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KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

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KEC

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

Corporate Juridical Person

TEST REPORT

Report No.A-028-01-C Date: 24 October 2001

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

FCC Rules and Regulations Part 15 Subpart C Intentional 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 : SANWA ELECTRONIC INSTRUMENT CO., LTD.

Mailing Address : 1-2-50, YOSHIDA HONMACHI, HIGASHI-OSAKA, 578-0982 Japan

2. Identification of Tested Device

Type of Device : Transmitter
Kind of Equipment Authorization : ☐: DoC ☒: Certification ☐: Verification
FCC ID : L73RM-Y807
Device Name : REMOTE CONTROL TRANSMITTER
Trade Name : SONY
Model Number : RM-Y807
Serial Number : 010001 ☐: Prototype ☒: Pre-production ☐: Production
Date of Manufacture : October 2001

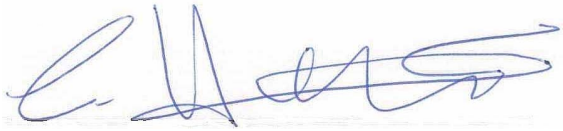
3. Test Items and Procedure

☐: AC Power Line Conducted Emission Measurement
☒: Radiated Emission Measurement
☒: Emission Bandwidth Measurement

Above all tests were performed under: ANSI C63.4 – 1992
☒: without deviation, ☐: with deviation(details are found inside of this report)

4. Date of Test

Receipt of Test Sample : 17 October 2001
Test Completed on : 19 October 2001



Eizo Hariya
General Manager/ Ikoma Testing Laboratory

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0. LABORATORY ACCREDITATION AND MEASUREMENT UNCERTAINTY

0.1. Laboratory Accreditation

KEC is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for the specific scope of accreditation under Lab Code: 200207-0.

When the test report concerns with the NVLAP accreditation test, the first page of the test report is signed by NVLAP Approved Signatory accompanied by the NVLAP logo.

The report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

0.2. Measurement Uncertainty

The result of a measurement is only an approximation or estimate of the value of a specific quantity. And thus the measured is complete only when a statement of uncertainty is given.
KEC quotes Measurement Uncertainty (U)

of +/- 4.9 dB for Radiated Emissions
of +/- 2.2 dB for Conducted Emissions

1. CERTIFICATION OF THE COMPLIANCE

This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 15 Subpart C Intentional Radiators.

KEC evaluation criteria for compliance:
The Product complies, if
the measured results are below the specification limit by a margin more than or equal to

1/2 U (2.5 dB) for Radiated Emissions
U (2.2 dB) for Conducted Emissions

2. GENERAL INFORMATION

2.1. Product Description

The SONY Model No. : RM-Y807 (referred to as the EUT in this report) is REMOTE CONTROL TRANSMITTER.

1) Technical Specifications

· Operating frequency range	: 315.625~316.425 MHz (316.025 MHz in EUT)
Type of antenna	: Internal monopole Antenna (50Ω, Unbalance)
Type of Emission	: F1D (FSK)
Frequency deviation	: 37.5kHz (Nominal)

2) Contained Oscillators

CPU clock	: 4 MHz

3) Rated Power Supply	: DC2.4~3.2V (2 peace of type “AA” alkaline manganese battery)

2.2. Description for Equipment Authorization

(1) Type of device	:	☒ Intentional Radiators
(2) Reference Rule and Specification	:	FCC Rule Part 15 Subpart C, Section 15.231 Periodic operation in the band 40.66 - 40.70MHz and above 70 MHz ☐ Section 15.207 ☒ Section 15.209 ☒ Section 15.231(b) ☒ Section 15.231(c)
(3) Kind of Equipment Authorization	:	☐ DoC ☒ Certification ☐ Verification
(4) Procedure of Application	:	☒ Original Equipment ☐ Modification
(5) Highest Frequency used in the Device	:	316.025 MHz
(6) Upper Frequency of Radiated Emission Measurement Range	:	☐ 1000 MHz ☐ 2000 MHz ☐ 5000 MHz ☒ Tenth harmonics of the highest fundamental frequency

2.3. 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	☒ No.3
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 M.C. Anechoic Chamber No.1, Shielded Room No.4 and EMC M.C. 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).

3. TESTED SYSTEM

3.1. Test Mode

Continuously transmitted code (data) mode.

[Note]
The EUT was operated continuously in measurement. In the measurement of radiated emission, The EUT was placed horizontally or vertically on the test table.
The data of operation modes that produce the maximum emission were reported at each frequency.

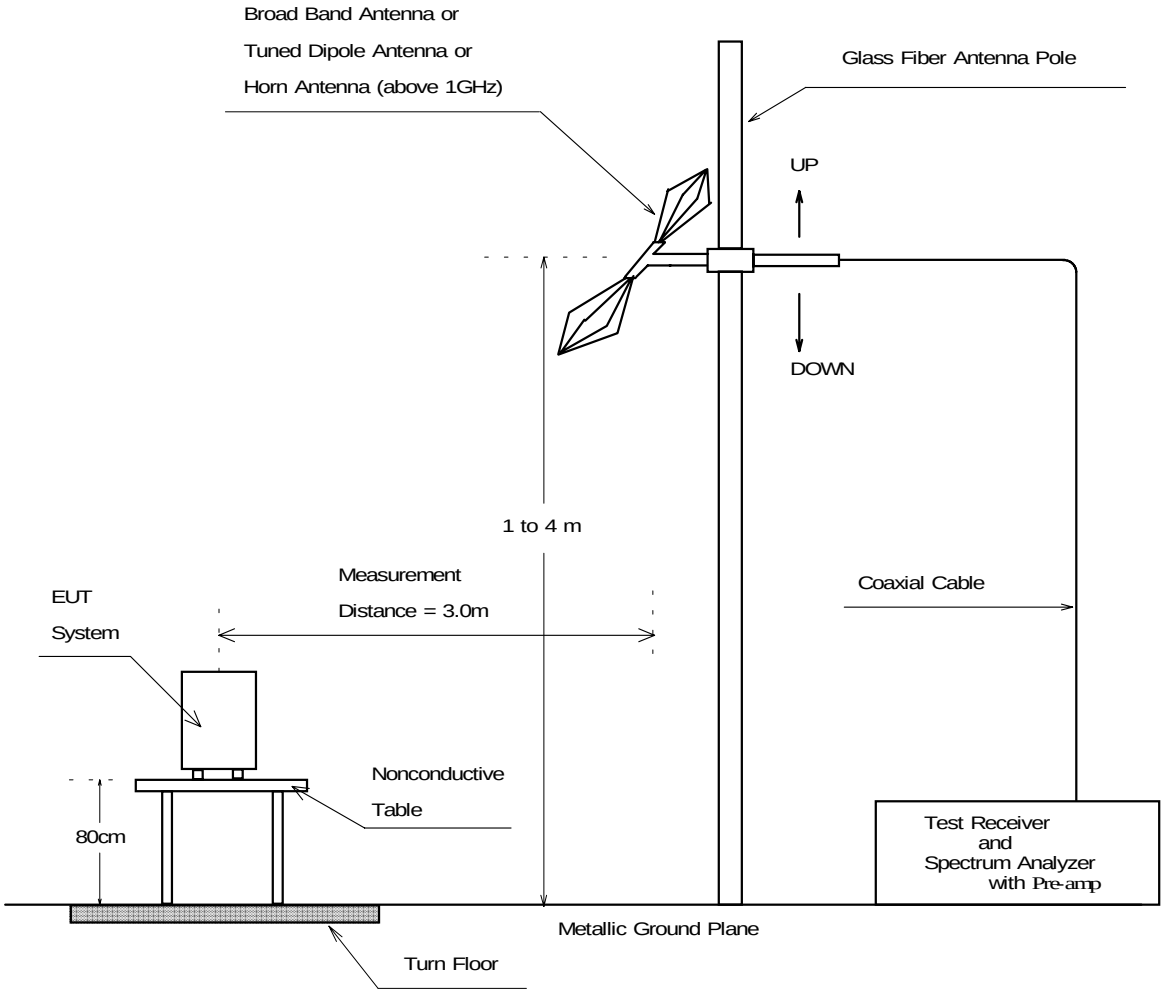
3.2. Characterization and condition of EUT System

☒ : normal , ☐ : not normal (that is)

4. RADIATED EMISSION MEASUREMENT

4.1. Test Configuration

[Open Area Test Site or Anechoic Chamber]



4.2. Test Procedure

(1)	Configure 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 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 the upper frequency of measurement range, and collect the six highest emissions minimum on the spectrum analyzer relative to the limits in the whole range.
(8)	In final compliance test, the six highest emissions minimum, recorded above, are measured at the specified distance using the broad band antenna or the tuned dipole antenna and 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

Detector function	: Quasi-Peak or Peak
IF bandwidth	: 120 kHz

(*4) Test Receiver Set Up Conditions

Detector function	: Average
IF bandwidth	: 1 MHz

4.3. Test Results

(1) Fundamental and Harmonics of Transmitting Frequency

Measurement Distance ☒: 3m ☐: 10m

Measured Frequency	Antenna Factor (*1)	Meter Reading		Maximum Field Strength	Limits		Margin for Limit
		Horizontal Polarization	Vertical Polarization		Peak	Average	
[MHz]	[dB/m]	[dBuV]	[dBuV]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]
[Peak detector measurement]							
Fundamental							
* 316.025	22.0	45.6	42.7	67.6	95.7	75.7	28.1
Harmonics							
* 632.05	29.8	17.0	13.6	46.8	75.7	55.7	28.9
* 948.075	34.3	10.5	8.4	44.8	75.7	55.7	30.9
1264.100	-12.3	51.0	51.2	38.9	75.7	55.7	36.8
1580.125	-12.0	64.4	59.4	52.4	74.0	54.0	21.6
1896.150	-10.5	58.0	58.3	47.8	75.7	55.7	27.9
2212.175	-10.1	60.8	61.0	50.9	74.0	54.0	23.1
2528.200	-9.6	56.1	59.0	49.4	75.7	55.7	26.3
2844.225	-8.7	52.2	52.0	43.5	74.0	54.0	30.5
3160.250	-7.8	50.0	47.3	42.2	75.7	55.7	33.5
[Average detector measurement(*2)]							
1580.125	-12.0	62.8	57.2	50.8	-	54.0	3.2
2212.175	-10.1	57.3	57.5	47.4	-	54.0	6.6
2528.200	-9.6	52.4	54.8	45.2	-	55.7	10.5

- Continued -

(2) In the frequency range : 30 MHz to 1000 MHz (Restricted Bands)

Quasi-Peak Detector Measurement

Measurement Distance ☒: 3m ☐: 10m

Measured Frequency [MHz]	Antenna Factor (*1) [dB/m]	Meter Reading Horizontal Polarization [dBuV]	Meter Reading Vertical Polarization [dBuV]	Field Strength Horizontal Polarization [dBuV/m]	Field Strength Vertical Polarization [dBuV/m]	Limit Quasi detector [dBuV/m]
[Quasi - Peak Detector Measurement]						
37.50	16.6	<-1.5	<-1.5	<15.1	<15.1	40.0
38.25	16.4	<-1.5	<-1.5	<14.9	<14.9	40.0
73.00	7.9	<-2.0	<-2.0	<5.9	<5.9	40.0
74.60	8.0	<-2.0	<-2.0	<6.0	<6.0	40.0
74.80	8.0	<-1.5	<-1.5	<6.5	<6.5	40.0
75.20	8.1	<-1.5	<-1.5	<6.6	<6.6	40.0
108.00	13.2	<-2.0	<-2.0	<11.2	<11.2	43.5
121.94	14.8	<-2.0	<-2.0	<12.8	<12.8	43.5
123.00	14.8	<-2.0	<-2.0	<12.8	<12.8	43.5
138.00	16.0	<-2.0	<-2.0	<14.0	<14.0	43.5
149.90	16.5	<-2.0	<-2.0	<14.5	<14.5	43.5
150.05	16.5	<0.0	<0.0	<16.5	<16.5	43.5
156.52475	16.7	<-2.0	<-2.0	<14.7	<14.7	43.5
156.52525	16.7	<-2.0	<-2.0	<14.7	<14.7	43.5
156.70	16.7	<-2.0	<-2.0	<14.7	<14.7	43.5
156.90	16.7	<-2.0	<-2.0	<14.7	<14.7	43.5
162.01	16.9	<-2.0	<-2.0	14.9	14.9	43.5
167.17	17.2	<-2.0	<-2.0	<15.2	<15.2	43.5
167.72	17.3	<-2.0	<-2.0	<15.3	<15.3	43.5
173.20	17.6	<-2.0	<-2.0	<15.6	<15.6	43.5
240.00	19.6	<0.0	<0.0	<19.6	<19.6	46.0
285.00	22.0	<0.0	<0.0	<22.0	<22.0	46.0
322.00	17.5	<0.0	<0.0	<17.5	<17.5	46.0
335.40	17.7	<0.0	<0.0	<17.7	<17.7	46.0
399.90	19.1	<0.0	<0.0	<19.1	<19.1	46.0
410.00	19.3	<0.0	<0.0	<19.3	<19.3	46.0
608.00	22.9	<0.0	<0.0	<22.9	<22.9	46.0
614.00	23.0	<0.0	<0.0	<23.0	<23.0	46.0
960.00	27.4	<0.0	<0.0	<27.4	<27.4	46.0
1000.00	27.8	<0.0	<0.0	<27.8	<27.8	46.0

- Continued -

(3) In the frequency range : above 1 GHz (Restricted Bands)

Peak detector Measurement

Measurement Distance ☒: 3m ☐: 10m

Measured Frequency [MHz]	Antenna Factor (*1) [dB/m]	Meter Reading Horizontal Polarization [dBuV]	Meter Reading Vertical Polarization [dBuV]	Field Strength Horizontal Polarization [dBuV/m]	Field Strength Vertical Polarization [dBuV/m]	Limit Average detector [dBuV/m]
[Peak Detector Measurement]						
1000.00	-13.5	<47.0	<47.0	<33.5	<33.5	54.0
1240.00	-12.9	<46.0	<46.0	<33.1	<33.1	54.0
1300.00	-12.5	<47.0	<47.0	<34.5	<34.5	54.0
1427.00	-12.1	<47.0	<47.0	<34.9	<34.9	54.0
1435.00	-12.1	<48.0	<48.0	<35.9	<35.9	54.0
1626.50	-12.2	<47.0	<47.0	<34.8	<34.8	54.0
1645.50	-12.1	<47.0	<47.0	<34.9	<34.9	54.0
1646.50	-12.1	<47.0	<47.0	<34.9	<34.9	54.0
1660.00	-12.0	<47.0	<47.0	<35.0	<35.0	54.0
1710.00	-11.5	<47.0	<47.0	<35.5	<35.5	54.0
1718.80	-11.5	<47.0	<47.0	<35.5	<35.5	54.0
1722.20	-11.5	<47.0	<47.0	<35.5	<35.5	54.0
2200.00	-10.7	<46.0	<46.0	<35.3	<35.3	54.0
2300.00	-10.5	<46.0	<46.0	<35.5	<35.5	54.0
2310.00	-10.4	<47.0	<47.0	<36.6	<36.6	54.0
2390.00	-10.2	<46.0	<46.0	<35.8	<35.8	54.0
2483.50	-10.2	<46.0	<46.0	<35.8	<35.8	54.0
2500.00	-10.3	<46.0	<46.0	<35.7	<35.7	54.0
2655.00	-9.9	<47.0	<47.0	<37.1	<37.1	54.0
2900.00	-9.2	<48.0	<48.0	<38.8	<38.8	54.0
3260.00	-7.9	<44.0	<44.0	<36.1	<36.1	54.0
3267.00	-7.9	<44.0	<44.0	<36.1	<36.1	54.0

- Continued -

[Remark]

(*1) : Antenna Factor includes the cable loss, above 1GHz, antenna factor includes both of the cable loss and pre-amplifier gain.

(*2) : If the measurement value with the peak detector meets the average limits, the measurement with average detector is omitted.
In FCC rule, the limit of measurement of radiated emission above 1GHz is regulated on the average value. Therefore, the average value above 1GHz was determined by using a reduced the video bandwidth of spectrum analyzer to obtain the average value in this case spectrum analyzer set up condition.

Resolution Bandwidth : 1 MHz
Video Bandwidth : 30Hz
Detector function : Peak detector

[Note]

(1) * mark in Measured Frequency : Measured with the tuned dipole antenna.
No mark in Measured Frequency : Measured with the broadband antenna.

(2) All emission not reported were less than 10dBμV at meter reading.

[Calculation method]

Maximum Field Strength (dBμV/m)
= Meter Reading (at maximum level of Horizontal or Vertical) (dBμV) + Antenna Factor (dB/m)

[Calculation of Limit (Average detector)]

Fundamental

$L = 20\log\left(\frac{1}{3} \times (125 \times F - 21250)\right)$ Where, L: Limit [dBμV/m], F: Frequency [MHz]
L = 75.7 [dBμV/m] at F=316.025[MHz]

Spurious Emission

L = 75.7 – 20 = 55.7 [dBμV/m]
Limit of peak detector are up to 20 dB from the fundamental and spurious emissions average limits.

[Environment]

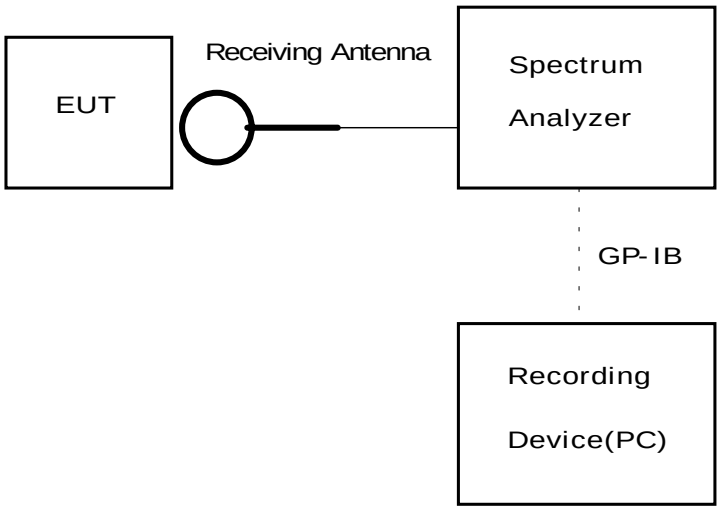
Temperature: 24°C Humidity: 62%

[Tested Date/ Tester]

19 October 2001 Signature

5. EMISSION BANDWIDTH MEASUREMENT

5.1. Test Configuration



5.2. Test Results

Measured emission bandwidth = 424 kHz

See next Figure 1(the picture of spectrum analyzer)

[Note]

Emission Bandwidth was determined at the points 20dB down from the modulated carrier.

Spectrum Analyzer Setting:

Center Frequency	= 316.025 MHz
Frequency Span	= 200 kHz/div.
Resolution Bandwidth	= 100 kHz
Video Bandwidth	= 3 MHz
Sweep Time	= 10 m sec
Trace Mode	: MAX. HOLD

[Environment]

Temperature : 24°C Humidity : 62%

[Calculation of Limit]

Limit of Emission bandwidth = 316.025 MHz × 0.25% = 790.06 kHz

[Summary of Test Results]

Minimum margin of emission bandwidth was 366.06 kHz.

Tested Date : 19 October 2000 Signature

Ikuya Minematsu

- Continued -

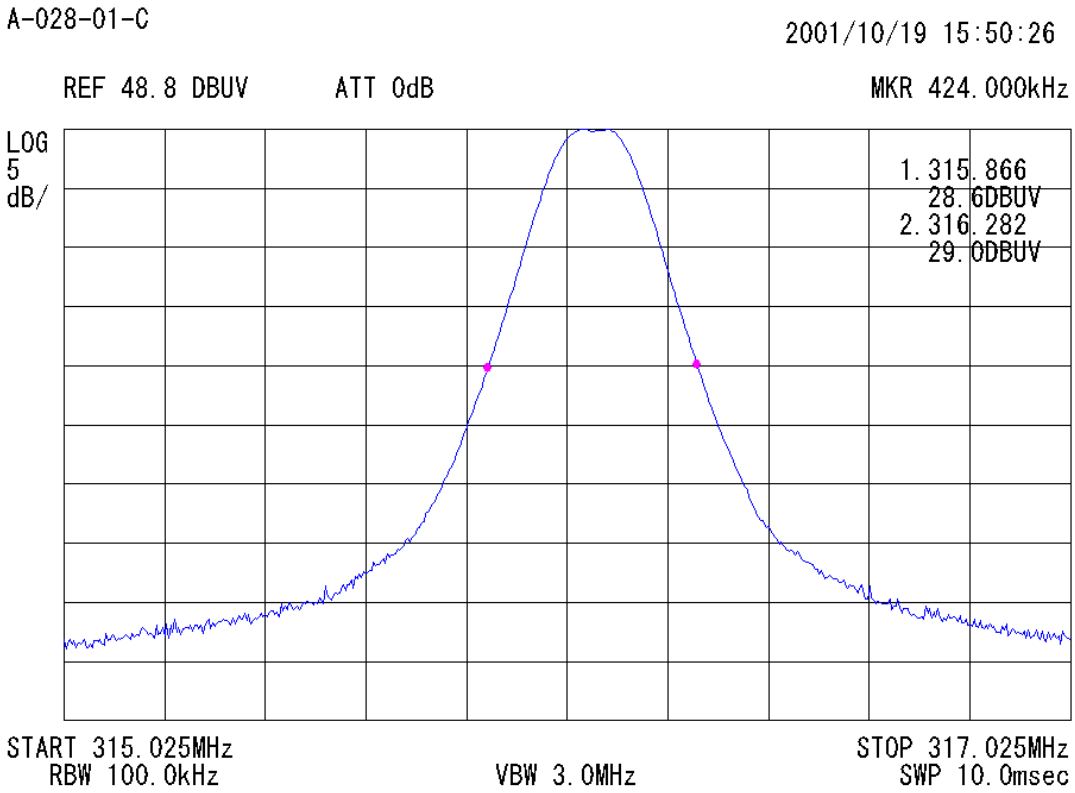


Figure 1

6. USED TEST EQUIPMENTS AND CALIBRATION STATUS

Equipment	Manufacturer	Model No.	Speecifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESHS10	Frequency Range 9kHz-30MHz	FS-83	N/A	2001/3	2002/3
		ESVS10	Frequency Range 20MHz-1.0GHz	FS-79	2	2000/11	2001/11
Spectrum Analyzer	Rohde & Schwarz	8564E	Frequency Range 30 Hz-40 GHz	SA-39	2,3	2001/2	2002/2
	Hewlett Packard	8568B	Frequency Range 100 Hz-1.5 GHz	FS-46-3	N/A	2001/5	2002/5
Pre-amplifier	Hewlett Packard	8449B	Frequency Range 1 GHz-26.5 GHz	AM-52	2	2001/2	2002/2
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30MHz-300MHz	AN-180	2	2001/2	2002/2
Log-Periodic Antenna	Schwarzbeck	UHALP9108A	Frequency Range 300MHz-1GHz	AN-215	2,3	2001/2	2002/2
Tuned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Range 25MHz-500MHz	AN-135	2	2001/3	2002/3
		KBA-611S	Frequency Range 500MHz-1GHz	AN-137	2	2001/3	2002/3
Horn Antenna	Raven	92888-2	Frequency Range 1 GHz- 2GHz	AN-167	2	2001/4	2002/4
		91889-2	Frequency Range 2 GHz- 5GHz	AN-168	2	2001/4	2002/4
LISN for EUT	Kyoritsu	KNW-407	Frequency Range 150kHz- 30MHz	FL-106	N/A	2001/4	2002/4
LISN for Peripheral	Kyoritsu	KNW-242	Frequency Range 10kHz- 30MHz	FL-110	N/A	2001/6	2002/6

[Note]
Test Item (*): 1: Conducted Emission Measurement
2: Radiated Emission Measurement
3: Bandwidth 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.