

Designated by Ministry of International Trade and Industry

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

HEAD OFFICE
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KITA-KU, OSAKA, 530 JAPAN



IKOMA
TESTING LABORATORY
10630, TAKAYAMA-CHO
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*Corporate Juridical Person***ENGINEERING TEST REPORT**Report No. A-039-98-C

Date : February 12, 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 : Shintom Co., Ltd.

Mailing Address : 1-19-20, Shin-Yokohama, Kohoku-ku, Yokohama, 222-0033 Japan

2. Identification of Tested Device

FCC ID : BFYVRK6AANAY

Device Name : Video Cassette Recorder

Trade Name : Shintom

Model Number : VRK6AANAY

Serial Number : WS-0001 ☒ prototype ☐ pre-production ☐ production

Date of Manufacture : November, 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 : December 10, 1998

Test Completed on : February 2, 1999

Fumitoshi Nagaoka
Associate Director of Ikoma Testing Laboratory

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

The Shintom Model No.VRK6AANAY (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

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

(3) Used Oscillating Frequencies

- 16 MHz : CPU System clock
- 3.58 MHz : VIDEO IC VXCO
- 32 kHz : Timer 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

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 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.

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 Connection of EUT System

(1) Common Test Condition

Audio IN : 47 k Ω termination
 Audio OUT : The cable 2, see List of cables
 Video OUT : The cable 2, see List of cables

(2) AC Power Line Conducted Emission Measurement and

(3) Radiated Emission Measurement

a. RF IN : 75 k Ω termination
 RF OUT : The cable 1, see List of cables
 Video IN : 75 k Ω termination

b, c. RF IN : 75 k Ω termination
 RF OUT : The cable 1, see List of cables
 Video IN : VITS signal generator

d, e. RF IN : NTSC TV signal generator
 RF OUT : The cable 2, see List of cables is connected.
 Its other end is terminated with 75 k Ω
 Video IN : 75 k Ω termination

(4) Output Signal Level Measurement and

(5) Output Terminal Conducted Spurious Emission Measurement

a. RF IN : 75 k Ω termination
 RF OUT : Spectrum Analyzer or Pre Amp and Spectrum Analyzer
 Video IN : 75 k Ω termination

b, c. RF IN : 75 k Ω termination
 RF OUT : Spectrum Analyzer or Pre Amp and Spectrum Analyzer
 Video IN : VITS signal generator

d, e. RF IN : NTSC TV signal generator
 RF OUT : Spectrum Analyzer or Pre Amp and Spectrum Analyzer
 Video IN : 75 k Ω termination

(6) Transfer Switch Measurement

a. RF IN : Pre Amp and Spectrum Analyzer
 RF OUT : 75 k Ω termination
 Video IN : 75 k Ω termination

b, c. RF IN : Pre Amp and Spectrum Analyzer
 RF OUT : 75 k Ω termination
 Video IN : VITS signal generator

[Note]

a ~ e : See 2.1 Test Mode

ENGINEERING TEST REPORT**2.4 List of Cables**

No	Cable Name	Model Number (Trade Name)	Shielded (Y/N)	Length (m)	Note	Remark
1	RF Cable		Y	1.0	One-end 75 Ω Termination	1)
2	A/V Cable		Y	1.45	One-end 47 k Ω Termination	
3	AC Cord		N	1.55	2-wires type	2)

[Remark]

1) : Accessory cable of EUT

2) : Permanently attached to EUT

ENGINEERING TEST REPORT**3.2 Test Results**

Emission Frequency [MHz]	LISN Correction Factor [dB]	Meter Reading [dBμV]		Maximum RF Voltage [dBμV]	Limits [dBμV]
		One-end To Ground	Other-end to Ground		
0.6669	0.1	26.7	21.9	26.8	48.0
0.9042	0.1	25.4	20.1	25.5	48.0
1.003	0.1	25.7	20.5	25.8	48.0
2.278	0.1	24.9	25.1	25.2	48.0
16.00	0.7	34.3	36.1	36.8	48.0
29.70	1.3	20.3	22.1	23.4	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 reported 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 : 30%

[Sample Calculation]

Frequency : 0.6669 MHz
 Meter Reading : 26.7 dBμV (One-end to Ground)
 LISN Corr. Factor : 0.1 dB

Then, RF voltage is calculated as follows.

$$\text{RF Voltage} = 26.7 + 0.1 = 26.8 \text{ dB}\mu\text{V}$$

[Summary of Test Results]

Minimum margin was 11.2 dB at 16.00 MHz, other-end to ground.

Tested Date : February 2, 1999

Signature


 Yoshiko Kotani

ENGINEERING TEST REPORT**4.2 Test Results**

[Distance : 3m]

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	9.1	0.6	10.6	19.7	40.0
65.75	8.5	1.1	4.1	12.6	40.0
122.50	15.1	4.1	0.9	19.2	43.5
245.00	20.2	<0.0	<0.0	<20.2	46.0
Test Channel #4					
67.25	8.4	2.0	3.3	11.7	40.0
71.75	8.0	12.1	8.5	20.1	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					
32.00	17.9	4.4	13.7	31.6	40.0
*48.00	4.5	19.5	32.5	37.0	40.0
64.00	8.8	10.6	15.8	24.6	40.0
72.00	8.0	24.7	17.4	32.7	40.0
80.00	7.9	24.5	19.4	32.4	40.0
128.00	15.6	18.0	7.4	33.6	43.5
144.00	16.8	16.8	10.0	33.6	43.5
200.46	18.9	12.7	10.6	31.6	43.5
214.80	19.3	11.8	11.0	31.1	43.5
240.00	20.1	15.3	12.1	35.4	46.0
243.41	20.2	13.4	12.4	33.6	46.0
256.00	20.7	16.6	12.4	37.3	46.0
272.00	21.6	14.0	10.5	35.6	46.0
300.71	16.8	17.1	18.5	35.3	46.0
329.34	17.5	15.9	14.3	33.4	46.0

ENGINEERING TEST REPORT

- Continued -

[Note]

- 1) Antenna Factor includes the cable loss.
- 2) * : Measured data with the Tuned Dipole Antenna.

[Environment]

Temperature : 18°C

Humidity : 53%

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
Meter Reading : 10.6 dB μ V (at Vertical Polarization)
Antenna Factor : 9.1 dB/m

Then, Field Strength is calculated as follows.

$$\text{Field Strength} = 10.6 + 9.1 = 19.7 \text{ dB}\mu\text{V/m}$$

[Summary of Test Results]

Minimum margin was 3.0 dB at 48.00 MHz, (Other emissions) vertical polarization.

Tested Date : February 6, 1999

Signature


Yoshiko Kotani

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	65.1	67.1	69.5
65.75	2.0	49.5	51.5	56.5
Test Channel #4				
67.25	2.0	65.5	67.5	69.5
71.75	2.0	50.3	52.3	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 : 23 °C

Humidity : 45 %

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
 Meter Reading : 65.1 dBμV/50Ω
 Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

$$\text{Signal Level} = 65.1 + 2.0 = 67.1 \text{ dB}\mu\text{V}/75\Omega$$

[Summary of Test Results]

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

Tested Date : January 28, 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**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				
52.27	2.0	22.0	24.0	39.5
55.91	2.0	29.4	31.4	39.5
56.65	2.0	36.4	38.4	39.5
70.22	2.0	23.7	25.7	39.5
122.56	2.1	19.1	21.2	39.5
183.85	2.4	17.8	20.2	39.5
** 56.65	2.0	18.8	20.8	39.5
Test Channel #4				
58.32	2.0	24.1	26.1	39.5
61.91	2.0	30.3	32.3	39.5
62.65	2.0	37.7	39.7	39.5
76.83	2.0	20.3	22.3	39.5
134.56	2.2	19.8	22.0	39.5
201.85	2.4	22.6	25.0	39.5
** 62.65	2.0	19.1	21.1	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 : 45 %

[Sample Calculation]

Frequency : 52.27 MHz (Test Channel #3)
 Meter Reading : 22.0 dBμV/50Ω
 Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

$$\text{Signal Level} = 22.0 + 2.0 = 24.0 \text{ dB}\mu\text{V}/75\Omega$$

[Summary of Test Results]

Minimum margin was 7.2 dB at 61.91 MHz, test channel #4.

Tested Date : January 28, 1999

Signature

Y. Kotani
Yoshiko Kotani

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	3.3	5.3	9.5
306.25	2.6	4.1	6.7	9.5
Test Channel #4				
67.25	2.0	3.1	5.1	9.5
201.75	2.4	5.4	7.8	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 : 45 %

[Sample Calculation]

Frequency : 61.25 MHz (Test Channel #3)
 Meter Reading : 3.3 dB μ V/50 Ω
 Correction Factor : 2.0 dB

Then, the output signal level is calculated as follows.

$$\text{Signal Level} = 2.6 + 3.3 = 5.3 \text{ dB}\mu\text{V}/75\Omega$$

[Summary of Test Results]

Minimum margin was 1.7 dB, at 201.75 MHz, test channel #4.

Tested Date : January 28, 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	FS-59	1	1998/4	1999/4
		ESVS10	Frequency Range 20 MHz – 1 GHz	FS-82	2	1998/2	1999/2
Spectrum Analyzer	Hewlett Packard	8568B	Frequency Range 100 Hz – 1.5 GHz	FS-46-3	1	1998/6	1999/6
	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 μ H Capacity: AC250V, 15A	FL-107	1	1998/4	1999/4
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30 MHz – 300 MHz	AN-94	2	1998/2	1999/2
Log-Periodic Antenna	Schwarzbeck	UHALP9108A	Frequency Range 300 MHz – 1 GHz	AN-217	2	1998/2	1999/2
Tuned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Range 25 MHz – 500 MHz	AN-135	2	1998/2	1999/2
		KBA-611S	Frequency Range 500 MHz – 1 GHz	AN-137	—	1998/2	1999/2

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-28-2	3,4,5	1998/11	1999/11
				AX-28-1	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

Designated by Ministry of International Trade and Industry

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

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



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

*Corporate Juridical Person***ENGINEERING TEST REPORT****REPORT NO. A-039-98-C1**

Issued Date : February 12, 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 : Shintom Co., Ltd.

Mailing Address : 1-19-20, Shin-Yokohama, Kohoku-ku, Yokohama 222-0033, Japan

2. Identification of Tested Device

Device Name : Video Cassette Recorder
Trade Name : Shintom
Model Number : VRK6AANAY
Serial Number : WS-0001 ☒ Prototype ☐ Pre-production ☐ Production
Date of Manufacture : November, 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 : December 10, 1998

Test Completed on : February 5, 1999

CERTIFIED BY :

Fumitoshi Nagaoka
Associate Director of Ikoma Testing Laborator

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

The Shintom Model No.VRK6AANAY (referred to as the EUT in this report) is a VIDEO CASSETTE RECORDER containing RF modulator and Tuner.

1) Provided Terminals

- (1) Antenna Input Terminal
- (2) RF Output Terminal
- (3) A/V Input Terminals(front side)
- (4) A/V Output Terminals

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

Name : KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC)
IKOMA TESTING LABORATORY
Open Test Site No.1 and EMC Measurement Center Anechoic Chamber 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),

ENGINEERING TEST REPORT**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.

RF OUT : The cable 1, see List of cables
 Audio IN : 47 k Ω termination
 Audio OUT : The cable 2, see List of cables
 Video IN : 75 k Ω termination
 Video OUT : The cable 2, see List of cables

(2) AC Power Line Conducted Emission Measurement

RF IN : TV signal generator US #13

(3) Radiated Emission Measurement

RF IN : 75 k Ω termination

(4) Antenna Power Conduction Measurement

RF IN : Test Receiver or Spectrum Analyzer

2.3 List of Cables

No	Cable Name	Model Number (Trade Name)	Shielded (Y/N)	Length (m)	Note	Remark
1	RF Cable		Y	1.0	One-end 75 Ω Termination	1)
2	A/V Cable		Y	1.45	One-end 47k Ω Termination	
3	AC Cord		N	1.55	2-wires type	2)

[Remark]

1) : Accessory cable of EUT

2) : Permanently attached to EUT

ENGINEERING TEST REPORT

3.2 Test Results

Emission Frequency [MHz]	LISN Correction Factor [dB]	Meter Reading [dB μ V]		Maximum RF Voltage [dB μ V]	Limit [dB μ V]
		One-end to Ground	Other-end to Ground		
(Measurement with the Quasi-Peak detector)					
0.4568	0.1	29.8	24.4	29.9	48.0
0.5710	0.1	28.0	20.5	28.1	48.0
0.5840	0.1	25.3	19.1	25.4	48.0
0.9120	0.1	25.8	19.8	25.9	48.0
2.166	0.1	24.8	17.5	24.9	48.0
16.00	0.7	20.4	27.2	27.9	48.0

[Note]

LISN Correction Factor includes the cable loss.

[Environment]

Temperature : 20 °C Humidity : 48 %

[Sample Calculation]

Frequency : 0.4568 [MHz]
 Meter Reading : 29.8 [dB μ V] (at One-end to Ground)
 LISN Corr. Factor : 0.1 [dB]

Then, RF voltage is calculated as follows.

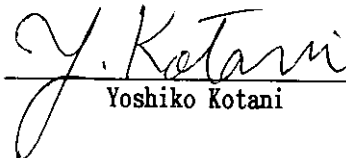
RF Voltage = 29.8 + 0.1 = 29.9 [dB μ V]

[Summary of Test Results]

Minimum margin was 18.1 dB at 0.4568 MHz, one-end to ground.

Tested Date : February 4, 1999

Signature



Yoshiko Kotani

ENGINEERING TEST REPORT

4.2 Test Results

[ON AIR CHANNEL --- below 1GHz]

[Distance : 3m]

Measurement Frequency		Antenna Factor [dB/m]	Meter Reading		Maximum Field Strength [dB μ V/m]	Limits [dB μ V/m]
Ch.	[MHz]		Horiz. [dB μ V]	Vert. [dB μ V]		
TV VHF Fundamental						
2	101	13.6	10.5	5.1	24.1	43.5
3	107	14.5	11.5	6.9	26.0	43.5
4	113	15.3	12.4	8.7	27.7	43.5
5	123	16.7	14.5	6.6	31.2	43.5
6	129	17.3	16.8	9.6	34.1	43.5
7	221	22.0	11.3	3.3	33.3	46.0
8	227	22.1	9.5	1.9	31.6	46.0
9	233	22.3	8.0	0.5	30.3	46.0
10	239	22.4	6.3	-0.4	28.7	46.0
11	245	22.6	4.6	-0.2	27.2	46.0
12	251	22.8	4.9	0.1	27.7	46.0
13	257	23.2	5.3	1.0	28.5	46.0
TV VHF 2nd Harmonic						
2	202	21.5	3.3	<0.0	24.8	43.5
3	214	21.8	5.6	<0.0	27.4	43.5
4	226	22.1	6.6	<0.0	28.7	46.0
5	246	22.6	4.7	<0.0	27.3	46.0
6	258	23.2	2.7	<0.0	25.9	46.0
7	442	25.1	9.6	12.0	37.1	46.0
8	454	25.4	13.0	11.9	38.4	46.0
9	466	25.8	17.5	16.7	43.3	46.0
10	478	26.1	16.8	16.3	42.9	46.0
11	490	26.4	12.1	12.3	38.7	46.0
12	502	26.7	9.0	8.8	35.7	46.0
13	514	27.0	6.2	2.6	33.2	46.0

ENGINEERING TEST REPORT

- Continued -

[ON AIR CHANNEL --- below 1GHz]

[Distance : 3m]

Measurement Frequency		Antenna Factor [dB/m]	Meter Reading		Maximum Field Strength [dB μ V/m]	Limits [dB μ V/m]
Ch.	[MHz]		Horiz. [dB μ V]	Vert. [dB μ V]		
TV UHF Fundamental						
14	517	22.1	13.1	11.7	35.2	46.0
19	547	22.8	10.0	10.6	33.4	46.0
28	601	24.1	9.9	5.6	34.0	46.0
36	649	24.8	6.9	6.0	31.7	46.0
44	697	25.4	9.0	6.8	34.4	46.0
53	751	25.9	9.5	5.1	35.4	46.0
61	799	26.4	11.8	10.2	38.2	46.0
69	847	26.9	15.8	16.5	43.4	46.0

[ON AIR CHANNEL --- above 1GHz]

[Distance : 3m]

Measurement Frequency		Antenna Factor [dB/m]	Pre-AMP Gain [dB]	Meter Reading		Maximum Field Strength [dB μ V/m]	Limits [dB μ V/m]
Ch.	[MHz]			Horiz. [dB μ V]	Vert. [dB μ V]		
TV UHF 2nd Harmonic							
14	1034	25.0	37.2	41.6	42.7	30.5	54.0
19	1094	23.6	37.1	43.5	45.2	31.7	54.0
28	1202	24.5	37.0	48.3	48.8	36.3	54.0
36	1298	23.3	36.8	45.5	50.1	36.6	54.0
44	1394	22.5	36.7	44.7	44.0	30.5	54.0
54	1514	23.1	36.5	37.5	44.2	30.8	54.0
61	1598	22.2	36.3	50.6	51.3	37.2	54.0
69	1694	22.6	36.2	50.8	53.0	39.4	54.0

ENGINEERING TEST REPORT

- Continued -

[CATV CHANNEL --- below 1GHz]

[Distance : 3m]

Measurement Frequency		Antenna Factor [dB/m]	Meter Reading		Maximum Field Strength [dB μV/m]	Limits [dB μV/m]
Ch.	[MHz]		Horiz. [dB μV]	Vert. [dB μV]		
CATV Fundamental						
1	119	13.7	12.5	10.1	26.2	43.5
95	137	15.1	16.6	8.9	31.7	43.5
97	149	15.8	19.2	11.6	35.0	43.5
99	161	16.3	21.1	14.0	37.4	43.5
14	167	16.7	23.7	14.9	40.4	43.5
18	191	17.5	9.0	4.0	26.5	43.5
22	215	18.1	10.5	3.6	28.6	43.5
23	263	19.6	5.7	1.6	25.3	46.0
29	299	21.8	7.1	2.6	28.9	46.0
36	341	18.5	13.2	6.5	31.7	46.0
37	347	18.6	14.5	7.4	33.1	46.0
65	515	22.0	13.8	11.7	35.8	46.0
94	689	25.3	8.9	6.4	34.2	46.0
100	695	25.4	8.8	6.8	34.2	46.0
113	773	26.1	11.4	8.4	37.5	46.0
124	839	26.8	16.0	16.4	43.3	46.0
CATV 2nd Harmonic						
1	238	18.5	8.5	1.5	27.0	46.0
95	274	20.3	3.7	1.6	24.0	46.0
97	298	21.7	3.5	0.2	25.2	46.0
99	322	18.3	2.8	<0.0	21.1	46.0
14	334	18.4	4.8	0.5	23.2	46.0
18	382	19.0	8.3	5.3	27.3	46.0
22	430	19.9	12.6	12.9	32.8	46.0
23	526	22.3	8.2	7.4	30.5	46.0
29	598	24.1	2.4	1.9	26.5	46.0
36	682	25.2	6.3	5.1	31.5	46.0
37	694	25.4	6.6	5.2	32.0	46.0

ENGINEERING TEST REPORT

- Continued -

[CATV CHANNEL --- above 1GHz]

[Distance : 3m]

Measurement Frequency		Antenna Factor [dB/m]	Pre.AMP Gain [dB]	Meter Reading		Maximum Field Strength [dB μ V/m]	Limits [dB μ V/m]
Ch.	[MHz]			Horiz. [dB μ V]	Vert. [dB μ V]		
CATV 2nd Harmonic							
65	1030	25.1	37.2	44.5	39.8	32.4	54.0
94	1378	22.7	36.7	44.5	44.1	30.5	54.0
100	1390	22.6	36.7	44.6	44.8	30.7	54.0
113	1546	22.7	36.4	45.0	47.8	34.1	54.0
125	1690	22.6	36.2	50.7	52.8	39.2	54.0

[Note]

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

[Environment]

Temperature : 13 °C Humidity : 45 %

[Sample calculation]

Frequency : 1030 [MHz] (CATV 65ch. 2nd Harmonic)
 Meter Reading : 44.5 [dB μ V] (at Horiz. Polarization)
 Antenna Factor : 25.1 [dB/m]
 Pre-AMP Gain : 37.2 [dB]

Then, Field Strength is calculated as follows.

$$\text{Field Strength} = 44.5 + 25.1 - 37.2 = 32.4 \text{ [dB}\mu\text{V/m]}$$

[Summary of Test Results]

Minimum margin was 2.6 dB at 847 MHz, UHF 69ch (Fundamental) Vert. polarization.

Tested Date : February 2, 1999

Signature



Yoshiko Kotani

ENGINEERING TEST REPORT

5. ANTENNA POWER CONDUCTION MEASUREMENT

5.1 Test Results

[ON AIR CHANNEL]

Measurement Frequency		Correction Factor [dB]	Meter Reading [dB μ V]	Conversion Factor [dB μ V] to [dBmW]	Antenna Power Conduction [dBmW]	Limit* [dBmW]
ch.	[MHz]					
TV VHF Fundamental						
2	101	6.5	22.3	-48.8	-20.0	3.0
3	107	6.5	22.4	-48.8	-19.9	3.0
4	113	6.5	22.3	-48.8	-20.0	3.0
5	123	6.5	21.7	-48.8	-20.6	3.0
6	129	6.5	21.4	-48.8	-20.9	3.0
7	221	6.5	19.9	-48.8	-22.4	3.0
8	227	6.5	20.1	-48.8	-22.2	3.0
9	233	6.5	20.3	-48.8	-22.0	3.0
10	239	6.5	20.8	-48.8	-21.5	3.0
11	245	6.5	21.2	-48.8	-21.1	3.0
12	251	6.5	21.7	-48.8	-20.6	3.0
13	257	6.5	22.2	-48.8	-20.1	3.0
TV VHF 2nd Harmonic						
2	202	6.5	3.9	-48.8	-38.4	3.0
3	214	6.5	5.7	-48.8	-36.6	3.0
4	226	6.5	6.8	-48.8	-35.5	3.0
5	246	6.5	10.4	-48.8	-31.9	3.0
6	258	6.5	11.2	-48.8	-31.1	3.0
7	442	6.5	15.5	-48.8	-26.8	3.0
8	454	6.5	15.9	-48.8	-26.4	3.0
9	466	6.5	15.8	-48.8	-26.5	3.0
10	478	6.5	13.1	-48.8	-29.2	3.0
11	490	6.5	10.4	-48.8	-31.9	3.0
12	502	6.5	10.9	-48.8	-31.4	3.0
13	514	6.5	10.4	-48.8	-31.9	3.0
TV UHF Fundamental						
14	517	6.5	8.4	-48.8	-33.9	3.0
19	547	6.5	9.1	-48.8	-33.2	3.0
28	601	6.5	19.3	-48.8	-23.0	3.0
36	649	6.5	21.4	-48.8	-20.9	3.0
44	697	6.5	23.5	-48.8	-18.8	3.0
53	751	6.5	23.8	-48.8	-18.5	3.0
61	799	6.5	20.3	-48.8	-22.0	3.0
69	847	6.5	19.2	-48.8	-23.1	3.0
TV UHF 2nd Harmonic						
14	1034	6.6	31.6	-48.8	-10.6	3.0
19	1094	6.6	34.2	-48.8	-8.0	3.0
28	1202	6.6	38.5	-48.8	-3.7	3.0
36	1298	6.6	37.1	-48.8	-5.1	3.0
44	1394	6.6	30.2	-48.8	-12.0	3.0
53	1502	6.6	18.6	-48.8	-23.6	3.0
61	1598	6.6	16.3	-48.8	-25.9	3.0
69	1694	6.6	16.9	-48.8	-25.3	3.0

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

ENGINEERING TEST REPORT

- Continued -

[CATV CHANNEL]

Measurement Frequency		Correction Factor [dB]	Meter Reading [dB μ V]	Conversion Factor [dB μ V] to [dBnW]		Antenna Power Conduction	Limit* [dBnW]
ch.	[MHz]			[dBnW]			
CATV Fundamental							
1	119	6.5	22.0	-48.8		-20.3	3.0
95	137	6.5	22.3	-48.8		-20.0	3.0
97	149	6.5	22.0	-48.8		-20.3	3.0
99	161	6.5	21.3	-48.8		-21.0	3.0
14	167	6.5	21.2	-48.8		-21.1	3.0
18	191	6.5	17.2	-48.8		-25.1	3.0
22	215	6.5	19.6	-48.8		-22.7	3.0
23	263	6.5	22.5	-48.8		-19.8	3.0
29	299	6.5	24.0	-48.8		-18.3	3.0
36	341	6.5	23.5	-48.8		-18.8	3.0
37	347	6.5	22.8	-48.8		-19.5	3.0
65	515	6.5	8.8	-48.8		-33.5	3.0
94	689	6.5	23.2	-48.8		-19.1	3.0
100	695	6.5	23.4	-48.8		-18.9	3.0
113	773	6.5	22.9	-48.8		-19.4	3.0
125	845	6.5	19.0	-48.8		-23.3	3.0
CATV 2nd Harmonic							
1	238	6.5	8.9	-48.8		-33.4	3.0
95	274	6.5	9.7	-48.8		-32.6	3.0
97	298	6.5	14.7	-48.8		-27.6	3.0
99	322	6.5	17.1	-48.8		-25.2	3.0
14	334	6.5	17.6	-48.8		-24.7	3.0
18	382	6.5	13.4	-48.8		-28.9	3.0
22	430	6.5	15.8	-48.8		-26.5	3.0
23	526	6.5	7.2	-48.8		-35.1	3.0
29	598	6.5	5.3	-48.8		-37.0	3.0
36	682	6.5	10.2	-48.8		-32.1	3.0
37	694	6.5	11.5	-48.8		-30.8	3.0
65	1030	6.6	32.0	-48.8		-10.2	3.0
94	1378	6.6	30.4	-48.8		-11.8	3.0
100	1390	6.6	30.2	-48.8		-12.0	3.0
113	1546	6.6	17.5	-48.8		-24.7	3.0
125	1690	6.6	16.3	-48.8		-25.9	3.0

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

ENGINEERING TEST REPORT

- Continued -

[Environment]

Temperature : 20 °C Humidity : 56 %

[Note]

- 1) The spectrum was scanned from 30 MHz to 1.7 GHz, and all emission not reported were less than 10 dB μ V at meter reading.
- 2) The correction factor consist of the voltage loss of the impedance matching transformer (50 Ω : 75 Ω) and the coaxial cable used for the test.

[Sample calculation]

Frequency : 101 [MHz] (VHF 2ch Fundamental)
Meter Reading : 22.3 [dB μ V]
Correction Factor : 6.5 [dB]
Conversion Factor : -48.8 [dB] (dB μ V to dBnW)

Then, the antenna Power Conduction is calculated as follows.

$$\text{Antenna Power Conduction} = 22.3 + 6.5 - 48.8 = -20.0 \text{ [dBnW]}$$

[Summary of Test Results]

Minimum margin was 6.7 dB at 1202 MHz(UHF 28ch) at 2nd harmonic.

Tested Date : January 11, 1999

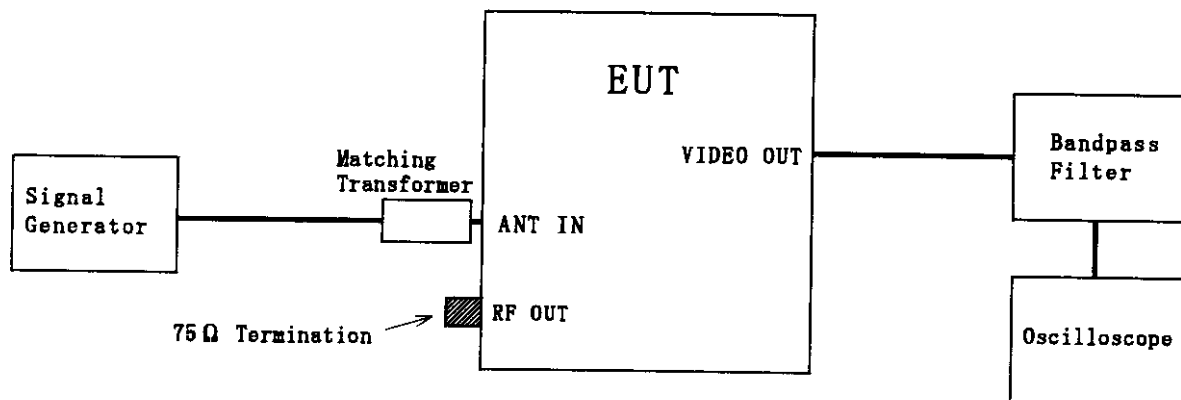
Signature


Yoshiko Kotani

ENGINEERING TEST REPORT

6. PICTURE SENSITIVITY 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	-87.0	1.995	14	471.25	-88.3	1.479
6	83.25	-90.7	0.851	44	651.25	-87.4	1.820
7	175.25	-87.6	1.738	69	801.25	-88.8	1.318
13	211.25	-88.3	1.479				
AVERAGE "VHF"			1.516	AVERAGE "UHF"			1.539
AVERAGE UHF/VHF : $10 \text{ Log } \frac{\text{"UHF" pW}}{\text{"VHF" pW}} = 0.1 \text{ dB}$							
[Limit 8.0 dB]							

[Environment]

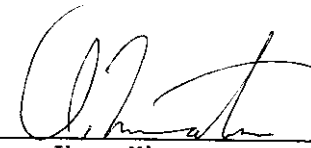
Temperature : 20 °C Humidity : 56 %

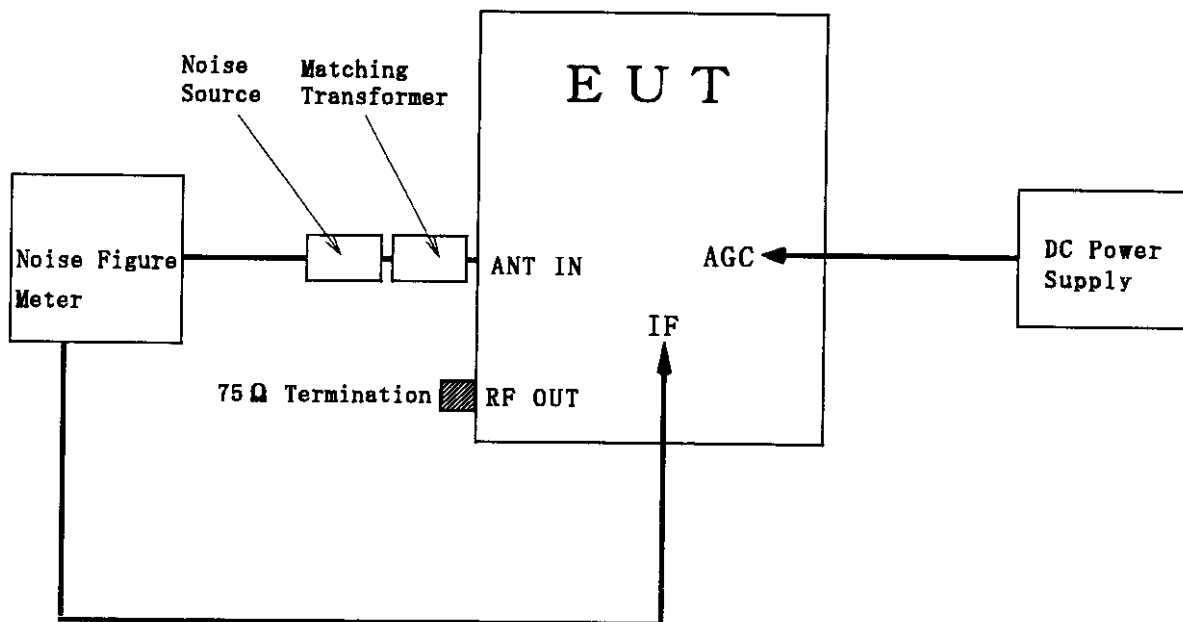
[Summary of Test Results]

Margin was 7.9 dB.

Tested Date : February 5, 1998

Signature


Ikuya Minematsu

ENGINEERING TEST REPORT**7. NOISE FIGURE MEASUREMENT****7.1 Test Configuration**

ENGINEERING TEST REPORT

7.2 Test Results

Measurement Frequency		Correction Factor	Meter Reading	Tuner Gain	ΔF	Noise Figure	Limit
ch.	[MHz]	[dB]	[dB μ V]	[dB]	[dB]	[dB]	[dB]
TV UHF							
14	471.25	0.8	6.4	41.6	0.060	5.6	14
20	507.25	0.8	6.6	41.0	0.061	5.8	14
26	543.25	0.8	6.8	40.2	0.064	6.0	14
32	579.25	0.9	6.6	40.8	0.064	5.7	14
38	615.25	0.9	6.6	41.1	0.062	5.7	14
44	651.25	0.9	6.8	41.0	0.060	5.9	14
50	687.25	1.0	6.9	41.0	0.060	5.9	14
56	723.25	1.0	7.0	40.8	0.060	6.0	14
62	759.25	1.1	7.3	40.3	0.061	6.2	14
69	801.25	1.1	7.8	44.0	0.035	6.7	14
Maximum "NF" Channel(69)		1.1	7.8	44.0	0.035	6.7	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:

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

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 : 20 °C Humidity : 56 %

[Summary of Test Results]

Minimum margin was 7.3 dB at 801.25 MHz, 69ch.

Tested Date : February 5, 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-60	2	1998/5	1999/5
				FS-81	2	1998/10	1999/10
		ESVSD	Frequency Range 20 MHz - 2.05 GHz	FS-79	3	1998/2	1999/2
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-32	2	1998/6	1999/6
Pre-Amplifier	Hewlett Packard	8449B	Frequency Range 1 GHz - 26.5 GHz	AM-52	2	1998/4	1999/4
Line Impedance Stabilization Network	Kyoritsu	KNW-407	Frequency Range 150 kHz - 30 MHz Impedance 50 Ω / 50 μ H Capacity AC 250 V, 15 A	FL-72	1	1998/4	1999/4
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30 MHz - 300 MHz	AN-99	2	1998/2	1999/2
				AN-219	2	1998/2	1999/2
Log-Periodic Antenna	Schwarzbeck	UHALP 9107	Frequency Range 300 MHz - 1 GHz	AN-199	2	1998/2	1999/2
		UHALP 9108A	Frequency Range 300 MHz - 1 GHz	AN-218	2	1998/2	1999/2
Tuned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Range 25 MHz - 500 MHz	AN-111	—	1998/3	1999/3
				AN-132	—	1998/2	1999/2
		KBA-611S	Frequency Range 500 MHz - 1 GHz	AN-115	—	1998/3	1999/3
				AN-8-11	—	1998/2	1999/2
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	1998/3	1999/3
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

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3IN1 Module US181ch 仕様書案

御社型名 :

NJRC型名 : NJH3091U219

NJH3091U219

New Japan Radio Co., Ltd.

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2 General Specifications (一般仕様)

2-1 Applicable Broad Casting System
(適合放送方式)

M NTSC/USA

2-2 Receiving System
(受信方式)Upper Heterodyne
(上側 ヘテロダイン)2-3 Intermediate Frequency
(中間周波数)Picture Intermediate Frequency : 45.75 MHz
(映像中間周波数)Sound Intermediate Frequency : 41.25MHz
(音声中間周波数)2-4 Receiving Channel
(受信チャンネル)

VHF Low : 2 ~ B CH

VHF High : C ~ W + 11 CH

UHF : W + 12 ~ 69 CH

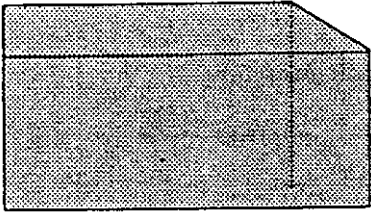
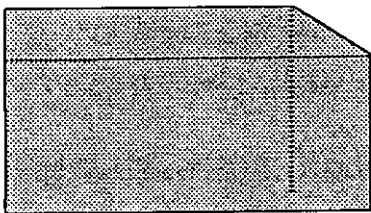
2-5 Output Channel of Modulator
(モジュレータ 出力チャンネル)

3/4 CH.

	TERMINAL NO.2
3CH	OPEN.
4CH	GND..

2-8 Maximum Ratings

(絶対最大定格)

Terminal	SPECIFICATION		
+B	(Supply Voltage)	5.2V	
	+B Should be within hatched area. 電圧印加時、右図で示す領域以外の条件は、 瞬時といえども、与えてはならない。 温度については、許容差 $\pm 2^{\circ}\text{C}$	5.0V 0V -20°C +60°C +70°C	
MB	(Modulator Supply Voltage)	5.2V	
	+B Should be within hatched area. 電圧印加時、右図で示す領域以外の条件は、 瞬時といえども、与えてはならない。 温度については、許容差 $\pm 2^{\circ}\text{C}$	5.0V 0V -20°C +60°C +70°C	
TU	34.0V		
CONTROL	6.0V		
SCL、SDA	Within "+B" Supply Voltage. +B 電源電圧を越えないこと。		

2-9 Storage Temperature Range

(保存温度範囲)

Temperature (温度) : $-20^{\circ}\text{C} \sim 70^{\circ}\text{C}$ Humidity (湿度) : Less than 90 % RH
(90% RH 以下)

(2) Band switching output

(バンド 切り換え出力)

BAND	B 3	B 2	B 1	B 0
UHF	1	0	0	0
VHF High	0	0	1	0
VHF Low	0	0	0	1

(3) Address selection

MA1	MA0	Voltage Applied on CE Input
0	0	0V to $0.1 \times V_{cc}$
0	1	Open or $0.2 \times V_{cc}$ to $0.3 \times V_{cc}$
1	0	$0.4 \times V_{cc}$ to $0.6 \times V_{cc}$
1	1	$0.9 \times V_{cc}$ to $1.0 \times V_{cc}$

2-12 Test Condition

(試験条件)

* Unless otherwise specified, Electrical Characteristic tests shall performed under the following conditions.

(電気的特性の試験は、特に指定のない限り下記の条件で行う。)

TERMINAL	Supply Voltage (印加電圧)
+B	$5V \pm 0.1V$
MB	$5V \pm 0.1V$
TU	$32V \pm 1/2V$
CONTROL	$5V \pm 0.1V$
Ambient Temperature (周囲温度)	$25^{\circ}C \pm 5^{\circ}C$
Relative Humidity (相対湿度)	$65\% \pm 10\%$

(NOTE) +B Ripple : 10mVp-p MAX.

ITEM (項目)	SPECIFICATION (仕様)				NOTE (備考)
	MIN.	TYP.	MAX.	UNIT	
3-1-5 Differential Gain (DG) (微分利得)		2	7	%	Input signal : 1.0Vp-p stair step Chrominance : 20 IRE Luminance : 10~90%
3-1-6 Differential Phase (DP) (微分位相)		1.5	7	deg	Input signal : 1.0Vp-p stair step Chrominance : 20 IRE Luminance : 10~90%
3-1-7 Video S/N (映像 S/N)	45	52		dB	Compensation of spectral luminous efficacy. (感度補正無し。) Measurement Condition. (測定条件) Measure at the out of the standard DE-Modulator H.P.F : 100KHz , L.P.F : 4.2MHz SC TRAP : on, WEIGHT : OFF Input signal Video : 100% White signal Audio : None Video band : 0.1~4.2MHz
3-1-8 Chroma Beat (Fs * Fc Beat) (クロマビート)	55	65		dB	Input signal Video : 1.0Vp-p, 3.58MHz, Sine wave Audio : None Use Spectrum analyzer to measure the level of Fp+0.92MHz. The value is relative to the level of Fp without video modulation. (スペクトラムアナライザを使用し Fp+0.92MHz のレベルを測定する。 測定値は無変調時の Fp のレベルを 基準とする。)

ITEM (項目)	SPECIFICATION (仕様)				NOTE (備考)
	MIN.	TYP.	MAX.	UNIT	
3-1-13 Audio S/N (音声 S/N)	48	62		dB	Reference audio input signal : -3.8dBs, 1KHz ($\approx 0.5V$ rms.) Sine wave Video input signal : ALL Black (Sync. Only.) (全黒信号) Use standard De-Modulator of Inter-Carrier system. and by Audio Analyzer. De-emphasis(75 μ Sec.) is ON. (標準復調器使用でデエムファイズで 測定する。 インターキャリア方式 デエムファイズ ON)
3-1-14 Audio buzz (音声バズ)	45	63		dB	Video input signal : 1Vp-p Color Bar. Other conditions : Same as Item 3-1-13 (その他の条件は 3-1-13 項と同じ。)
3-1-15 Video Carrier Output Level (映像搬送波出力レベル)	63.0	66.0	69.0	dB μ V	Video input signal : 1Vp-p 10 stair step
3-1-16 P/S (Sound Carrier Level) (音声出力レベル差)	-13	-15.0	-19	dB	Audio input signal : None Other conditions : Same as Item 3-1-15 (音声入力無し。 他の条件は 3-1-15 項と同様。)
3-1-17 Video Carrier Frequency (映像搬送波周波数)	-200		+200	KHz	Video Input signal : None

3-1-22 Stability
(安定度)

3-1-22-1 Video Carrier Frequency Rise Up Time
(映像搬送波立上り)

The time to approach the set value ± 50 KHz : within 10 seconds.
(設定値 ± 50 KHz に達する時間) : (10秒以内)

3-1-22-2 Audio Carrier Frequency Rise Up Time
(音声搬送波立ち上がり)

The time to approach the set value ± 3 KHz : within 10 seconds.
(設定値 ± 3 KHz に達する時間) : (10秒以内)

3-1-22-3 Video Carrier Frequency Shift by Supply Voltage Drift
(映像搬送波周波数電圧安定度)

Within ± 10 KHz by ± 0.3 V shift of the supply voltage.
(+B ± 0.3 V で ± 10 KHz 以内)

3-1-22-4 Audio Carrier Frequency Shift by Supply Voltage Drift
(音声搬送波周波数電圧安定度)

Within ± 2 KHz by ± 0.3 V shift of the supply voltage.
(+B ± 0.3 V で ± 2 KHz 以内)

3-1-23-4 Thermal Stability of Audio Carrier Frequency
(音声搬送波周波数温度安定度)

Within ± 10 KHz based on the temperature of 25°C .
(25°C を基準にして $\pm 10\text{KHz}$ 以内)

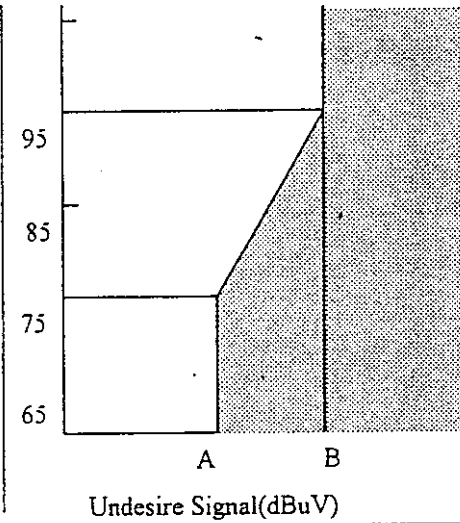
3-1-23-5 Thermal Stability of Video Carrier Output Level
(映像搬送波出力レベル温度安定度)

Within $\pm 2.0\text{dB}$ based on the temperature of 25°C .
(25°C を基準にして $\pm 2.0\text{dB}$ 以内)

3-1-23-6 Thermal Stability of P/S Ratio
(P/S 比 温度安定度)

Within $\pm 2.5\text{dB}$ based on the temperature of 25°C , but the P/S ratio itself
should not be less than 13 dB.
(25°C を基準にして $\pm 2.5\text{dB}$ 以内、但し その P/S 比は 13dB 以下にならない事)

ITEM (項目)	SPECIFICATION (仕様)				NOTE (備考)															
	MIN.	TYP.	MAX.	UNIT																
3-2-6 2nd Inter-Modulation (2次相互変調)	55	64		dB	FIM1=F1(F2-F1).FIM2=F2+(F2-F1) Mode : TV (at MD OFF) <table><tr><td>Item</td><td>Freq(MH)</td><td>Level(dB μ)</td></tr><tr><td>F1</td><td>91.25</td><td>100</td></tr><tr><td>F2</td><td>103.25</td><td>100</td></tr><tr><td>FIM1</td><td>79.25</td><td>—</td></tr><tr><td>FIM2</td><td>115.25</td><td>—</td></tr></table> Both F1 and F2 are not modulated. (F1、F2 の両方とも無変調のこと。)	Item	Freq(MH)	Level(dB μ)	F1	91.25	100	F2	103.25	100	FIM1	79.25	—	FIM2	115.25	—
Item	Freq(MH)	Level(dB μ)																		
F1	91.25	100																		
F2	103.25	100																		
FIM1	79.25	—																		
FIM2	115.25	—																		
3-2-7 Cross Modulation (混変調)	55	62		dB	Then take the smallest ratio from the sideband to F2 as Cross-Modulation value. (F2 と両側波との比のうち、小さい方の値をとる。) <table><tr><td>Item</td><td>Freq(MHz)</td><td>Level(dB μ)</td></tr><tr><td>F1</td><td>91.25</td><td>105</td></tr><tr><td>F2</td><td>193.25</td><td>80</td></tr></table> F1 is 40% AM modulated by 15.75KHz sine wave F2 is not modulated. (F1 は、15.75KHz 正弦波にて AM 変調 40% F2 は、無変調のこと) F1 F2 FIM1 FIM2 15.75K 15.75K	Item	Freq(MHz)	Level(dB μ)	F1	91.25	105	F2	193.25	80						
Item	Freq(MHz)	Level(dB μ)																		
F1	91.25	105																		
F2	193.25	80																		

ITEM (項目)	SPECIFICATION (仕様)				NOTE (備考)
	MIN.	TYP.	MAX.	UNIT	
3-3-4 CH 6 Beat (6 CH ビート)	50	60		dB	ANT INPUT Des : 54dB μ V (75 Ω terminate) Und : 54dB μ V (75 Ω terminate)
3-3-5 CB Rejection (CB 妨害比)	0.535MHz $\sim$ 30MHz -7dBm Min				Desire : 55.25MHz $\sim$ 83.25MHz (CH2 $\sim$ CH6) -66dBm
3-3-6 1% Cross (1) Modulation (1%混変調妨害比 隣々接 CH)	(dBuV)  Undesire Signal(dBuV)				75 Ω terminate

CH	A (dB μ)	B(dB μ)
UHF	64	84
CATV	64	84
VHF	64	84

Cross modulation value should be within hatched area.

※Tuner should be measured for 1% cross modulation with ± 2 channel undesired signal.

3-4 IF Section

(IF 部)

When the test electrical characteristics when there are no instruction.

Fp input level is 70dB μ v and P/S ratio is -6dB.(電気性能測定時 指定なき場合、fp ANT 入力 は 70dB μ V, P/S レベル差は-6dB とする。)

ITEM (項目)	SPECIFICATION (仕様)				NOTE (備考)
	MIN.	TYP.	MAX.	UNIT	
3-4-1 Video S/N (映像 S/N)					100% white signal. 87.5% modulation. Subcarrier trap : ON HPF : 100KHz, LPF : 4.2MHz ANT INPUT Level VHF: 70dB μ V 75 Ω term. UHF: 70dB μ V 75 Ω term
VHF	44	48		dB	
UHF	43	47			
3-4-2 Sensitivity (雑音制限感度)					100% white signal. 87.5% modulation. Subcarrier trap : ON HPF : 100KHz, LPF : 4.2MHz Video S/N = 30 dB
VHF		47	53	dB μ	
UHF		48	55		
3-4-3 Video Output Level (映像出力レベル) [CH:11]	0.8	1.0	1.2	Vp-p	Standard color bar : 87.5% mod. (標準カラーバー)
3-4-4 Sync Ratio (同期比率) [CH:11]	26.0	28.0	32.0	%	Standard color bar : 87.5% mod. (標準カラーバー) V+S = 100%

ITEM (項目)	SPECIFICATION (仕様)				NOTE (備考)
	MIN.	TYP.	MAX.	UNIT	
3-4-12 Frequency Characteristics (音声振幅周波数特性)					1KHz / ± 25 KHz Standard (基準) Standard color bar : 87.5% mod. (標準カラーバー) De-emphasis : OFF
100Hz	-1	0	+1	dB	
1KHz	-1	0	+1		
10KHz	-1	0	+1		
55khz	-3	-1	+1		
100KHz	-5	-3	0		
[CH:11]					
3-4-13 Audio S/N (音声 S/N)	46	53		dB	1KHz / ± 25 KHz Dev. Standard color bar : 87.5% mod. (全黒信号) De-emphasis : ON
3-4-15 Audio Buzz (音声バズ) [CH:11]		30	100	mVp-p	Standard color bar : 87.5% mod. (標準カラーバー) P/S = -10dB De-emphasis :
3-4-16 AFT Alignment Accuracy (AFT 調整精度)	-50	0	+50	KHz	Alignment center : 2.5V at PIF (調整センター) IF input level : 90dB μ V (IF 入力レベル) P/S = -6dB Standard color bar : 87.5% mod. (標準カラーバー)
3-4-17 AFT Output Voltage Center MAX MIN [CH:2]		2.5 0.4 5.0		V	RF Input Level : 70dB μ V Standard color bar : 87.5% mod (標準カラーバー)

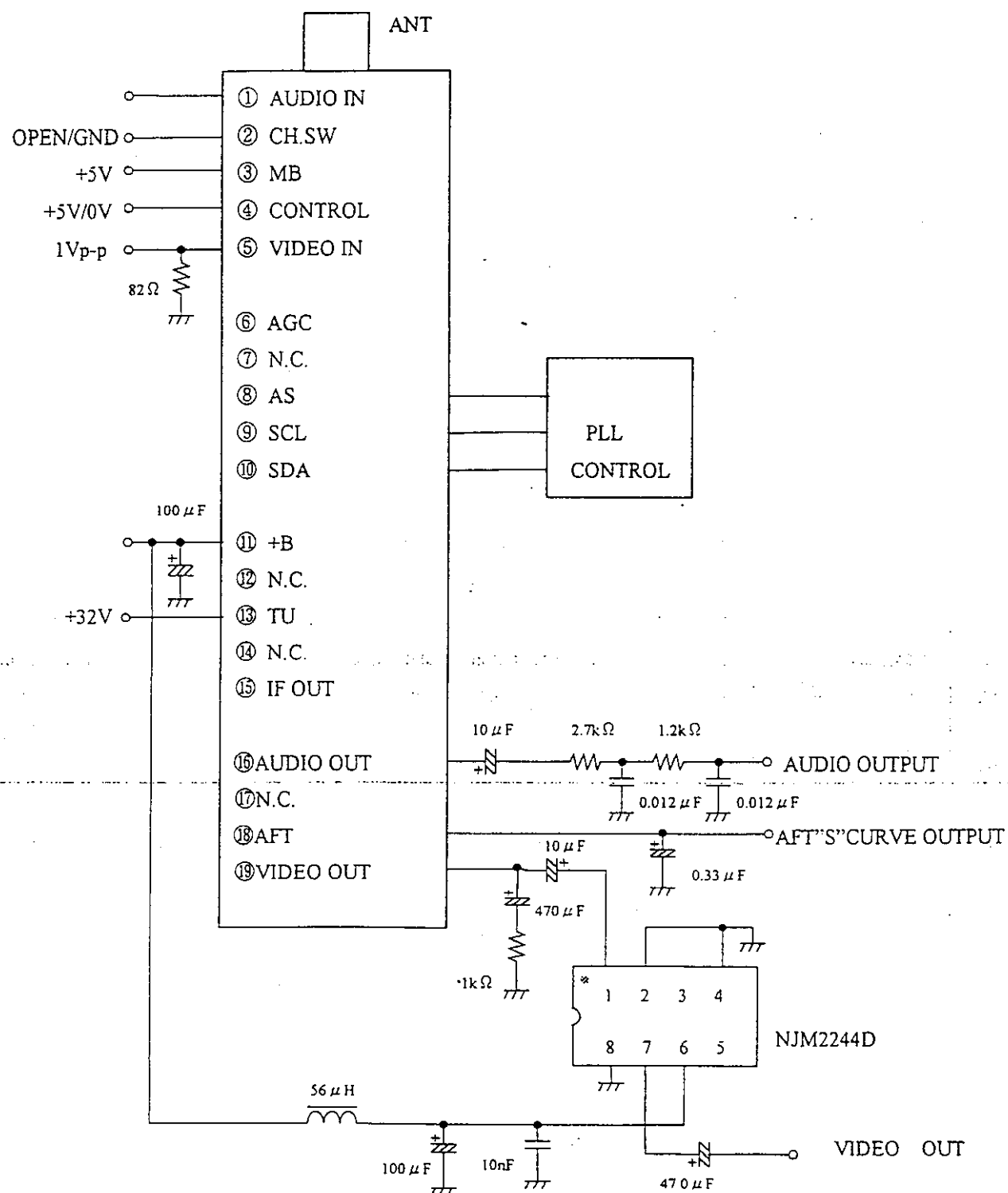
ITEM (項目)	SPECIFICATION (仕様)			NOTE (備考)
	TUNER	MODULATOR	IF	
4-2 Humidity Load Test (耐湿負荷試験)	Same as in item 4-1 (4-1 項に同じ)			Test Condition 4-2-1
4-3 Cold Test (耐寒試験)	Same as in item 4-1 (4-1 項に同じ)			Test Condition 4-3-1
4-4 Operating Life Test (実動寿命試験)	Same as in item 4-1 (4-1 項に同じ)			Test Condition 4-4-1
4-5 High Voltage Test (落雷試験)	Same as in item 4-1 (4-1 項に同じ)			Test Condition 4-5-1
4-6 Vibration Test (振動試験)	Same as in item 4-1 (4-1 項に同じ)			Test Condition 4-6-1
4-7 Impact Test (衝撃試験)	Same as in item 4-1 (4-1 項に同じ)			Test Condition 4-7-1

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ITEM (項目)	TEST CONDITION (試験条件)
4-4-1 Test (実動寿命試験)	1. Take measurements in standard test condition. (常温、常湿にて初期測定) 2. Leave samples for 500 hours, then take measurements. (500H 放置後測定) 3. Apply voltage : Standards (印加電圧) (定格)
4-5-1 High Test (落雷試験)	15KV, 10 times (150pF charged) (15KV 10 回) (150pF 充電) Series R=150Ω (直列抵抗 150Ω)
4-6-1 Vibration Test (振動試験)	Vibration test fixture is used to vibrate the tuner with a total amplitude of 1mm and frequency ranging from 10 to 55Hz, once per minute consecutively, for 40 minutes in each of three direction, X, Y and Z. (全振幅 1mm、周波数範囲 10~55Hz、周波数反転時間 1 分にて振動試験を行う。尚、加振時間は、取付面に平行な軸方向、互いに直角な 3 方向に各 40 分)
4-7-1 Impact Test (衝撃試験)	1. Impact acceleration : 50 m/s² (衝撃加速度) 2. Impact time : 11 msec (衝撃時間) 3. Impact time and direction : 3 times per each 6 sides. (衝撃回数と方向) (各 6 面に対し 3 回ずつ)

6 Test Circuit (測定回路)



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