] [Distance : 3m]

Measurement Frequency		Antenna Factor	Meter Reading		Maximum Field Strength	Limits
Ch.	[MHz]	[dB/m]	Horiz. [dBμV]	Vert. [dBμV]	[dBμV/m]	[dBμV/m]
TV VHF Fundamental						
2	101	11.2	<5.0	<5.0	<16.2	43.5
3	107	12.0	6.2	<5.0	18.2	43.5
4	113	12.9	4.6	3.5	17.5	43.5
5	123	14.1	5.0	2.4	19.1	43.5
6	129	14.5	4.6	<3.0	19.1	43.5
7	221	18.2	8.2	1.5	26.4	46.0
8	227	18.3	8.4	1.7	26.7	46.0
9	233	18.4	8.4	1.4	26.8	46.0
10	239	18.6	8.1	3.1	26.7	46.0
11	245	18.7	10.3	3.6	29.0	46.0
12	251	18.8	12.6	4.9	31.4	46.0
13	257	19.2	12.6	5.0	31.8	46.0
TV VHF 2nd Harmonic						
2	202	17.8	<0.0	<0.0	<17.8	43.5
3	214	18.1	1.5	<0.0	19.6	43.5
4	226	18.3	<0.0	<0.0	<18.3	46.0
5	246	18.7	<0.0	<0.0	<18.7	46.0
6	258	19.3	<0.0	<0.0	<19.3	46.0
7	442	20.2	<0.0	<0.0	<20.2	46.0
8	454	20.5	<0.0	<0.0	<20.5	46.0
9	466	20.8	<0.0	<0.0	<20.8	46.0
10	478	21.1	<0.0	<0.0	<21.1	46.0
11	490	21.4	<0.0	<0.0	<21.4	46.0
12	502	21.7	<0.0	<0.0	<21.7	46.0
13	514	22.0	<0.0	<0.0	<22.0	46.0

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[ON AIR CHANNEL --- below 1GHz] [Distance : 3m]

Measurement Frequency		Antenna Factor	Meter Reading		Maximum Field Strength	Limits
Ch.	[MHz]	[dB/m]	Horiz. [dBμV]	Vert. [dBμV]	[dBμV/m]	[dBμV/m]
TV UHF Fundamental						
14	517	22.1	5.3	5.4	27.5	46.0
19	547	22.8	12.2	11.4	35.0	46.0
28	601	24.1	16.0	10.1	40.1	46.0
36	649	24.8	9.2	9.3	34.1	46.0
44	697	25.4	7.6	8.8	34.2	46.0
53	751	25.9	11.6	6.8	37.5	46.0
61	799	26.4	8.1	9.4	35.8	46.0
69	847	26.9	10.5	7.0	37.4	46.0

[ON AIR CHANNEL --- above 1GHz] [Distance : 3m]

Measurement Frequency		Antenna Factor	Pre·AMP Gain	Meter Reading		Maximum Field Strength	Limits
Ch.	[MHz]	[dB/m]	[dB]	Horiz. [dBμV]	Vert. [dBμV	[dBμV/m]	[dBμV/m]
TV UHF 2nd Harmonic							
14	1034	25.0	37.2	45.2	45.3	33.1	54.0
19	1094	23.6	37.1	42.2	49.4	35.9	54.0
28	1202	24.5	37.0	43.2	51.8	39.3	54.0
36	1298	23.3	36.8	43.2	45.0	31.5	54.0
44	1394	22.5	36.7	36.7	40.0	25.8	54.0
54	1514	23.1	36.5	37.4	43.8	30.4	54.0
61	1598	22.2	36.3	40.2	44.3	30.2	54.0
69	1694	22.6	36.2	43.7	47.3	33.7	54.0

ENGINEERING TEST REPORT

- Continued -

[CATV CHANNEL --- below 1GHz] [Distance : 3m]

Measurement Frequency		Antenna Factor	Meter Reading		Maximum Field Strength	Limits
Ch.	[MHz]	[dB/m]	Horiz. [dBμV]	Vert. [dBμV]	[dBμV/m]	[dBμV/m]
CATV Fundamental						
1	119	13.7	2.9	1.0	16.6	43.5
95	137	15.1	3.0	<0.0	18.1	43.5
97	149	15.8	4.8	1.0	20.6	43.5
99	161	16.3	4.1	0.8	20.4	43.5
14	167	16.7	4.8	4.4	21.5	43.5
18	191	17.5	2.3	<0.0	19.8	43.5
22	215	18.1	9.1	1.6	27.2	43.5
23	263	19.6	11.3	2.2	30.9	46.0
29	299	21.8	13.7	6.4	35.5	46.0
36	341	18.5	16.4	10.0	34.9	46.0
37	347	18.6	11.0	8.3	29.6	46.0
65	515	22.0	9.3	5.5	31.3	46.0
94	689	25.3	8.9	8.7	34.2	46.0
100	695	25.4	8.7	8.6	34.1	46.0
113	773	26.1	10.6	7.6	36.7	46.0
124	845	26.9	7.7	6.0	34.6	46.0
CATV 2nd Harmonic						
1	238	18.5	<0.0	<0.0	<18.5	46.0
95	274	20.3	<0.0	<0.0	<20.3	46.0
97	298	21.7	0.3	0.6	22.3	46.0
99	322	18.3	<0.0	<0.0	<18.3	46.0
14	334	18.4	<0.0	<0.0	<18.4	46.0
18	382	19.0	<0.0	<0.0	<19.0	46.0
22	430	19.9	<0.0	<0.0	<19.9	46.0
23	526	22.3	<1.0	<1.0	<23.3	46.0
29	598	24.1	<0.0	<0.0	<24.1	46.0
36	682	25.2	1.9	1.2	27.1	46.0
37	694	25.4	1.2	1.2	26.6	46.0

ENGINEERING TEST REPORT

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[CATV CHANNEL --- above 1GHz] [Distance : 3m]

Measurement Frequency		Antenna Factor	Pre.AMP Gain	Meter Reading		Maximum Field Strength	Limits
Ch.	[MHz]	[dB/m]	[dB]	Horiz. [dBμV]	Vert. [dBμV]	[dBμV/m]	[dBμV/m]
CATV 2nd Harmonic							
65	1030	25.1	37.2	41.0	48.0	35.9	54.0
94	1378	22.7	36.7	37.8	40.6	26.6	54.0
100	1390	22.6	36.7	37.7	40.6	26.5	54.0
113	1546	22.7	36.4	40.0	42.6	28.9	54.0
125	1690	22.6	36.2	41.8	48.4	34.8	54.0

[Note]

Antenna factor includes the loss of coaxial cable used for the test.

[Environment]

Temperature : 18 ℃ Humidity : 71 %

[Sample calculation]

Frequency : 1030 [MHz] (CATV 65ch. 2nd Harmonic)
Meter Reading : 48.0 [dBμV] (at Vert. Polarization)
Antenna Factor : 25.1 [dB/m]
Pre-AMP Gain : 37.2 [dB]

Then, Field Strength is calculated as follows.

Field Strength = 48.0 + 25.1 - 37.2 = 35.9 [dBμV/m]

[Summary of Test Results]

Minimum margin was 5.9 dB at 601 MHz, UHF 28ch (Fundamental) horiz. polarization.

Tested Date : March 19, 1999

Signature Y. Kotani
Yoshiko Kotani

ENGINEERING TEST REPORT

5. ANTENNA POWER CONDUCTION MEASUREMENT

5.1 Test Results

[ON AIR CHANNEL]

Measurement Frequency		Correction Factor	Meter Reading	Conversion Factor [dBμV] to [dBnW]	Antenna Power Conduction	Limit*
ch.	[MHz]	[dB]	[dBμV]	[dB]	[dBnW]	[dBnW]
TV VHF Fundamental						
2	101	6.5	12.2	-48.8	-30.1	3.0
3	107	6.5	11.9	-48.8	-30.4	3.0
4	113	6.5	11.6	-48.8	-30.7	3.0
5	123	6.5	12.2	-48.8	-30.1	3.0
6	129	6.5	12.5	-48.8	-29.8	3.0
7	221	6.5	11.6	-48.8	-30.7	3.0
8	227	6.5	11.3	-48.8	-31.0	3.0
9	233	6.5	11.3	-48.8	-31.0	3.0
10	239	6.5	11.4	-48.8	-30.9	3.0
11	245	6.5	11.8	-48.8	-30.5	3.0
12	251	6.5	12.0	-48.8	-30.3	3.0
13	257	6.5	12.4	-48.8	-29.9	3.0
TV VHF 2nd Harmonic						
2	202	6.5	<0.0	-48.8	<-42.3	3.0
3	214	6.5	<0.0	-48.8	<-42.3	3.0
4	226	6.5	<0.0	-48.8	<-42.3	3.0
5	246	6.5	<0.0	-48.8	<-42.3	3.0
6	258	6.5	<0.0	-48.8	<-42.3	3.0
7	442	6.5	9.2	-48.8	-33.1	3.0
8	454	6.5	8.9	-48.8	-33.4	3.0
9	466	6.5	8.7	-48.8	-33.6	3.0
10	478	6.5	8.3	-48.8	-34.0	3.0
11	490	6.5	7.9	-48.8	-34.4	3.0
12	502	6.5	7.5	-48.8	-34.8	3.0
13	514	6.5	7.2	-48.8	-35.1	3.0
TV UHF Fundamental						
14	517	6.5	13.7	-48.8	-28.6	3.0
19	547	6.5	13.1	-48.8	-29.2	3.0
28	601	6.5	12.5	-48.8	-29.8	3.0
36	649	6.5	12.6	-48.8	-29.7	3.0
44	697	6.5	12.5	-48.8	-29.8	3.0
53	751	6.5	14.4	-48.8	-27.9	3.0
61	799	6.5	21.5	-48.8	-20.8	3.0
69	847	6.5	31.5	-48.8	-10.8	3.0
TV UHF 2nd Harmonic						
14	1034	6.6	21.5	-48.8	-20.7	3.0
19	1094	6.6	34.2	-48.8	-8.0	3.0
28	1202	6.6	31.6	-48.8	-10.6	3.0
36	1298	6.6	37.1	-48.8	-5.1	3.0
44	1394	6.6	38.5	-48.8	-3.7	3.0
53	1502	6.6	37.8	-48.8	-4.4	3.0
61	1598	6.6	33.8	-48.8	-8.4	3.0
69	1694	6.6	21.8	-48.8	-20.4	3.0

[Note] *) 3.0[dBnW] in Limit is equal to 2[nW].

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[CATV CHANNEL]

Measurement Frequency		Correction Factor	Meter Reading	Conversion Factor [dBμV] to [dBnW]	Antenna Power Conduction	Limit*
ch.	[MHz]	[dB]	[dBμV]	[dB]	[dBnW]	[dBnW]
CATV Fundamental						
1	119	6.5	14.2	-48.8	-28.1	3.0
95	137	6.5	14.9	-48.8	-27.4	3.0
97	149	6.5	15.1	-48.8	-27.2	3.0
99	161	6.5	15.2	-48.8	-27.1	3.0
14	167	6.5	15.4	-48.8	-26.9	3.0
18	191	6.5	11.4	-48.8	-30.9	3.0
22	215	6.5	12.2	-48.8	-30.1	3.0
23	263	6.5	13.3	-48.8	-29.0	3.0
29	299	6.5	10.3	-48.8	-32.0	3.0
36	341	6.5	19.3	-48.8	-23.0	3.0
37	347	6.5	19.4	-48.8	-22.9	3.0
65	515	6.5	13.6	-48.8	-28.7	3.0
94	689	6.5	12.7	-48.8	-29.6	3.0
100	695	6.5	12.7	-48.8	-29.6	3.0
113	773	6.5	17.0	-48.8	-25.3	3.0
125	845	6.5	31.2	-48.8	-11.1	3.0
CATV 2nd Harmonic						
1	238	6.5	<0.0	-48.8	<-42.3	3.0
95	274	6.5	<0.0	-48.8	<-42.3	3.0
97	298	6.5	<0.0	-48.8	<-42.3	3.0
99	322	6.5	0.5	-48.8	-41.8	3.0
14	334	6.5	<0.0	-48.8	<-42.3	3.0
18	382	6.5	4.6	-48.8	-37.7	3.0
22	430	6.5	9.0	-48.8	-33.3	3.0
23	526	6.5	7.0	-48.8	-35.3	3.0
29	598	6.5	8.5	-48.8	-33.8	3.0
36	682	6.5	14.3	-48.8	-28.0	3.0
37	694	6.5	15.4	-48.8	-26.9	3.0
65	1030	6.6	19.4	-48.8	-22.8	3.0
94	1378	6.6	37.0	-48.8	-5.2	3.0
100	1390	6.6	36.6	-48.8	-5.6	3.0
113	1546	6.6	34.7	-48.8	-7.5	3.0
125	1690	6.6	21.3	-48.8	-20.9	3.0

[Note] *) 3.0[dBnW] in Limit is equal to 2[nW].

ENGINEERING TEST REPORT

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[Environment]

Temperature : 18 ℃ Humidity : 71 %

[Note]

1) The spectrum was scaned from 30 MHz to 1.7 GHz, and all emission not reported were less than 10 dBμV at meter reading.

2) The correction factor consist of the voltage loss of the impedance matching transformer (50Ω : 75Ω) and the coaxial cable used for the test.

[Sample calculation]

Frequency	:	101	[MHz] (VHF 2ch Fundamental)
Meter Reading	:	12.2	[dBμV]
Correction Factor	:	6.5	[dB]
Conversion Factor	:	-48.8	[dB] (dBμV to dBnW)

Then, the antenna Power Conduction is calculated as follows.

Antenna Power Conduction = 12.2 + 6.5 - 48.8 = -30.1 [dBnW]

[Summary of Test Results]

Minimum margin was 6.7 dB at 1394 MHz(UHF 44ch) 2nd harmonic.

Tested Date : March 19, 1999

Signature Y. Kotani
Yoshiko Kotani

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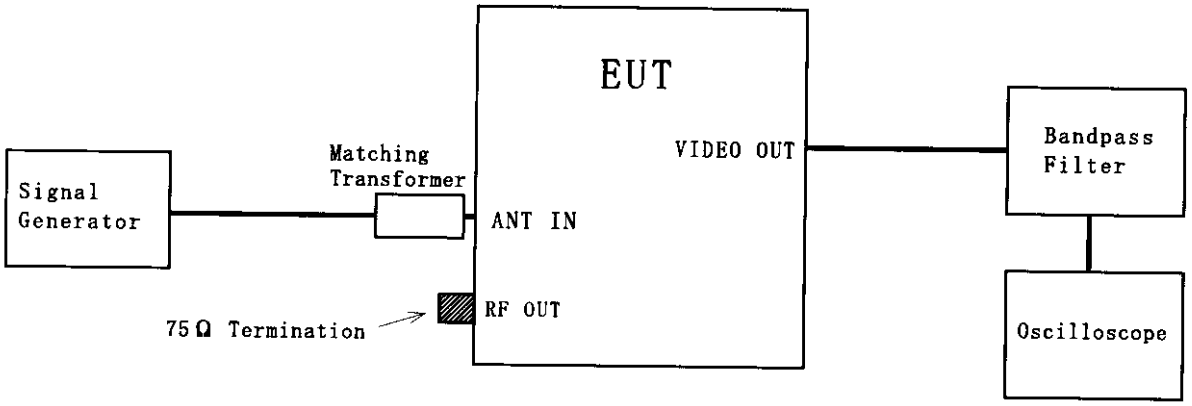
6. PICTURE SENSITVITY MEASUREMENT

6.1 Test Configuration



6.2 Test Result

VHF Measurement Frequency		Antenna Input Level		UHF Measurement Frequency		Antenna Input Level	
ch.	[MHz]	[dBm]	[pW]	ch.	[MHz]	[dBm]	[pW]
2	55.25	-82.7	5.370	14	471.25	-78.9	12.882
6	83.25	-78.0	15.849	44	651.25	-80.3	9.333
7	175.25	-82.5	5.623	69	801.25	-73.7	42.658
13	211.25	-84.0	3.981				
AVERAGE "VHF"			7.706	AVERAGE "UHF"			21.624

AVERAGE UHF/VHF : $10 \log \frac{\text{"UHF" pW}}{\text{"VHF" pW}} = 4.5$ dB

[Limit 8.0 dB]

[Environment]
Temperature : 17 ℃ Humidity : 51 %

[Summary of Test Results]
Margin was 3.5 dB.

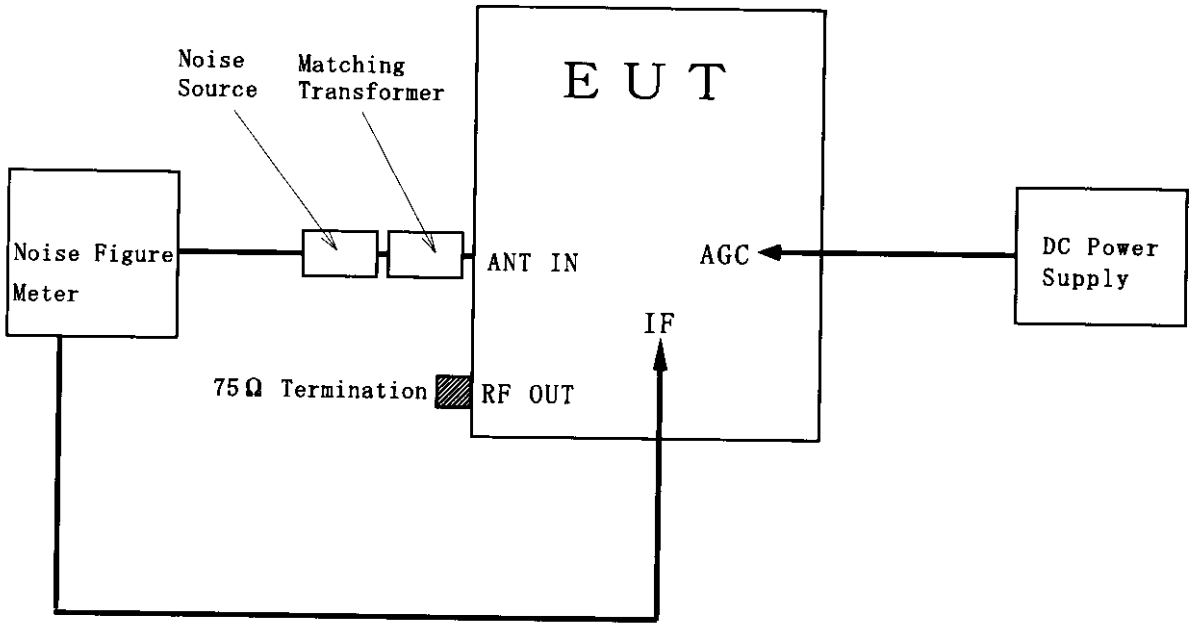
Tested Date : March 19, 1999 Signature

Ikuya Minematsu

ENGINEERING TEST REPORT

7.NOISE FIGURE MEASUREMENT

7.1 Test Configuration



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7.2 Test Results

Measurement Frequency ch.	[MHz]	Correction Factor [dB]	Meter Reading [dBμV]	Tuner Gain [dB]	△F [dB]	Noise Figure [dB]	Limit [dB]
TV UHF							
14	471.25	0.8	9.9	32.6	0.075	9.1	14
20	507.25	0.8	10.1	31.9	0.078	9.3	14
26	543.25	0.8	10.1	31.4	0.083	9.3	14
32	579.25	0.9	9.9	31.6	0.087	9.0	14
38	615.25	0.9	9.7	32.4	0.083	8.8	14
44	651.25	0.9	8.9	33.5	0.088	8.0	14
50	687.25	1.0	8.2	35.1	0.088	7.2	14
56	723.25	1.0	7.6	36.7	0.084	6.6	14
62	759.25	1.1	7.0	38.7	0.078	5.9	14
69	801.25	1.1	6.5	42.3	0.058	5.4	14
Maximum "NF" Channel(26)		0.8	10.1	31.4	0.083	9.3	14

[Note]

(×) The second stage(IF Amp) noise figure contribution did not exceed 0.3dB.
(×) 4dB is subtracted from the measured noise figure, because a power splitter is equiped in VCR.

The noise figure contribution of IF amplifier following the measurement point:

$$\triangle F = 10 \log_{10} \left\{ 1 + \frac{F_2 - 1}{F_1 \times G_1} \right\}$$

where, △F: Noise figure contribution of the amplifier following the measurement point in dB.
F_1: Noise figure from receiver antenna input terminal to measurement point as power ratio.
F_2: Noise figure of that IF amplifier as power ratio.
G_1: Gain of circuit from receiver antenna input terminals to measurement point as a power gain.

[Environment]

Temperature : 17 ℃ Humidity : 51 %

[Summary of Test Results]

Minimum margin was 4.7 dB at 543.25 MHz, 26ch.

Tested Date : March 19, 1999 Signature

Ikuya Minematsu

ENGINEERING TEST REPORT

8. LIST OF TEST INSTRUMENTS

Instrument	Manufacturer	Model No	Specifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
Test Receiver	Kyoritsu	KNM-2403	Frequency Range 9 kHz - 30 MHz	FS-70	1	1998/4	1999/4
	Rohde & Schwarz	ESVS10	Frequency Range 20 MHz - 1 GHz	FS-81	2	1998/10	1999/10
Spectrum Analyzer	Advantest	TR4172	Frequency Range 50 Hz - 1.8 GHz	SA-23	1,4,5	1999/1	2000/1
		R3261B	Frequency Range 9 kHz - 3.6 GHz	SA-31	2,3	1998/8	1999/8
Pre-Amplifier	Hewlett Packard	8449B	Frequency Range 1 GHz - 26.5 GHz	AM-52	2	1998/4	1999/4
Line Impedance Stabiliza-tion Network	Kyoritsu	KNW-407	Frequency Range 150 kHz - 30 MHz Impedance 50 Ω / 50 μH	FL-72	1	1998/4	1999/4
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30 MHz - 300 MHz	AN-99	2	1999/2	2000/2
Log-Periodic Antenna	Schwarzbeck	UHALP 9107	Frequency Range 300 MHz - 1 GHz	AN-199	2	1999/2	2000/2
Tuned Dipole Antenna	oritsu	KBA-511AS	Frequency Range 25 MHz - 500 MHz	AN-111	—	1999/3	2000/3
		KBA-611S	Frequency Range 500 MHz - 1 GHz	AN-115	—	1999/3	2000/3
Horn Antenna	RAVEN	91888-2	Frequency Range 1 GHz - 2 GHz	AN-167	2	1997/11	1999/11

ENGINEERING TEST REPORT

- Continued -

Instrument	Manufacturer	Model No	Specifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
IRE TV Signal Generator	Sibasoku	VG40A	NTSC US 4ch, 13ch	MG-43	1	1998/12	1999/12
20dB PAD	Made by KEC		Attenuation 20 dB	MM-39-4	1	–	–
Impedance Trans-former	NMC	MB-009	Frequency Range 10 MHz - 2 GHz 50 Ω : 75 Ω	AX-27	3	1998/11	1999/11
Oscillo-scope	Matsushita	VP-5530B	Frequency Range DC - 300 MHz	OS-18	4	1998/5	1999/5
Filter	Krohn-Hite	3550	Frequency Range 2 Hz - 200 kHz	FL-32	4	1999/3	2000/3
Matching Trans-former	Anritsu	MP614A	Frequency Range 10 MHz - 1.2 GHz 50 Ω : 75 Ω	AX-28-3	4,5	1998/11	1999/11
Standard Signal Generator	Anritsu	MG3601A	Frequency Range 100 kHz - 1.04 GHz	SG-41	4,5	1998/9	1999/9
Noise Figure Meter	Elena	ENF-2005	Frequency Range 10.7MHz - 56.5MHz Noise Source 28 Vp-p	MM-30	5	1998/6	1999/6
Noise Source	Microwave Semiconduc-tor	MC1100	Frequency Range 5 MHz - 1 GHz Noise Ratio 15 dB - 16 dB	MM-30-2	5	1998/6	1999/6

[Note] Test Item(*) : 1. AC Power Line Conducted Emission Measurement
2. Radiated Emission Measurement
3. Antenna Power Conduction Measurement
4. Picture Sensitivity Measurement
5. Noise Figure Measurement

Designated by Ministry of International Trade and Industry

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

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

KEC

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

Corporate Juridical Person

ENGINEERING TEST REPORT

Report No. A-005-99-C

Date : March 25, 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 : MITSUBISHI ELECTRIC CORP.
   Audio-Visual Systems Business Division Imaging
   Storage Products Department

   Mailing Address : 1 Baba-Zusyo Nagaokakyo-City Kyoto 617-8550 Japan

2. Identification of Tested Device
   FCC ID : BGBHS-U795
   Device Name : Video Cassette Recorder
   Trade Name : MITSUBISHI
   Model Number : HS-U795
   Serial Number : P012 ☒ prototype ☐ pre-production ☐ production
   Date of Manufacture : December, 1998

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 : January 26, 1999
   Test Completed on : March 19, 1999

Fumitoshi Nagaoka
Associate Director of Ikoma Testing Laboratory

ENGINEERING TEST REPORT

Table of Contents

ENGINEERING TEST REPORT

1. GENERAL INFORMATION

1.1 Product Description

The MITSUBISHI Model No.HS-U795 (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 75Ω (Unbalanced)

(2) Provided terminal

- ANT Input Terminal
- ANT Output Terminal
- A/V Input Terminals (rear side and front side)
- A/V Output Terminals
- S-VIDEO Input Terminals
- S-VIDEO Output Terminal
- ACTIVE AV NETWORK Input Terminal
- ACTIVE AV NETWORK Output Terminal
- CONVERTER BOX CONTROL Terminal
- EDIT JACK IN/OUT Terminal

(3) Used Oscillating Frequencies

- 12.000 MHz : MAIN CLOCK
- 8.000 MHz : VSET CLOCK
- 8.000 MHz : MOVIE ADVANCE CLOCK
- 4.000 MHz : CONV BOX CLOCK
- 4.000 MHz : SIGNAL CLOCK
- 3.579545 MHz : CHROMA-OSC
- 32.768 kHz : BACK-UP

(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
Open Test Site No.4
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.

2.2 Operation of EUT System

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

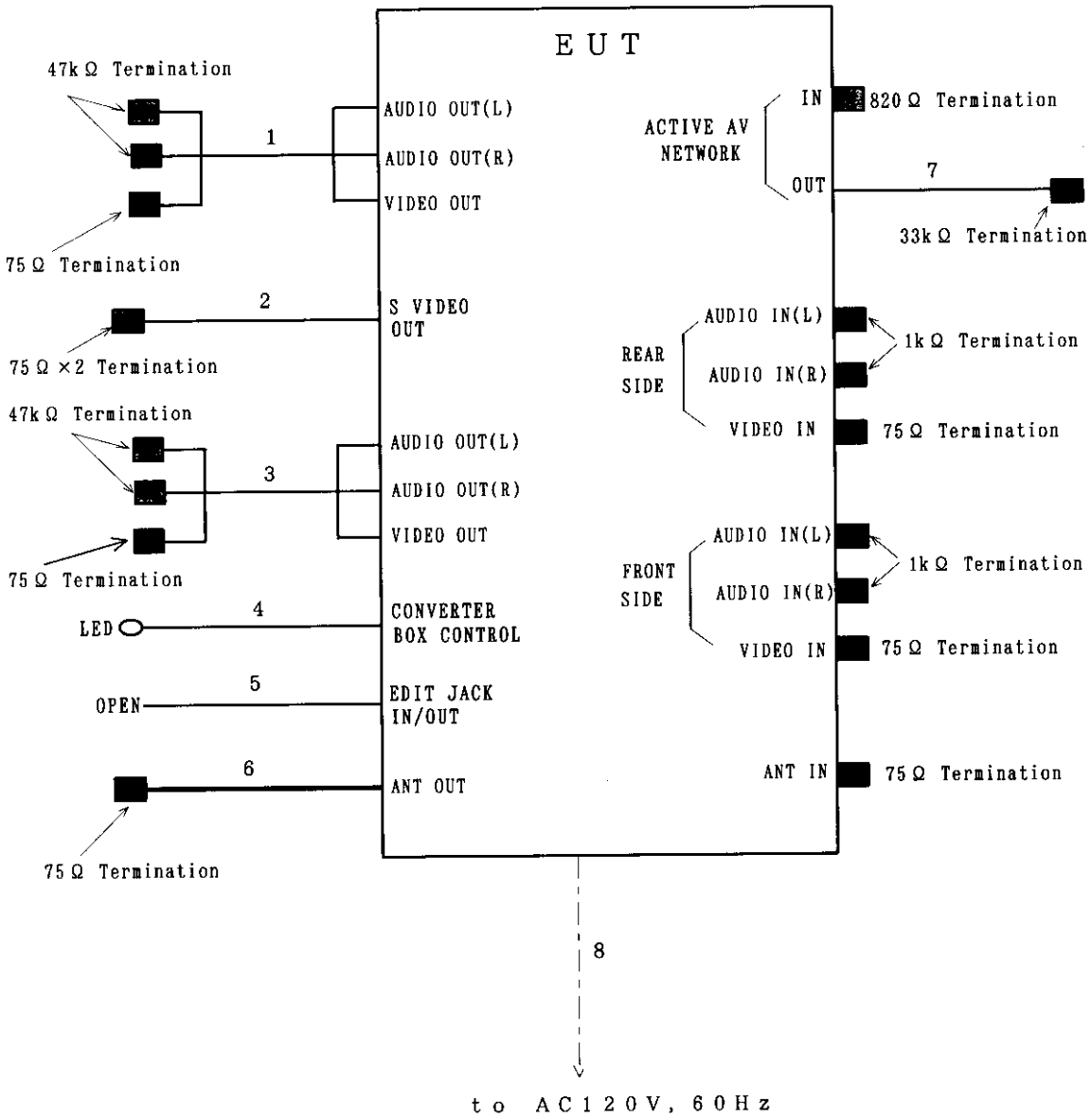
(2) Record mode (1V / 5V VITS Signal Input)
1V/5V peak-to-peak VITS signal is supplied through the VIDEO IN terminal, if applicable.

(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

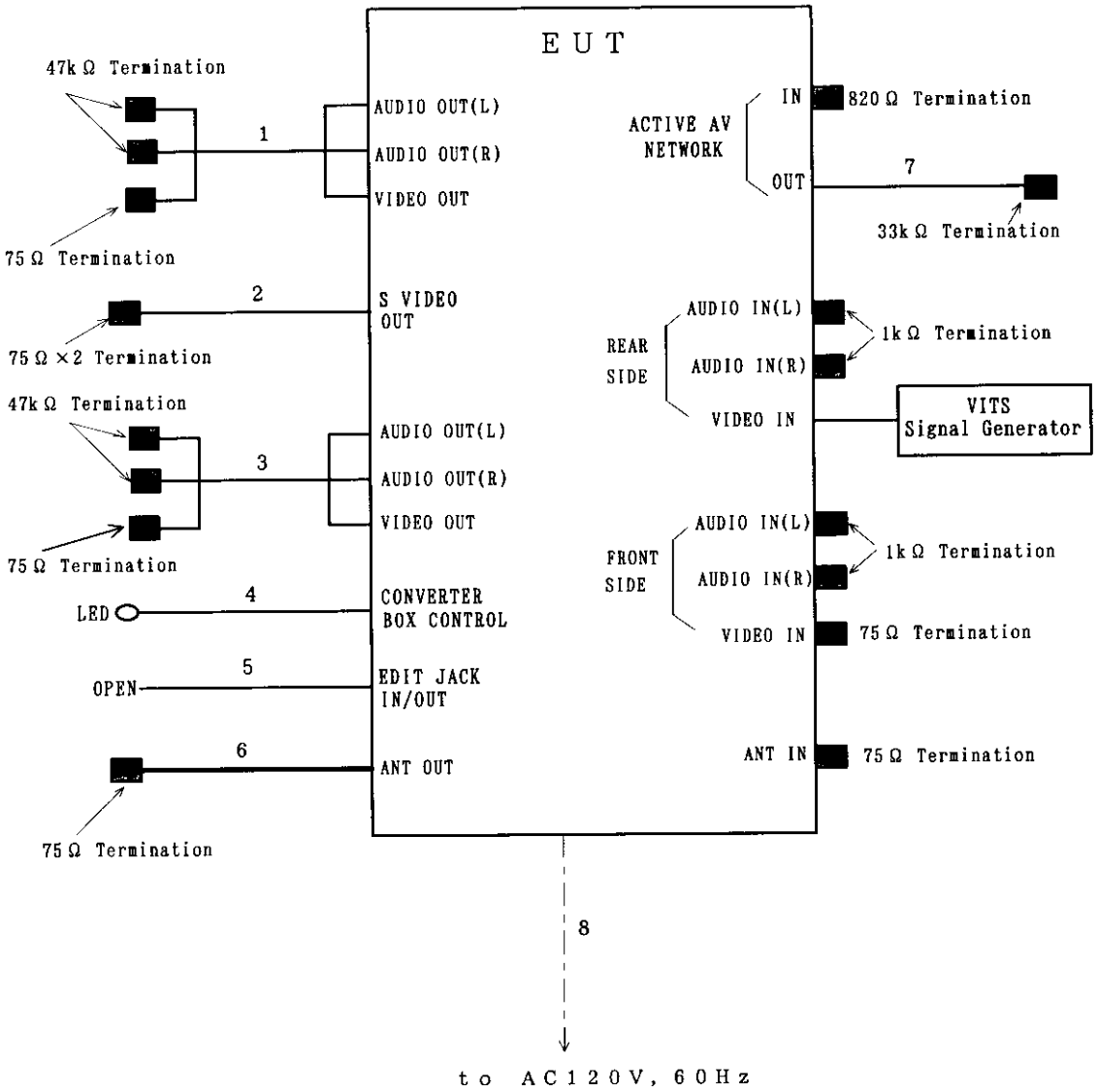
a. Playback mode



ENGINEERING TEST REPORT

- Continued -

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



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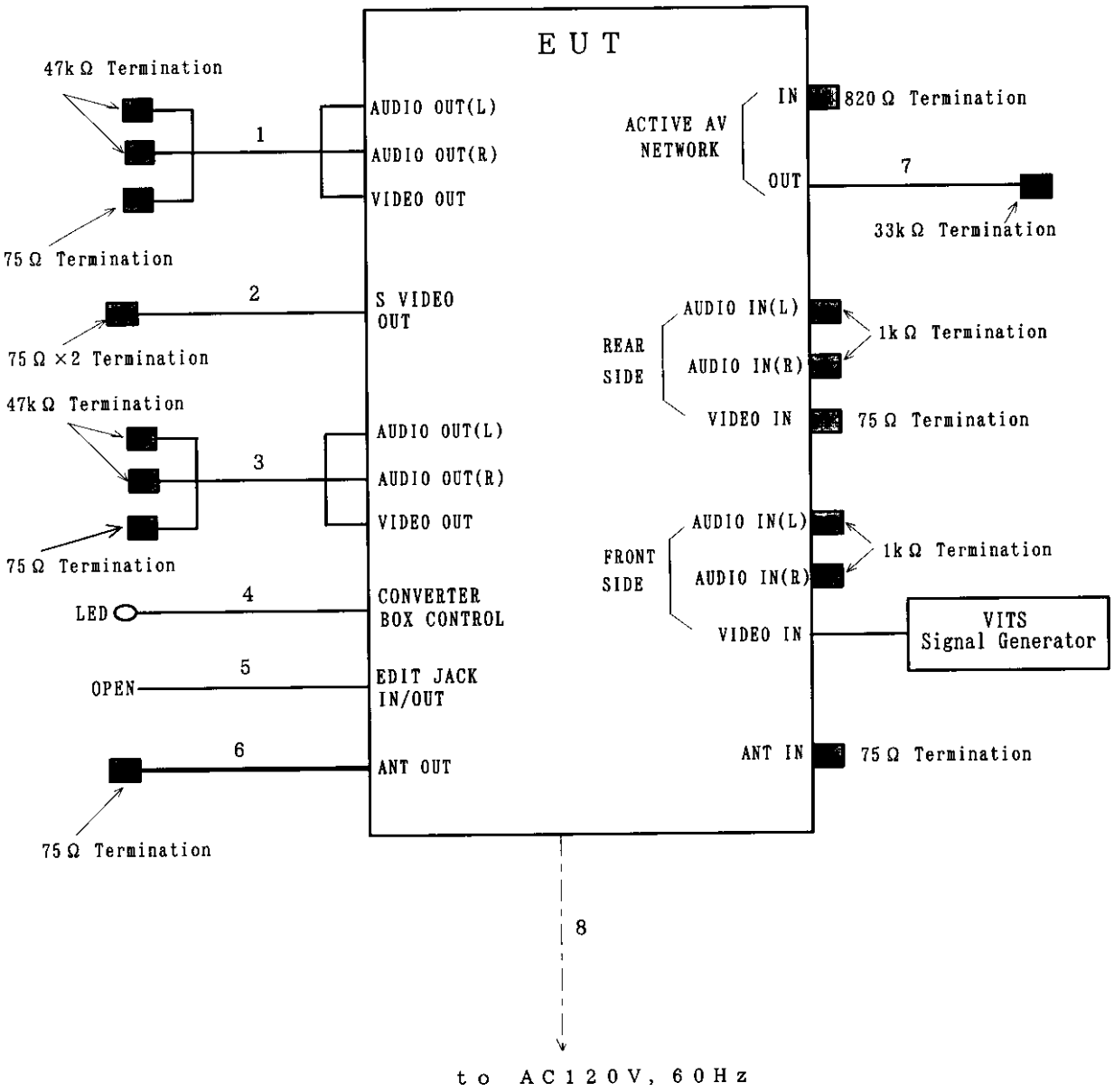
- Continued -

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



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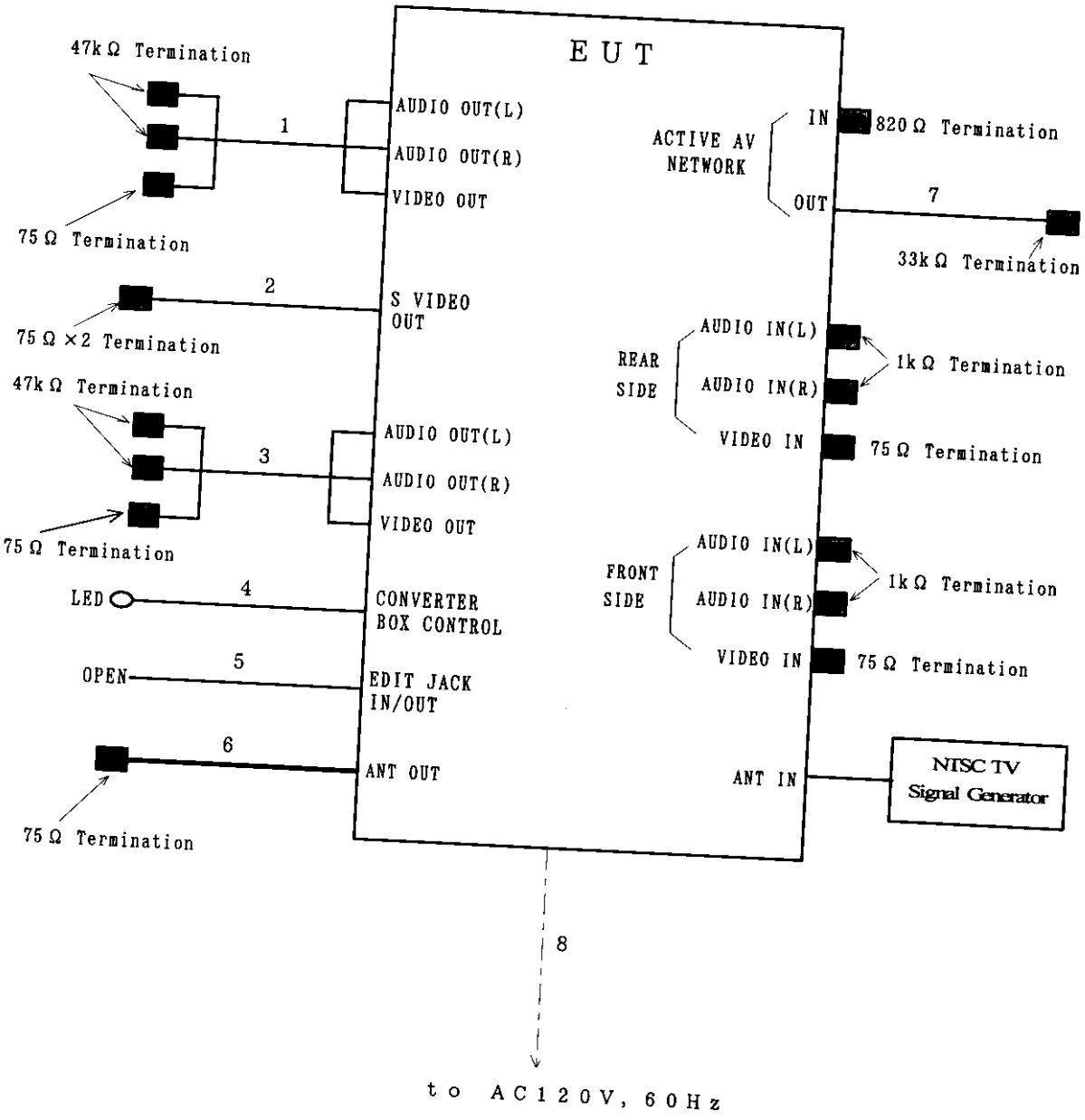
- Continued -

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



[Note]

See 2.4 List of Cables.

ENGINEERING TEST REPORT

2.4 List of Cables

No	Cable Name	Model Number (Trade Name)	Shielded (Y/N)	Length (m)	Note	Remark
1	A/V Cables		Y	1.45	RCA Plug	1)
2	S-VIDEO Cable		Y	1.45		1)
3	A/V Cables		Y	1.5	RCA Plug	
4	CONVERTER BOX CONTROL Cables		Y	1.9	Permanently attached to LED one- end mini jack plug	1)
5	EDIT JACK IN/OUT Cable		Y	1.0	RCA Plug	
6	ANT OUT Cable		Y	1.45	Caoxical type	1)
7	ACTIVE NETWORK Out Cable		Y	1.5	mini jack plug	
8	AC Power Cord		N	1.85	2-wires type, permanently attached to EUT	

[Remark]

1) : Accessory cable of EUT

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7.2 Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBμV/50Ω]	Maximum Signal Level [dBμV/75Ω]	Limits [dBμV/75Ω]
Test Channel #3				
61.25	2.0	3.1	5.1	9.5
122.50	2.2	5.0	7.2	9.5
Test Channel #4				
67.25	2.1	5.3	7.4	9.5
134.50	2.3	3.0	5.3	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.

[Environment]

Temperature : 15 °C Humidity : 51 %

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
Meter Reading : 3.1 dBμV/50Ω
Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.
Signal Level = 3.1 + 2.0 = 5.1 dBμV/75Ω

[Summary of Test Results]

Minimum margin was 2.1 dB, at 67.25 MHz, test channel #4.

Tested Date : February 3, 1999 Signature Y. Kotani
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-82	2	1999/2	2000/2
Spectrum Analyzer	Hewlett Packard	8568B	Frequency Range 100 Hz – 1.5 GHz	FS-46-3	1	1998/6	1999/6
				SA-16	3,4,5	1998/8	1999/8
	Advantest	R3261C	Frequency Range 9 kHz – 2.6 GHz	SA-41	2	1998/8	1999/8
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-94	2	1999/2	2000/2
Log-Periodic Antenna	Schwarzbeck	UHALP9108A	Frequency Range 300 MHz – 1 GHz	AN-217	2	1999/2	2000/2
Tuned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Range 25 MHz – 500 MHz	AN-135	—	1999/3	2000/3
		KBA-611S	Frequency Range 500 MHz – 1 GHz	AN-137	—	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

ENGINEERING TEST REPORT

6.2 Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBμV/50Ω]	Maximum Signal Level [dBμV/75Ω]	Limits [dBμV/75Ω]
Test Channel #3				
47.75	2.0	9.0	11.0	39.5
49.50	2.0	8.2	10.2	39.5
56.65	2.0	37.7	39.7	39.5
122.50	2.2	18.4	20.6	39.5
183.75	2.4	23.1	25.5	39.5
367.50	2.7	14.1	16.8	39.5
** 56.65	2.0	11.1	13.1	39.5
Test Channel #4				
49.49	2.0	7.7	9.7	39.5
53.75	2.0	10.3	12.3	39.5
62.65	2.0	38.7	40.7	39.5
134.50	2.3	14.8	17.1	39.5
201.74	2.4	22.6	25.0	39.5
336.24	2.7	15.2	17.9	39.5
** 62.65	2.0	12.7	14.7	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.

[Environment]

Temperature : 15 °C Humidity : 51 %

[Sample Calculation]

Frequency : 47.75 MHz (Test Channel #3)
Meter Reading : 9.0 dBμV/50Ω
Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

Signal Level = 9.0 + 2.0 = 11.0 dBμV/75Ω

[Summary of Test Results]

Minimum margin was 14.0 dB at 183.75 MHz, test channel #3.

Tested Date : February 3, 1999 Signature Y. Kotani
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

5.2 Test Results

Emission Frequency [MHz]	Correction Factor [dB]	Meter Reading [dBμV/50Ω]	Maximum Signal Level [dBμV/75Ω]	Limits [dBμV/75Ω]
Test Channel #3				
61.25	2.0	65.0	67.0	69.5
65.75	2.1	49.5	51.6	56.5
Test Channel #4				
67.25	2.1	65.0	67.1	69.5
71.75	2.1	49.6	51.7	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 : 15 ℃ Humidity : 50 %

[Sample Calculation]

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

Then, the output signal level is calculated as follows.
Signal Level = 65.0 + 2.0 = 67.0 dBμV/75Ω

[Summary of Test Results]

Minimum margin was 2.4 dB at 67.25 MHz test channel #4.

Tested Date : February 3, 1999 Signature Y. Kotani
Yoshiko Kotani

ENGINEERING TEST REPORT

- Continued -

[Note]
Antenna Factor includes the cable loss.

[Environment]
Temperature : 17°C Humidity : 51%

[Sample Calculation]
Frequency : 61.25 MHz (Test Channel #3)
Meter Reading : 15.8 dBμV (at Horizontal Polarization)
Antenna Factor : 9.1 dB/m

Then, Field Strength is calculated as follows.
Field Strength = 15.8 + 9.1 = 24.9 dBμV/m

[Summary of Test Results]
Minimum margin was 11.3 dB at 57.29 MHz, (Other emissions) vertical polarization.

Tested Date : March 8, 1999 Signature Y. Kotani
Yoshiko Kotani

ENGINEERING TEST REPORT

4.2 Test Results

[Distance : 3m]

Emission Frequency [MHz]	Antenna Factor [dB]	Meter Reading [dBμV] Horizontal Polarization	Meter Reading [dBμV] Vertical Polarization	Maximum Field Strength [dBμV/m]	Limits [dBμV/m]
Test Channel #3					
61.25	9.1	15.8	14.2	24.9	40.0
65.75	8.5	9.4	9.1	17.9	40.0
122.50	15.1	<0.0	<0.0	<15.1	43.5
245.00	20.2	<0.0	<0.0	<20.2	46.0
Test Channel #4					
67.25	8.4	4.9	6.2	14.6	40.0
71.75	8.0	7.0	9.8	17.8	40.0
134.50	16.2	<0.0	<0.0	<16.2	43.5
201.75	18.9	<0.0	<0.0	<18.9	43.5
Other emissions					
57.29	9.9	13.6	18.8	28.7	40.0
59.01	9.5	6.9	14.8	24.3	40.0
64.23	8.7	16.0	14.9	24.7	40.0
65.26	8.6	13.7	16.1	24.7	40.0
69.40	8.1	16.0	18.2	26.3	40.0
72.00	8.0	13.7	16.5	24.5	40.0
229.11	19.7	10.9	9.5	30.6	46.0

ENGINEERING TEST REPORT

3.2 Test Results

Emission Frequency [MHz]	LISN Corr. Factor [dB]	Meter Reading [dBμV] One-end to Ground	Meter Reading [dBμV] Other-end to Ground	Maximum RF Voltage [dBμV]	Limits [dBμV]
0.4500	0.1	40.4	40.7	40.8	48.0
3.996	0.2	34.7	34.6	34.9	48.0
4.009	0.2	41.2	41.1	41.4	48.0
26.62	1.2	33.1	32.8	34.3	48.0
27.37	1.2	36.9	37.1	38.3	48.0
28.12	1.3	34.7	34.6	36.0	48.0

[Note]

1) LISN Correction Factor includes the cable loss.
2) The emissions at channel #3 and channel #4 were measured, and the maximum emissions were repoted either channel #3 or 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 : 22°C Humidity : 39%

[Sample Calculation]

Frequency : 0.4500 MHz
Meter Reading : 40.7 dBμV (Other-end to Ground)
LISN Corr. Factor : 0.1 dB

Then, RF voltage is calculated as follows.

RF Voltage = 40.7 + 0.1 = 40.8 dBμV

[Summary of Test Results]

Minimum margin was 6.6 dB at 4.009 MHz, one-end to ground.

Tested Date : March 8, 1999 Signature Y. Kotani
Yoshiko Kotani