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KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

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IKOMA TESTING LABORATORY
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Corporate Juridical Person

TEST REPORT

Report No.A-032-99-C1 Date: 1 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 : MITSUBISHI ELECTRIC CORP.
Audio-Visual Systems Business Division

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

2. Identification of Tested Device

Type of Device : TV Broadcasting Receiver
Kind of Equipment Authorization : Verification
Device Name : Video Cassette Recorder
Trade Name : MITSUBISHI
Model Number : HS-U576
Serial Number : P010 ☒: Prototype ☐: Pre-production ☐: Production
Date of Manufacture : August 1999

3. Test Items and Procedure

☒: AC Power Line Conducted Emission Measurement
☒: Radiated Emission Measurement
☒: Antenna Power Conduction Measurement
☒: Picture Sensitivity Measurement
☒: Noise Figure Measurement
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
☒: without deviation, ☐: with deviation(details are found inside of this report)

4. Date of Test

Receipt of Test Sample : 6 September 1999
Test Completed on : 20 September 1999

Fumitoshi Nagaoka
Associate Director/ Ikoma Testing Laboratory

Table of Contents

1 GENERAL INFORMATION

1.1 Product Description

The MITSUBISHI Model No.HS-U576 (referred to as the EUT in this report) is a Video Cassette Recorder containing RF modulator and Tuner.

(1) Provided Terminals

1) ANT Input Terminal
2) ANT Output Terminal
3) A/V Input Terminals(front side and rear side)
4) A/V Output Terminals
5) ACTIVE AV NETWORK Input Terminal
6) ACTIVE AV NETWORK Output Terminal
7) CABLE BOX CONTROL Terminal

(2) Tuning Range and Local Oscillating Frequencies

TV : VHF/2 to 3ch(101-257 MHz), UHF/14 to 69ch(517-847 MHz).
CATV : VHF/5A(119 MHz), LOW/A-5 to A-1(137-161 MHz),
MID/A to I(167-215 MHz),SUPER/J to W(263-341 MHz),
HYPER/W+1 to W+58(347-689 MHz), W+59 to 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 120V, 60Hz

1.2 Description for Equipment Authorization

(1) Type of device	: ☒ TV Broadcasting Receiver
(2) Reference Rule and Specification	: FCC Rule Part 15 ☒ Section 15.107 (a) ☒ Section 15.109 (a)(c)(f) ☒ Section 15.111 (a) ☒ Section15.117 (f) (g)
(3) Kind of Equipment Authorization	: ☒ Verification
(4) Procedure of Application	: ☒ Original Equipment ☐ Modification
(5) Highest Frequency used in the Device	: 71.75 MHz (RF Modulator) 847 MHz (Local Oscillating Frequency)
(6) Upper Frequency of Radiated Emission Measurement Range	: 30 MHz up to at least the second harmonic of the highest local Oscillator frequency generated in the device

1.3 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).

2 TESTED SYSTEM

2.1 Test Planning and Test Mode

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

2.2 Connection of EUT System

(1) Common Test Condition for the Test Item below.

- ANT OUT : The cable 3,see 2.4 List of cable
- Audio IN : 1 kΩ termination
- Audio OUT : The cable 2,see 2.4 List of cable (one-end 47 kΩ termination)
- Video IN : 75 Ω termination
- Video OUT : The cable 2,see 2.4 List of cable (one-end 75 Ω termination)
- ACTIVE NETWORK In : Open
- ACTIVE NETWORK Out : The cable 1,see 2.4 List of cable
- CABLE BOX CONTROL : The cable 4,see 2.4 List of cable

(2) AC Power Line Conducted Emission Measurement

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

(3) Radiated Emission Measurement

ANT IN : 75 Ω termination

(4) Antena Power Conduction Measurement

ANT IN : Test Receiver or Spectrum Analyzer

2.3 Characterization and condition of EUT System

☒ : normal , ☐ : not normal (that is)

2.4 List of Cable

No	Cable Name	Model Number (Trade Name)	Shielded (Y/N)	Length (m)	Note	Remark
1	ACTIVE NETWORK Out Cable		Y	1.5	mini jack plug one-end 33 kΩ Termination	
2	A/V Cables		Y	1.45	RCA Plug	(1)
3	ANT OUT Cable		Y	1.45	Caoxical type one-end 75 Ω Termination	(1)
4	CABLE BOX CONTROL Cable		Y	1.9	Permanently attached to LED one- end mini jack plug	(1)
5	AC Power Cord		N	1.85	2-wires type, permanently attached to EUT	

[Remark]

(1) : Accessory cable of EUT

3 AC POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1 Test Procedure

(1) Configure the EUT System in accordance with ANSI C63.4-1992 section and 12.1, IEEE Std 213-1987.
☒: without deviation, ☐: with deviation(details are found below)

(2) Connect the EUT's AC power cord to one Line Impedance Stabilization Network (LISN).

(3) Warm up the EUT System.

(4) Activate the EUT System and run the software prepared for the test, if necessary.

(5) The standard TV signal is supplied to the EUT through a 20dB, 75Ω antenna coupling pad. The tested TV channel is US 13ch.

(6) Using a calibrated coaxial cable, connect the spectrum analyzer (*1) to the measuring port of the LISN for the EUT.

(7) To find out an EUT System condition, which produces the maximum emission, change the EUT System configuration, the position of the cables, and the EUT 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

(*2) Test Receiver Set Up Conditions

Detector function	: Quasi-Peak/ Average (if necessary)
IF bandwidth	: 9 kHz

3.2 Test Results

Measured Frequency (MHz)	LISN Factor (dB)	Meter Reading Va (dBmV)	Meter Reading Vb (dBmV)	Maximum RF Voltage (dBmV)	Limits (dBm)	Margin for Limits (dB)
17.856	0.8	28.6	25.7	29.4	48.0	18.6
18.000	0.8	28.7	25.6	29.5	48.0	18.5
18.315	0.9	28.5	25.2	29.4	48.0	18.6
22.125	1.0	27.1	25.4	28.1	48.0	19.9
23.998	1.1	38.8	35.6	39.9	48.0	8.1
26.624	1.2	26.0	22.2	27.2	48.0	20.8

[Calculation method]

Maximum RF Voltage (dBμV)

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

[Note]

LISN Correction Factor includes the cable loss

[Environment]

Temperature 26°C Humidity 70%

[Tested Date / Tester]

16 September 1999 Signature Y. Kotani

Yoshiko Kotani

3.3 Photographs of EUT System Configuration

REAR VIEW

4 RADIATED EMISSION MEASUREMENT

4.1 Test Procedure

(1) Configure the EUT System in accordance with ANSI C63.4-1992 section 12.1, IEEE Std 187-1990.
☒: without deviation, ☐: with deviation(details are found below)

(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 1.7 GHz and collect the highest emissions on the spectrum analyzer relative to the limit.

(8) In final compliance test, the local oscillator emissions and the highest emissions recorded above are measured by using 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) 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
- Frequency range : 30 - 1000 MHz
- Detector function : Quasi-Peak
- IF bandwidth : 120 kHz

(*4) Test Receiver Set Up Conditions
- Frequency range : 1 GHz - Upper frequency of measurement range
- Detector function : Average
- IF bandwidth : 1 MHz

4.2 Test Results

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

Measurement Frequency		Antenna Factor	Meter Reading		Maximum Field Strength	Limits
			Horiz.	Vert.		
Ch.	[MHz]	[dB/m]	[dBμV]	[dBμV]	[dBμV/m]	[dBμV/m]
TV VHF Fundamental						
2	101	11.2	<2.5	<2.5	<13.7	43.5
3	107	12.0	3.2	3.0	15.2	43.5
4	113	12.9	1.2	1.5	14.4	43.5
5	123	14.0	2.3	1.1	16.3	43.5
6	129	14.5	2.6	1.6	17.1	43.5
7	221	18.3	8.0	<2.0	26.3	46.0
8	227	18.4	9.2	3.0	27.6	46.0
9	233	18.5	8.1	3.4	26.6	46.0
10	239	18.6	8.5	3.0	27.1	46.0
11	245	18.7	8.9	3.7	27.6	46.0
12	251	18.9	10.4	5.1	29.3	46.0
13	257	19.2	13.0	6.4	32.2	46.0
TV VHF 2nd Harmonic						
2	202	17.9	<0.0	<0.0	<17.9	43.5
3	214	18.2	<0.0	<0.0	<18.2	43.5
4	226	18.4	<0.0	<0.0	<18.4	46.0
5	246	18.7	<0.0	<0.0	<18.7	46.0
6	258	19.2	<0.0	<0.0	<19.2	46.0
7	442	20.2	0.3	<0.0	20.5	46.0
8	454	20.5	0.4	<0.0	20.9	46.0
9	466	20.8	<0.0	<0.0	<20.8	46.0
10	478	21.2	<0.0	<0.0	<21.2	46.0
11	490	21.5	<0.0	<0.0	<21.5	46.0
12	502	21.8	<0.0	<0.0	<21.8	46.0
13	514	22.0	<0.0	<0.0	<22.0	46.0

- Continued -

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

Measurement Frequency		Antenna Factor	Meter Reading		Maximum Field Strength	Limits
			Horiz.	Vert.		
Ch.	[MHz]	[dB/m]	[dBµV]	[dBµV]	[dBµV/m]	[dBµV/m]
TV UHF Fundamental						
14	517	22.0	4.6	4.7	26.7	46.0
19	547	22.5	5.4	10.0	32.5	46.0
28	601	23.2	7.7	9.4	32.6	46.0
36	649	23.6	9.4	9.3	33.0	46.0
44	697	24.1	7.4	7.7	31.8	46.0
53	751	25.0	7.2	6.9	32.2	46.0
61	799	25.8	8.6	5.1	34.4	46.0
69	847	26.4	9.1	8.6	35.5	46.0

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

Measurement Frequency		Antenna Factor	Pre-AMP Gain	Meter Reading		Maximum Field Strength	Limits
				Horiz.	Vert.		
Ch.	[MHz]	[dB/m]	[dB]	[dBµV]	[dBµV]	[dBµV/m]	[dBµV/m]
TV UHF 2nd Harmonic							
14	1034	25.0	36.7	42.6	47.8	36.1	54.0
19	1094	23.6	36.6	41.8	48.9	35.9	54.0
28	1202	24.5	36.4	41.3	50.3	38.4	54.0
36	1298	23.3	36.3	42.9	47.1	34.1	54.0
44	1394	22.5	36.1	40.0	46.1	32.5	54.0
54	1514	23.1	35.9	51.5	60.3	47.5	54.0
61	1598	22.2	35.8	51.9	60.8	47.2	54.0
69	1694	22.6	35.7	48.0	56.2	43.1	54.0

- Continued -

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

Measurement Frequency		Antenna Factor	Meter Reading		Maximum Field Strength	Limits
			Horiz.	Vert.		
Ch.	[MHz]	[dB/m]	[dBµV]	[dBµV]	[dBµV/m]	[dBµV/m]
CATV Fundamental						
1	119	13.7	1.9	<1.0	15.6	43.5
95	137	15.2	0.3	<0.0	15.5	43.5
97	149	15.9	1.1	0.3	17.0	43.5
99	161	16.2	2.2	1.1	18.4	43.5
14	167	16.5	3.9	1.0	20.4	43.5
18	191	17.5	5.8	1.9	23.3	43.5
22	215	18.2	10.1	4.5	28.3	43.5
23	263	19.5	10.2	6.6	29.7	46.0
29	299	21.5	16.2	7.8	37.7	46.0
36	341	18.4	16.4	14.6	34.8	46.0
37	347	18.5	15.7	11.7	34.2	46.0
65	515	22.0	4.9	4.5	26.9	46.0
94	689	24.0	8.5	7.8	32.5	46.0
100	695	24.1	7.9	8.3	32.4	46.0
113	773	25.3	5.2	6.1	31.4	46.0
125	845	26.4	9.6	9.3	36.0	46.0
CATV 2nd Harmonic						
1	238	18.6	<0.0	<0.0	<18.6	46.0
95	274	20.1	0.3	<0.0	20.4	46.0
97	298	21.5	0.1	0.1	21.6	46.0
99	322	18.2	2.0	<1.0	20.2	46.0
14	334	18.3	1.7	0.1	20.0	46.0
18	382	18.8	<3.0	<3.0	<21.8	46.0
22	430	19.8	1.1	<1.0	20.9	46.0
23	526	22.2	<1.0	<1.0	<23.2	46.0
29	598	23.2	<0.0	0.2	23.4	46.0
36	682	23.9	1.3	0.4	25.2	46.0
37	694	24.0	0.8	1.5	25.5	46.0

- Continued –

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

Measurement Frequency		Antenna Factor	Pre. AMP Gain	Meter Reading		Maximum Field Strength	Limits
				Horiz.	Vert.		
Ch.	[MHz]	[dB/m]	[dB]	[dBμV]	[dBμV]	[dBμV/m]	[dBμV/m]
CATV 2nd Harmonic							
65	1030	25.1	36.7	41.8	46.3	34.7	54.0
94	1378	22.7	36.1	39.5	43.0	29.6	54.0
100	1390	22.6	36.1	39.9	43.5	30.0	54.0
113	1546	22.7	35.9	53.4	63.6	50.4	54.0
125	1690	22.6	35.7	47.6	54.8	41.7	54.0

[Note]
(1) Antenna Factor includes the cable loss.
(2) * mark in Measured Frequency : Measured with the tuned dipole antenna.
No mark in Measured Frequenc : Measured with the broadband antenna

[Calculation method]
Maximum Field Strength (dBμV/m)
= Meter Reading (at maximum level of Horizontal or Vertical) (dBμV) + Antenna Factor (dB) - Pre-AMP Gain(dB)

[Environment]
Temperature:28°C Humidity: 65%

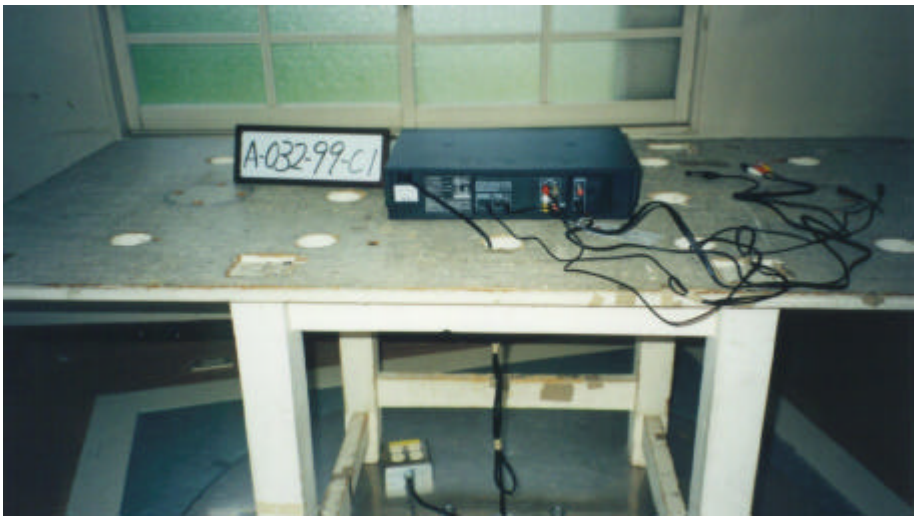
[Summary of Test Results]
Minimum margin was 3.6 dB at 1546 MHz (CATV 113ch) at 2nd harmonic, vert. polarization.

[Tested Date/ Tester]
13 September 1999 Signature Y. Kotani
Yoshiko Kotani

4.3 Photographs of EUT System Configuration

FRONT VIEW

REAR VIEW



5 ANTENNA POWER CONDUCTION MEASUREMENT

5.1 Test Procedure

(1)	Configure the EUT System in accordance with ANSI C63.4-1992 section 12.1. ☒: without deviation, ☐: with deviation(details are found below)
(2)	Power cord for the EUT System is connected the receptacle of LISN.
(3)	Connect the antenna terminal of EUT to the test receiver or the spectrum analyzer by using the matching transformer and the coaxial cable.
(4)	Warm up the EUT System.
(5)	Activate the EUT System and run the prepared software for the test, if require.
(6)	To find out the emissions of the EUT System, preliminary measurement are performed by using the spectrum analyzer (*1) . In the frequency above 1 GHz, it is performed by using the spectrum analyzer (*2) .
(7)	To find out an EUT System condition produces the maximum emission, change the position of the cables, and the EUT operation mode under normal usage of the EUT.
(8)	The spectrums are scanned from 30 MHz to 1.7 GHz and collect the highest emissions on the spectrum analyzer relative to the limit.
(9)	In final compliance test, the local oscillator emissions and the highest emissions recorded above are measured by using 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

[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

Frequency range	: 30 - 1000 MHz
Detector function	: Quasi-Peak
IF bandwidth	: 120 kHz

(*4) 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

[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	6.1	6.9	-48.8	-35.8	3.0
3	107	6.1	8.2	-48.8	-34.5	3.0
4	113	6.1	9.8	-48.8	-32.9	3.0
5	123	6.1	12.5	-48.8	-30.2	3.0
6	129	6.1	14.5	-48.8	-28.2	3.0
7	221	6.1	16.3	-48.8	-26.4	3.0
8	227	6.1	16.7	-48.8	-26.0	3.0
9	233	6.1	17.3	-48.8	-25.4	3.0
10	239	6.1	18.3	-48.8	-24.4	3.0
11	245	6.1	19.0	-48.8	-23.7	3.0
12	251	6.1	19.3	-48.8	-23.4	3.0
13	257	6.1	19.5	-48.8	-23.2	3.0
TV VHF 2nd Harmonic						
2	202	6.1	0.7	-48.8	-42.0	3.0
3	214	6.1	1.3	-48.8	-41.4	3.0
4	226	6.1	1.5	-48.8	-41.2	3.0
5	246	6.1	1.5	-48.8	-41.2	3.0
6	258	6.1	1.4	-48.8	-41.3	3.0
7	442	6.1	1.8	-48.8	-40.9	3.0
8	454	6.1	1.9	-48.8	-40.8	3.0
9	466	6.1	1.9	-48.8	-40.8	3.0
10	478	6.1	1.8	-48.8	-40.9	3.0
11	490	6.1	2.0	-48.8	-40.7	3.0
12	502	6.2	2.4	-48.8	-40.2	3.0
13	514	6.2	2.4	-48.8	-40.2	3.0

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

- Continued -

[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 UHF Fundamental						
14	517	6.2	9.8	-48.8	-32.8	3.0
19	547	6.2	8.6	-48.8	-34.0	3.0
28	601	6.2	12.6	-48.8	-30.0	3.0
36	649	6.2	20.0	-48.8	-22.6	3.0
44	697	6.2	17.8	-48.8	-24.8	3.0
53	751	6.2	17.6	-48.8	-25.0	3.0
61	799	6.2	22.5	-48.8	-20.1	3.0
69	847	6.2	26.2	-48.8	-16.4	3.0
TV UHF 2nd Harmonic						
14	1034	6.2	9.5	-48.8	-33.1	3.0
19	1094	6.2	0.2	-48.8	-42.4	3.0
28	1202	6.2	9.7	-48.8	-32.9	3.0
36	1298	6.2	16.0	-48.8	-26.6	3.0
44	1394	6.2	30.9	-48.8	-11.7	3.0
53	1502	6.2	27.3	-48.8	-15.3	3.0
61	1598	6.2	25.3	-48.8	-17.3	3.0
69	1694	6.2	29.6	-48.8	-13.0	3.0

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

- Continued -

[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	6.1	11.2	-48.8	-31.5	3.0
95	137	6.1	14.5	-48.8	-28.2	3.0
97	149	6.1	15.4	-48.8	-27.3	3.0
99	161	6.1	14.1	-48.8	-28.6	3.0
14	167	6.1	13.8	-48.8	-28.9	3.0
18	191	6.1	13.2	-48.8	-29.5	3.0
22	215	6.1	15.5	-48.8	-27.2	3.0
23	263	6.1	19.4	-48.8	-23.3	3.0
29	299	6.1	23.5	-48.8	-19.2	3.0
36	341	6.1	25.1	-48.8	-17.6	3.0
37	347	6.1	25.0	-48.8	-17.7	3.0
65	515	6.2	9.7	-48.8	-32.9	3.0
94	689	6.2	18.6	-48.8	-24.0	3.0
100	695	6.2	17.4	-48.8	-25.2	3.0
113	773	6.2	19.2	-48.8	-23.4	3.0
125	845	6.2	26.5	-48.8	-16.1	3.0
CATV 2nd Harmonic						
1	238	6.1	1.4	-48.8	-41.3	3.0
95	274	6.1	2.3	-48.8	-40.4	3.0
97	298	6.1	1.7	-48.8	-41.0	3.0
99	322	6.1	1.8	-48.8	-40.9	3.0
14	334	6.1	1.3	-48.8	-41.4	3.0
18	382	6.1	0.9	-48.8	-41.8	3.0
22	430	6.1	1.6	-48.8	-41.1	3.0
23	526	6.2	2.2	-48.8	-40.4	3.0
29	598	6.2	2.5	-48.8	-40.1	3.0
36	682	6.2	5.8	-48.8	-36.8	3.0
37	694	6.2	6.5	-48.8	-36.1	3.0
65	1030	6.2	10.3	-48.8	-32.3	3.0
94	1378	6.2	26.4	-48.8	-16.2	3.0
100	1390	6.2	28.3	-48.8	-14.3	3.0
113	1546	6.2	30.4	-48.8	-12.2	3.0
125	1690	6.2	29.4	-48.8	-13.2	3.0

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

- Continued -

[Note]
(1) The spectrum was scaned from 30 MHz to 1.7 GHz, and all emission not reported were less than 10 dBuV 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.

[Calculation method]
Antenna Power Conduction (dBnW)
= Meter Reading (dBμV) + Correction Factor (dB) - Conversion Factor(dB)

[Environment]
Temperature:28°C Humidity: 65%

[Summary of Test Results]
Minimum margin was 14.7 dB, 1394 MHz (UHF 44ch) at 2nd harmonic.

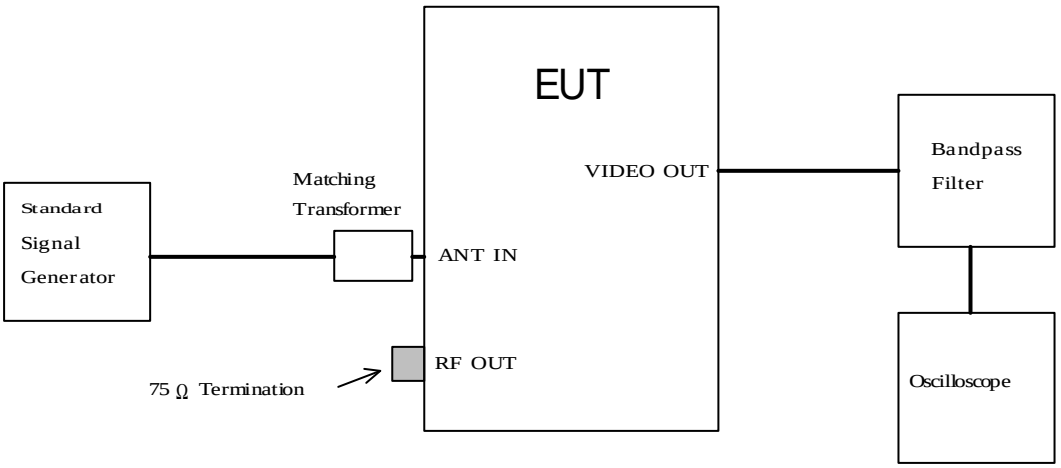
[Tested Date/ Tester]
13 September 1999 Signature Y. Kotani
Yoshiko Kotani

6 PICTURE SENSITVITY MEASUREMENT

6.1 Test Procedure

(1)	Configurate the EUT System in accordance with IEEE Std 190, and 6.2 Test Configuration in this report. ☒: without deviation, ☐: with deviation(details are found below)
(2)	Active and warm up the EUT system.
(3)	Connect the antenna terminal of EUT to the standard signal generator by using the matching transformer and coaxial cable, and connect the video out terminal of EUT to the band passs filter(*1) and oscilloscope(*2) by using the coaxial cables.
(4)	The frequency of the standard signal generator(*3) is adjusted the tuned frequency of EUT.
(5)	The frequency and output level of standard signal generator are adjusted, until the specified video output level of EUT system is appeared on the oscilloscope.
(6)	The measurement are performed at US VHF channel 2,6,7 and 13, and US UHF channel 14,44 and 69.
	[Note]
(*1)	Band pass filter set up conditions Start Frequency : 600 Hz Stop Frequency : 2000 Hz
(*2)	Oscilloscope set up conditions Sweep Time : 0.1 msec. Volt/Div. : 0.5 V
(*3)	Standard signal generator set up conditions Modulation : Amplitude modulation Modulating Frequency : 1000 Hz Percent modulation : 30 %

6.2 Test Configuration



6.3 Test Results

VHF Measurement Frequency		Antenna Input Level		UHF Measurement Frequency		Antenna Input Level	
ch.	[MHz]	[dBm]	[pW]	Ch.	[MHz]	[dBm]	[pW]
2	55.25	-90.5	0.891	14	471.25	-89.4	1.148
6	83.25	-91.5	0.708	44	651.25	-89.6	1.096
7	175.25	-90.8	0.832	69	801.25	-90.8	0.832
13	211.25	-91.3	0.741				
AVERAGE "VHF"			0.793	AVERAGE "UHF"			1.025

$$\text{AVERAGE UHF / VHF : } 10 \text{ Log } \frac{\text{"UHF" pW}}{\text{"VHF" pW}} = 1.1 \text{ dB}$$

[Limit 8.0 dB]

[Environment]
Temperature: 27°C Humidity: 75%

[Summary of Test Results]
Margin was 6.9 dB

[Tested Date/ Tester]
20 September 1999

Signature _____
Ikuya Minematsu

7 NOISE FIGURE MEASUREMENT

7.1 Test Procedure

(1) Configure the EUT System in accordance with FCC/OET MP-2, and 7.2 Test Configuration in this report.
☒: without deviation, ☐: with deviation(details are found below)

(2) Active and warm up the EUT system

(3) Connect the antenna input terminal of EUT to the correct terminating impedance.

(4) Measurement of AGC voltage of EUT are made at the measurement channels.

(5) Connect the antenna input terminal of EUT to the Noise Source of the Noise Figure Indicator(*1) by using the matching transformer, the noise source and coaxial cable. Connect the intermediate frequency terminal on the tuner pack of EUT to the IF INPUT terminal of the Noise Figure Indicator by using the coaxial cable.

(6) In final compliance test, the measurement are performed at all US UHF channel by using the noise figure indicator.

(7) If ΔF(Noise Figure contribution of the amplifier following the measurement point in dB) exceed 0.3 dB, the measured noise figure is corrected by ΔF. ΔF is calculated the tuner gain(gain of circuit from receiver antenna input terminal to measurement point as a power), the noise figure from receiver antenna input terminal to measurement point as power ratio and the noise figure of that IF amplifier as power radio, therefore the tuner gain shall be measured.

(8) For the measurement of the tuner gain, Connect the intermediate frequency terminal on the tuner pack of EUT to the spectrum analyzer(*2) by using the high impedance probe and connect the antenna input terminal of EUT to the standard signal generator by using the matching transformer and the coaxial cable.

(9) The frequency of the standard signal generator is adjusted the tuned frequency of EUT.

(10) Then, tuner gainis calculated as that the ratio of the output level of intermediate frequency amplifier on the tuner pack of EUT appeared on the spectrum analyzer minus the output level of the standard signal generator and ΔF is calculated.

[Note]

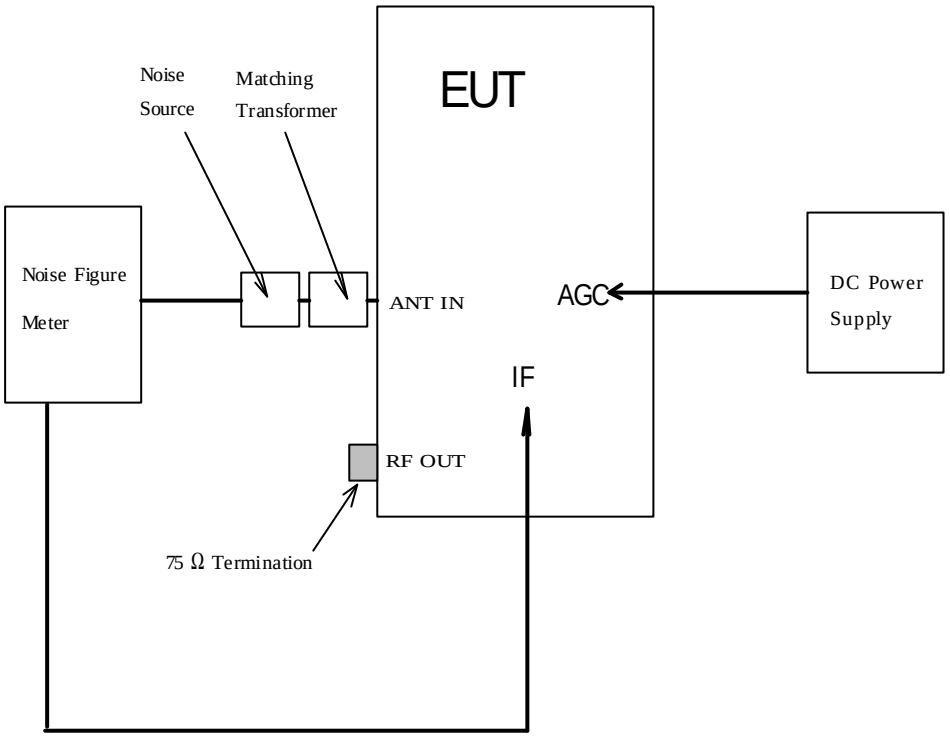
(*1) Noise Figure Indicator set up conditions

Frequency Select	:	43.5 MHz

(*2) Spectrum analyzer set up conditions

RBW	:	30 kHz
VBW	:	30 kHz
ATT	:	10 dB
Span	:	10 MHz

7.2 Test Configuration



7.3 Test Results

Measurement Frequency		Correction Factor	Meter Reading	Tuner Gain	ΔF	Noise Figure	Limit
ch.	[MHz]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
TV UHF							
14	471.25	0.8	6.5	35.3	0.120	5.7	14
20	507.25	0.8	6.2	35.2	0.130	5.4	14
26	543.25	0.8	5.9	35.2	0.140	5.1	14
32	579.25	0.9	5.7	35.3	0.148	4.8	14
38	615.25	0.9	5.8	35.6	0.140	4.9	14
44	651.25	0.9	6.2	35.8	0.125	5.3	14
50	687.25	1.0	5.4	37.2	0.130	4.4	14
56	723.25	1.0	4.7	37.4	0.149	3.7	14
62	759.25	1.1	4.4	42.7	0.090	3.3	14
69	801.25	1.1	4.5	41.1	0.105	3.4	14
Maximum "NF" Channel(14)		0.8	6.5	35.3	0.120	5.7	14

[Note]

(x) The second stage(IF Amp) noise figure contribution did not exceed 0.3dB.
(x) 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:

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

where, ΔF : 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 : 27 °C Humidity : 75 %

[Summary of Test Results]

Minimum margin was 8.3 dB at 471.25 MHz (14ch.)

Tested Date : 20 September 1999 Signature

Ikuya Minematsu

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	1999/4	2000/4
	Rohde & Schwarz	ESVS10	Frequency Range 20 MHz - 1 GHz	FS-81	2	1998/10	1999/10
		ESVD	Frequency Range 20 MHz – 2.05 GHz	S/N 846023 /018	3	1999/8	2000/8
Spectrum Analyzer	Advantest	TR4172	Frequency Range 50 Hz - 1.8 GHz	SA-23	1,3,5	1999/1	2000/1
		R3261B	Frequency Range 9 kHz - 3.6 GHz	SA-30	2	1999/7	2000/7
Pre-Amplifier	Hewlett Packard	8449B	Frequency Range 1 GHz - 26.5 GHz	AM-52	2	1999/4	2000/4
Line Impedance Stabiliza -tion Network	Kyoritsu	KNW-407	Frequency Range 150 kHz - 30 MHz Impedance 50 Ω / 50 μH	FL-72	1	1999/4	2000/4
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30 MHz - 300 MHz	AN-219	2	1999/2	2000/2
Log-Periodic Antenna	Schwarzbeck	UHALP 9108A	Frequency Range 300 MHz - 1 GHz	AN-218	2	1999/2	2000/2
Tuned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Pange 25 MHz - 500 MHz	AN-132	N/A	1999/3	2000/3
		KBA-611S	Frequency Range 500 MHz - 1 GHz	AN-115	N/A	1999/3	2000/3
Horn Antenna	RAVEN	91888-2	Frequency Range 1 GHz - 2 GHz	AN-167	2	1997/11	1999/11

- 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	Madeby KEC		Attenuation 20 dB	MM-39-4	1	-	-
Impedance Trans-Former	NMC	MB-009	Frequency Range 10 MHz - 2GHz 50 Ω : 75 Ω	AX-61	3	1999/8	2000/8
Oscillo-Scope	Matsushita	VP-5530B	Frequency Range DC - 300 MHz	OS-18	4	1999/5	2000/5
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	MG3601 A	Frequency Range 100 kHz - 1.04 GHz	SG-41	4,5	1999/9	2000/9
Noise Figure Meter	Elena	ENF-2005	Frequency Range 10.7MHz - 6.5 MHz Noise Source 28 Vp-p	MM-30	5	1999/6	2000/6
Noise Source	Microwave Semiconduc-tor	MC1100	Frequency Range 5 MHz - 1 GHz Noise Ratio 15 dB - 16 dB	MM-30-2	5	1999/6	2000/6

[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
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.