ORION ELECTRIC CO., LTD.

41-1 Iehisa-cho, Takefu-shi
FUKUI 915-8555, JAPAN

TEL: (0778) 23-0001
TELEX:5175-588 ORION J
FAX: (0778) 23-7799

ATTACHMENT H —— MEASUREMENT OF THE UHF NOISE FIGURES ON BULLETIN OST MP-2 AND STATISTICAL PLAN.

1. Measurements of TV Tuner Noise Figure

This documents is the material of UHF TV Receiver Noise Figure measurement.

1) Measurements Procedure. (ON BULLETIN OST MP-2 JULY 1982)

a. The measurements of noise figures are made in a shielded room.

b. Before testing, the television receiver and Noise figure test equipment are to be subjected to a warm-up period of sufficient time for stabilization of factors which could affect the measurements.

c. Automatic Gain Control bias, preceding the noise output measurement point, is maintained at the level(4.0V) existing When there is no input signal with the receivers UHF input terminated in its nominal impedance(75 ohm).

d. It must first be ascertained that the noise figure contribution of the I.F. amplifier following the measuring point not exceed 0.3dB.

If the influence of the 2nd stage is $\Delta F(dB)$, then

$$\Delta F(dB) = 10 \cdot \log_{10} \left[1 + \frac{F2 - 1}{G1F1} \right]$$ is given

so that Tuner Gain : G1 = 39 dB(typical) then the influence of the 2nd stage is to be less than 0.3dB so that influence of the 2nd stage can be ignored.

e. N.F. Value = Meter Reading —— Balun Insertion loss

Balun Insertion loss is mentioned in ATTACHMENT H-4. Therefor, it can get noise figures of UHF Tuner by correcting Factors of this value.

ORION ELECTRIC CO., LTD.

41-1 Iehisa-cho, Takefu-shi
FUKUI 915-8555, JAPAN

TEL: (0778) 23-0001
TELEX:5175-588 ORION J
FAX: (0778) 23-7799

2) Test Equipment

a. Standard Noise Figure Indicator
(Automatic Standard NF Indicator with Solid State Noise Source)

* Manufactured by Elena Electronics Co., Ltd. (Japan)

* Model ENF-2005

b. Noise Source

* Model No. MC1100 Made by M.S.C. and correct proofs.

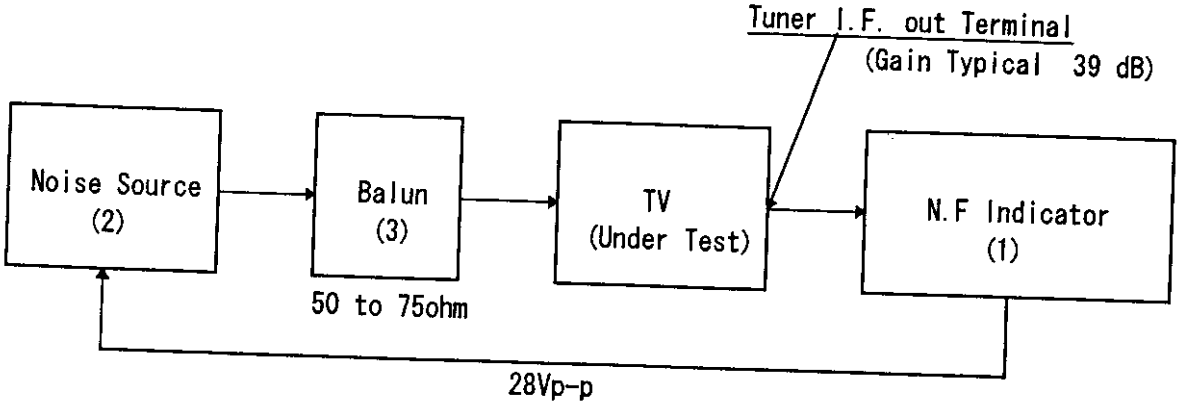
* ENR --- This Indicator has no internal oscillator then can be use no correction of compensation.
This Indicator will be send to FCC in November from Elena Electronics, and has already applied for it by KEC.

c. UHF Balun

* Model No. MP614A (50 to 75 ohm)
Made by Anritsu Corporation

* Insertion Loss --- Please see Attachment H-4

3) Block Diagram of UHF TV NF measurement.



2. STATISTICAL PLAN

TV Receiver UHF Noise Figure —— Certification and Compliance Criteria (July 1982)

In reply to yours of Jan. 14, 1980, we have pleasure of stating below:

Production Line compliance
We carry out QUALITY ASSURANCE for Plan C and submit the annual report of M4C7C(VCR2510) to the FCC.

A. Sampling Size
We check Sampling Size by TV Receiver Noise Figure —— Certification and Compliance Criteria 3.12.

B. Data Calculation Method
When one sampling is 20 sets, measurement data are a total 200 point, that is 20 set multiplied by 10 point/set. We check whether the measurement data comply with statistical condition on $X + KS \leqq 14$, by TV Receiver Noise Figure —— Certification and Compliance Criteria 3.13.

5) ATTACHED SHEET

1. Block Diagram of Model ENF-2005 —— H-1
   Standard Noise Figure Indicator "Elena Electronics".

2. Specifications of Standard NF Indicator —— H-2
   Model ENF-2005

3. Excess Noise Ration of Noise Source —— H-3
   M.S.C. Model MC1100, SN1012

4. Measurements Data —— H-4
   Insertion Loss of UHF Balun

ATTACHMENT H-C-1

Product ID.Code: M4C7C
(Model No.: VCR2510)
Brand Name: SANSUI

TV RECEIVER APPLICATION CHECKLIST

(X) 1. A statement identifying the production run plan we will be using to show compliance in meeting "TV Receiver, UHF Noise Figures Certification and Compliance Criteria" (July 1982).

: We will use the production run plan C to show compliance in meeting 14dB UHF Noise Figure requirement.

(X) 2. A statement that NF measurements were made pursuant to OST MP-2, July 1982.

: NF measurements were made pursuant to OST BULLETIN MP-2, July 1982.

(X) 3. The names of all manufacturing sources for the VHF and UHF tuners as well as the tuner manufacture's part No.

Product ID. Code (Model No.)	VHF/UHF 1 PACK TUNER	
	PART NO.	SOURCE
M4C7C(VCR2510)	0162600016	ALPS

(X) 4. UHF and VHF tuner part numbers assigned by the receiver manufacturer.

: There are no tuner part assigned by receiver manufacturer.

(X) 5. Frequency bands tuned by receiver.

VHF : 2 - 13 ch
UHF : 14- 69 ch
CATV : 1 -125 ch(101 - 845MHz)

(X) 6. Pursuant to Section 15.117 of the Rules, a statement specifying the receiver design noise figure, in dB.

: Because TV Tuner built in as part of a video tape recorder which uses a power splitter between the antenna terminals of the video tape recorder and input terminals of the TV Tuner, the limits of Noise Figure, pursuant to section 15.117(g)(4), complies with the limits subtracted 4dB from 14dB.

( ) 7. The length of the UHF lead, from antenna input terminal to the tuner.

:

(X) 8. A numbered electrical schematic for the receiver.

: Attached

(X) 9. The exact chassis number (MFR'S Model No. instead of chassis No.) (This number is classified with SUFFIX in order to show voltage difference, Radio band difference and so on.)

: Mfr's No. : M4C7C

( )10. Picture tube size in inches.

:

(X)11. Type of receiver - color or black and white.

: Color

(X)12. A description of the cabinet material.

: plastic and metal cover

( )13. Copy of all the information submitted with the original certification for the basic receiver.

:Attached

(X)14. A statement that the contribution not exceed 0.3dB for the channel.

$$\Delta F(dB) = 10 \cdot \log_{10} \left[1 + \frac{F2 - 1}{G1F1} \right]$$

where

F1 : 7.0 dB ———— typical value

F2 : 8.5 dB ———— N.F. indicator (I.F. Noise Figure)
* See ATTACHMENT H 2/4

G1 : 39.0 dB ———— See ATTACHMENT H 2/4

$\Delta F = 10 \cdot \log_{10} 1.014 = 0.060$ dB

The contribution does not exceed 0.3dB, so, neglected.

Designated by Ministry of International Trade and Industry

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

HEAD OFFICE
6-8-7, NISHITEMMA
KITA-KU, OSAKA, 530-0047 JAPAN

KEC

Corporate Juridical Person

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

ENGINEERING TEST REPORT

Report No. A-016-99-C

Date : May 31, 1999

This test report is to certify that the tested device properly complies with the requirements of:

FCC Rules and Regulations Part 15 Subpart B Unintentional Radiators.

All the tests necessary to show compliance to the requirements were performed and these results met the specifications of requirement. The results of this report should not be construed to imply compliance of equipment other than that which was tested. Unless the laboratory permission, this report should not be copied in part.

1. Applicant
   Company Name : ORION ELECTRIC CO., LTD.
   Mailing Address : 41-1, IEHISA-CHO, TAKEFU-SHI, FUKUI 915-8555 JAPAN

2. Identification of Tested Device
   FCC ID : A7RM4C7C
   Device Name : VIDEO CASSETTE RECORDER
   Trade Name : SANSUI
   Model Number : VCR2510
   Serial Number : ID-112-1244 ☐ prototype ☒ pre-production ☐ production
   Date of Manufacture : April, 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 : April 27, 1999
   Test Completed on : May 25, 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 SANSUI Model No.VCR2510 (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 Terminal (front side)
- 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, 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 Cnamber 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. 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).

2. TESTED SYSTEM

2.1 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.

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.

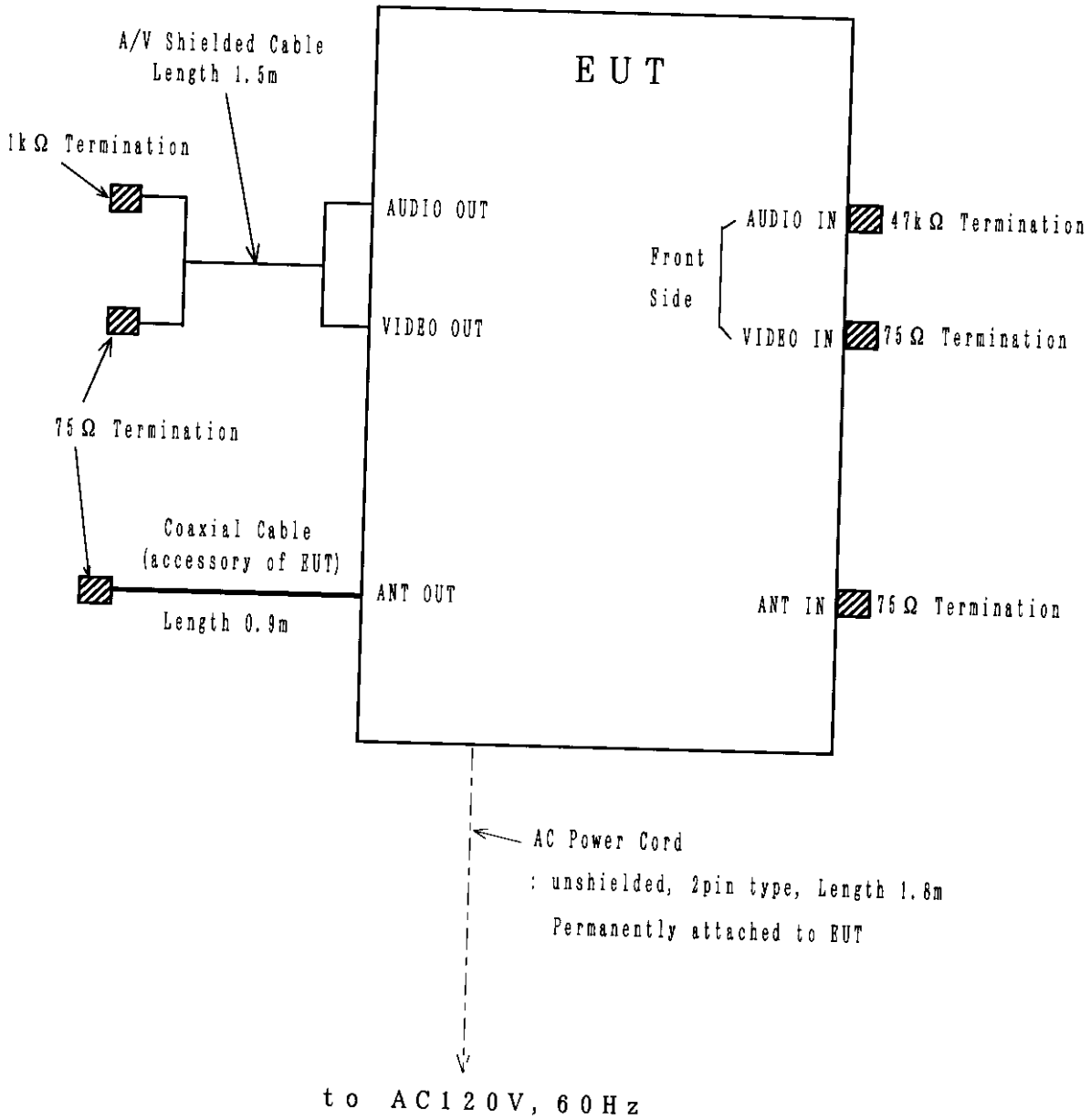
(2) Record mode (1V / 5V VITS Signal Input)
1V/5V peak-to-peak VITS signal is supplied through the VIDEO IN terminal, if applicable.

(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

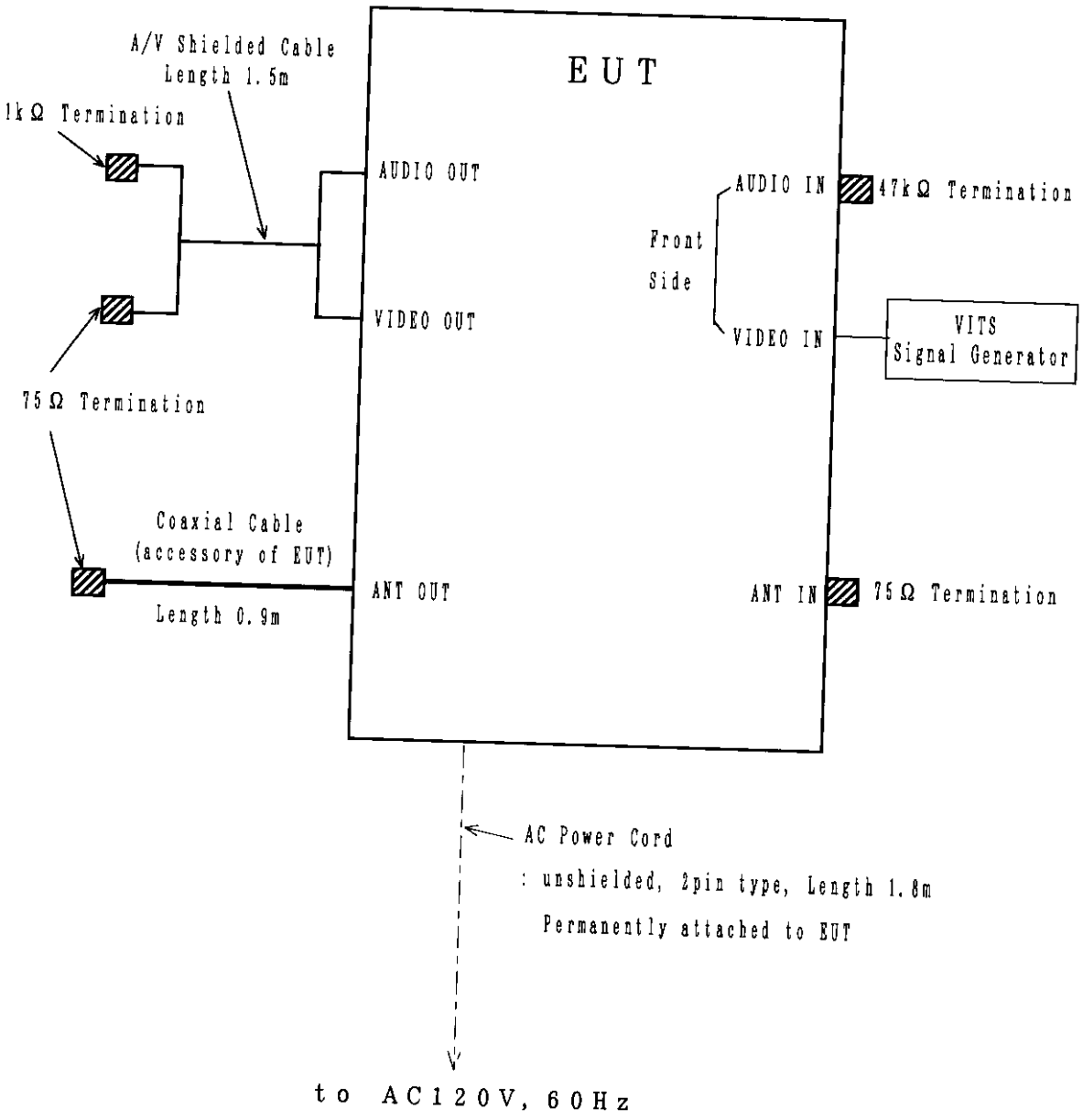
a. Playback mode



ENGINEERING TEST REPORT

- Continued -

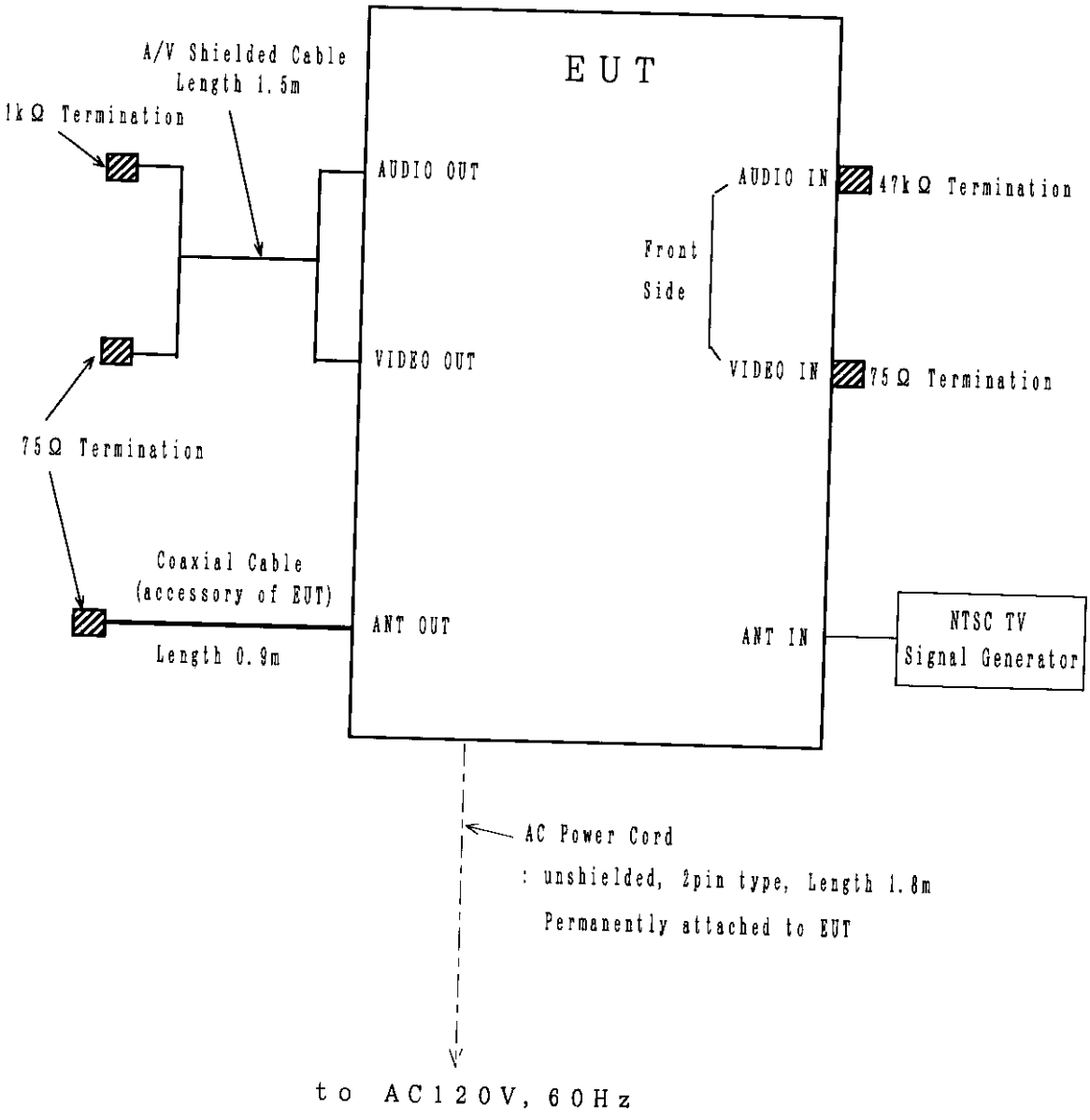
b. Record mode (1V VITS Signal Input)
c. Record mode (5V VITS Signal Input)



ENGINEERING TEST REPORT

- Continued -

d. Record mode (0 dBmV NTSC TV Signal Input)
e. Record mode (25 dBmV NTSC TV Signal Input)



3. AC POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1 Test Procedure

(1) Configurate the EUT System in accordance with ANSI C63.4-1992 section 7.
☒ :without deviation, ☐ :with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration in this report.

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

(3) Any other equipment power cord are 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 require.

(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 produces the maximum emission, the configuration of EUT System, the position of the cables, and the operation mode was changed under normal usage of the EUT.

(8) The spectrum are scanned from 450 kHz to 30 MHz and collect the minimum six highest emissions on the spectrum analyzer relative to the total limits.

(9) The test receiver(*2) is connected to the LISN for the EUT, and the minimum six highest emissions 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

ENGINEERING TEST REPORT

3.3 Test Results

Measured Frequency (MHz)	LISN Factor (dB)	Meter Reading Va (dBuV)	Meter Reading Vb (dBuV)	Maximum RF Voltage (dBuV)	Limits (dBuV)	Margin for Limits (dB)
0.486	0.3	30.4	30.4	30.7	48.0	17.3
0.605	0.3	30.7	31.2	31.5	48.0	16.5
0.618	0.3	31.3	31.8	32.1	48.0	15.9
20.000	0.9	36.0	36.7	37.6	48.0	10.4
28.638	1.3	38.7	39.9	41.2	48.0	6.8
30.000	1.3	28.4	29.6	30.9	48.0	17.1

[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 : 21℃ Humidity : 57%

[Sample Calculation]

Measurement with the quasi-peak detector

Frequency : 0.486 [MHz]
Meter Reading : 30.4 [dBμV]
LISN Corr. Factor : 0.3 [dB]

Then, RF voltage is calculated as follows.

RF Voltage = 30.4 + 0.3 = 30.7 [dBμV]

Tested Date : May 24, 1999

Signature Y. Kotani
Yoshiko Kotani

ENGINEERING TEST REPORT

4. RADIATED EMISSION MEASUREMENT

4.1 Test Procedure

(1) Configurate the EUT System in accordance with ANSI C63.4-1992 section 8.
☒ :without deviation, ☐ :with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration in this report.

(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 turn floor.

(3) Warm up the EUT System.

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

(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.

(6) To find out an EUT System condition produces the maximum emission, the configuration of EUT System, the position of the cables, and the operation mode was changed under normal usage of the EUT.

(7) The spectrum are scanned from 30 MHz to 1 GHz and collect the minimum six highest emissions on the spectrum analyzer relative to the total limits.

(8) In final compliance test, the minimum six highest emissions recorded above are measured at the specified distance using the broad band antenna or the tuned dipole antenna and the test receiver(*2).

[Note]

(*1) : Spectrum Analyzer Set Up Conditions

Frequency range	: 30 - 1000 MHz
Resolution bandwidth	: 100 kHz
Detector function	: Peak mode

(*2) : Test Receiver Set Up Conditions

Detector function	: Quasi-Peak
IF bandwidth	: 120 kHz

ENGINEERING TEST REPORT

4.3 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	10.5	<0.0	1.6	12.1	40.0
65.75	10.0	<0.0	3.6	13.6	40.0
122.50	16.8	<0.0	<0.0	<16.8	43.5
245.00	22.9	<0.0	<0.0	<22.9	46.0
Test Channel #4					
67.25	9.8	<0.0	5.3	15.1	40.0
71.75	9.4	<0.0	9.0	18.4	40.0
134.50	18.0	<0.0	<0.0	<18.0	43.5
201.75	21.6	<0.0	<0.0	<21.6	43.5
Other emissions					
42.95	14.8	6.1	19.0	33.8	40.0
55.85	11.5	3.2	12.6	24.1	40.0
57.27	11.2	7.4	12.5	23.7	40.0
71.61	9.4	7.2	17.4	26.8	40.0
85.92	10.7	3.0	13.1	23.8	40.0
100.24	13.9	5.4	8.5	22.4	43.5
114.55	15.8	22.3	24.3	40.1	43.5
315.00	20.6	6.0	3.8	26.6	46.0

[Note]

Antenna Factor includes the cable loss.

[Environment]

Temperature : 23°C Humidity : 62%

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
Meter Reading : 1.6 dBμV (at Vertical Polarization)
Antenna Factor : 10.5 dB/m

Then, Field Strength is calculated as follows.

Field Strength = 1.6 + 10.5 = 12.1 dBμV/m

[Summary of Test Results]

Minimum margin was 3.4 dB at 114.55 MHz, (Other emissions) vertical polarization.

Tested Date : May 25, 1999

Signature Y. Kotani

Yoshiko Kotani

ENGINEERING TEST REPORT

5. Output Signal Level Measurement

5.1 Test Procedure

(1) Configurate the EUT System in accordance with ANSI C63.4-1992 section 12.2.
☒ : without deviation, ☐ : with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration in this report.

(2) Unused RF input/output terminals are terminated in the proper impedance.

(3) Activate the EUT system.

(4) Set the spectrum analyzer as follows.

Frequency Span	: 1 MHz
Resolution bandwidth	: 100 kHz
Video bandwidth	: 3 MHz
Detector function	: Peak mode

(5) The RF output terminal is connected to the spectrum analyzer through the matching transformer with a calibrated 50 Ω coaxial cable.

(6) Then, the RF output signal level is measured under the EUT condition produced the maximum signal level.

ENGINEERING TEST REPORT

5.3 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	64.9	66.9	69.5
65.75	2.1	48.7	50.8	56.5
Test Channel #4				
67.25	2.1	64.4	66.5	69.5
71.75	2.1	48.2	50.3	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 : 24 °C Humidity : 55 %

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
Meter Reading : 64.9 dBμV/50Ω
Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

Signal Level = 64.9 + 2.0 = 66.9 dBμV/75Ω

[Summary of Test Results]

Minimum margin was 2.6 dB at 61.25 MHz test channel #3.

Tested Date : May 13, 1999

Signature Y. Kotani

Yoshiko Kotani

6. Output Terminal Conducted Spurious Emission Measurement

6.1 Test Procedure

(1) Configurate the EUT System in accordance with ANSI C63.4-1992 section 12.2.
☒ : without deviation, ☐ : with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration in this report.

(2) Unused RF input/output terminals are terminated in the proper impedance.

(3) Activate the EUT system.

(4) Set the spectrum analyzer as follows.

Frequency Span	: 1 MHz
Resolution bandwidth	: 100 kHz
Video bandwidth	: 3 MHz
Detector function	: Peak mode

(5) The RF output terminal is connected to the spectrum analyzer through the matching transformer with a calibrated 50 Ω coaxial cable.

(6) The spectrum was scanned from 30 MHz to more than 4.6 MHz below the visual carrier frequency, and from more than 7.4 MHz above the visual carrier frequency to 1000 MHz, and the three highest emissions are selected under the EUT condition produced the maximum signal level at each frequency range.

(7) Then, the RF output terminal conducted spurious emission level is measured under the EUT condition produced the maximum signal level.

6.2 Photographs of EUT System Configuration

the tested device configuration is the same as the output signal level measurement.
(See 5.2 Photographs of EUT System Configuration.)

ENGINEERING TEST REPORT

6.3 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	9.2	11.2	39.5
56.28	2.0	14.8	16.8	39.5
56.65	2.0	39.0	41.0	39.5
74.75	2.1	10.5	12.6	39.5
122.50	2.2	19.1	21.3	39.5
183.75	2.4	12.0	14.4	39.5
** 56.65	2.0	16.3	18.3	39.5
Test Channel #4				
53.75	2.0	10.5	12.5	39.5
62.28	2.0	15.2	17.2	39.5
62.65	2.0	39.8	41.8	39.5
80.75	2.1	9.7	11.8	39.5
134.50	2.3	13.0	15.3	39.5
201.75	2.4	12.1	14.5	39.5
** 62.65	2.0	16.8	18.8	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 : 24 °C Humidity : 55 %

[Sample Calculation]

Frequency : 47.75 MHz (Test Channel #3)
Meter Reading : 9.2 dBμV/50Ω
Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

Signal Level = 9.2 + 2.0 = 11.2 dBμV/75Ω

[Summary of Test Results]

Minimum margin was 18.2 dB at 122.50 MHz, test channel #3.

Tested Date : May 13, 1999

Signature Y. Kotani
Yoshiko Kotani

ENGINEERING TEST REPORT

7. Transfer Switch Measurement

7.1 Test Procedure

(1) Configurate 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 Ω coaxial cable. And the output of pre-amplifier is connected to the spectrum analyzer.

(6) Then, the signal level on the antenna input terminal is measured under the EUT condition produced the maximum signal level.

ENGINEERING TEST REPORT

7.3 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	1.1	3.1	9.5
Test Channel #4 67.25	2.1	2.8	4.9	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 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 : 24 ℃ Humidity : 55 %

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
Meter Reading : 1.1 dBμV/50Ω
Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

Signal Level = 1.1 + 2.0 = 3.1 dBμV/75Ω

[Summary of Test Results]

Minimum margin was 4.6 dB, at 67.25 MHz, test channel #4.

Tested Date : May 13, 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	FS-83	1	1999/3	2000/3
		ESVS10	Frequency Range 20 MHz – 1 GHz	FS-60	2	1998/5	1999/5
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	FL-107	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	UHALP9108A	Frequency Range 300 MHz – 1 GHz	AN-218	2	1999/2	2000/2

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

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.

ATTACHMENT J --- FCC IDENTIFIER (§2.926) &
LABELING REQUIREMENTS (§15.19)

FCC IDENTIFIER (§2.926):

FCC ID: A7RM4C7C MADE IN THAILAND

CODE DESCRIPTION ASSIGNED BY FCC:

CODE	GRANTEE
A7R	ORION ELECTRIC CO., LTD.

LABELING REQUIREMENTS (§15.19):

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.
OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:
(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE,
AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE
RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE
UNDESIRED OPERATION.

Please see ATTACHMENT J-1 and Photographs for detail of indication place.