



**JAPAN QUALITY ASSURANCE ORGANIZATION**  
2096, OHHATA, TSURU-SHI, YAMANASHI 402-0045, JAPAN  
PHONE (0554) 43-5517, FAX (0554) 43-6316

JQA APPLICATION NO.: 400-00588  
Issue Date : February 2, 2001  
Page 1 of 25

## **EMI TEST REPORT**

JQA APPLICATION NO. : 400-00588

Model No. : RI-19BTY

Type of Equipment : Immobilizer

Regulations Applied : CFR 47 FCC Rules and Regulations Part 15

FCC ID : MOZRI-19BTY

Applicant : TOKAI RIKA CO., LTD.

Address : 260, Toyota 3-chome, Oguchi-cho, Niwa-gun,  
Aichi-ken 480-0195, Japan

Manufacture : TOKAI RIKA CO., LTD.

Address : 260, Toyota 3-chome, Oguchi-cho, Niwa-gun,  
Aichi-ken 480-0195, Japan

Received date of EUT : January 23, 2001

**Final Judgment : Passed**

**TEST RESULTS IN THIS REPORT** are obtained in use of equipment that is traceable to Electrotechnical Lab. of MITI Japan and Communications Research Lab. of MPT Japan.

**The test results** only respond to the tested sample. It is not allowed to copy this report even partly without the allowance of the JQA EMC Engineering Dept. Testing Div.



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## **1 DOCUMENTATION**

### **1.1 TEST REGULATION**

FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) Intentional Radiators

#### **Test procedure :**

AC power line conducted emission, radiated emission, frequency stability and occupied bandwidth tests were performed according to the procedures in ANSI C63.4-1992.

### **1.2 GENERAL INFORMATION**

#### **1.2.1 Test facility :**

1) Test Facility located at EMC Engineering Dept. Testing Div. :

- No.2 and 3 Anechoic Chambers( 3 meters Site ).
- Shielded Enclosure.

Expiration date of FCC test facility filing : June 4, 2002

TSURU EMC Branch: Open Site No.1, No.2, An Anechoic Chamber (3 m and 10 m, on common plane) and a Shielded Room (Date of Listing: March 30, 1999)

2) EMC Engineering Dept. Testing Div. and TSURU EMC Branch are recognized under the National Voluntary Laboratory accreditation Program for satisfactory compliance established in title 15, Part 285 Code of Federal Regulations.

NVLAP Lab Code : 200189-0 (Effective through : June 30, 2001)

NVLAP Lab Code : 200192-0 (Effective through : June 30, 2001)

#### **1.2.2 Description of the Equipment Under Test (EUT) :**

- |                                      |                                                 |
|--------------------------------------|-------------------------------------------------|
| 1) Type of Equipment                 | : Immobilizer                                   |
| 2) Product Type                      | : Production                                    |
| 3) Category                          | : Low Power Communication Device<br>Transmitter |
| 4) EUT Authorization                 | : Certification                                 |
| 5) FCC ID                            | : MOZRI-19BTY                                   |
| 6) Trade Name                        | : -                                             |
| 7) Model No.                         | : RI-19BTY                                      |
| 8) Operating Frequency Range         | : 134.2 kHz                                     |
| 9) Highest Frequency Used in the EUT | : 134.2 kHz                                     |
| 10) Serial No.                       | : -                                             |
| 11) Date of Manufacture              | : -                                             |
| 12) Power Rating                     | : 12.0 VDC                                      |
| 13) EUT Grounding                    | : None                                          |

#### **1.2.3 Definitions for symbols used in this test report :**

- x   - indicates that the listed condition, standard or equipment is applicable for this report.
- indicates that the listed condition, standard or equipment is not applicable for this report.

### 1.3 TEST CONDITION

#### 1.3.1 The measurement of the AC Power Line Conducted Emission

- ☐ - was performed in the following test site.  
☒ - was not applicable.

#### Test location :

Safety Testing Center EMC Engineering Dept. Tsuru EMC Branch  
 2096 Ohhata, Tanbozawa, Tsuru-shi Yamanashi-ken 402-0045, JAPAN

- ☐ - Shielded Room No.1  
☐ - Shielded Room No.2  
☐ - Anechoic Chamber  
☐ - Open Site No.1  
☐ - Open Site No.2

#### Used test instruments :

| Type                                            | Model No. | Manufacturer        | Serial No. | Last Cal. | Interval |
|-------------------------------------------------|-----------|---------------------|------------|-----------|----------|
| <input type="checkbox"/> - Test Receiver        | ESH-3     | Rohde & Schwarz     | 872992/047 | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Test Receiver        | ESH-3     | Rohde & Schwarz     | 881460/016 | May. 2000 | 1 Year   |
| <input type="checkbox"/> - LISN(for Peripheral) | KNW-407   | Kyoritsu Electrical | 8-833-5    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - LISN(for EUT)        | KNW-407   | Kyoritsu Electrical | 8-680-14   | May. 2000 | 1 Year   |
| <input type="checkbox"/> - LISN                 | KNW-243C  | Kyoritsu Electrical | 8-831-1    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - LISN                 | KNW-243C  | Kyoritsu Electrical | 8-831-2    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - LISN                 | KNW-243C  | Kyoritsu Electrical | 8-831-3    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - LISN                 | KNW-243C  | Kyoritsu Electrical | 8-831-4    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - LISN                 | ESH 2-Z5  | Rohde & Schwarz     | 879341/007 | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable             | 3D-2W     | Fujikura            | No.1       | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable             | 3D-2W     | Fujikura            | No.2       | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable             | 3D-2W     | Fujikura            | No.3       | May. 2000 | 1 Year   |
| <input type="checkbox"/> - 50ohm Termination    | -         | TDC                 | 15406501E1 | Feb. 2000 | 1 Year   |
| <input type="checkbox"/> - 50ohm Termination    | -         | -                   | 15406502E1 | Feb. 2000 | 1 Year   |



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Standard :CFR 47 FCC Rules Part 15

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### 1.3.2 The measurement of the Radiated Emission(9 kHz - 30 MHz)

☒ - was performed in the following test site.

☐ - was not applicable.

#### Test location :

Safety Testing Center EMC Engineering Dept. Tsuru EMC Branch  
2096 Ohhata, Tsuru-shi, Yamanashi-ken 402-0045, JAPAN

☐ - Open Site No. 1 (3, 10 or 30 meters)

☒ - Open Site No. 2 (3, 10 or 30 meters)

☐ - Anechoic Chamber(3 or 10 meters)

#### Validation of Site Attenuation :

1) Last Confirmed Date : N/A

2) Interval : N/A

#### Used test instruments :

| Type                                                | Model No. | Manufacturer    | Serial No.   | Last Cal. | Interval |
|-----------------------------------------------------|-----------|-----------------|--------------|-----------|----------|
| <input checked="" type="checkbox"/> - Test Receiver | ESH-3     | Rohde & Schwarz | 872992/047   | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Test Receiver            | ESH-3     | Rohde & Schwarz | 881460/016   | May. 2000 | 1 Year   |
| <input checked="" type="checkbox"/> - Loop Antenna  | HFH2-Z2   | Rohde & Schwarz | 872994/043   | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Loop Antenna             | 6502      | EMCO            | 8905-2347    | May. 2000 | 1 Year   |
| <input checked="" type="checkbox"/> - RF Cable      | 5D-2W     | Fujikura        | 155-21-002E0 | Feb. 2000 | 1 Year   |

### 1.3.3 The measurement of the Radiated Emission(30 MHz - 1000 MHz)

☒ - was performed in the following test site.

☐ - was not applicable.

#### Test location :

Safety Testing Center EMC Engineering Dept. Tsuru EMC Branch  
 2096 Ohhata, Tsuru-shi, Yamanashi-ken 402-0045, JAPAN

☐ - Open Site No. 1 (3, 10 or 30 meters)

☐ - Open Site No. 2 (3, 10 or 30 meters)

☒ - Anechoic Chamber(3 or 10 meters)

#### Validation of Site Attenuation :

1) Last Confirmed Date :May, 2000

2) Interval :1 year

#### Used test instruments :

| Type                                                       | Model No. | Manufacturer        | Serial No. | Last Cal. | Interval |
|------------------------------------------------------------|-----------|---------------------|------------|-----------|----------|
| <input type="checkbox"/> - Test Receiver                   | ESV       | Rohde & Schwarz     | 863796/015 | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Test Receiver                   | ESVS10    | Rohde & Schwarz     | 843744/018 | May. 2000 | 1 Year   |
| <input checked="" type="checkbox"/> - Test Receiver        | ESVS10    | Rohde & Schwarz     | 84231/004  | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Biconical Antenna               | BBA9106   | Schwarzbeck         | 11905065-2 | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Biconical Antenna               | BBA9106   | Schwarzbeck         | 11905065-3 | May. 2000 | 1 Year   |
| <input checked="" type="checkbox"/> - Biconical Antenna    | BBA9106   | Schwarzbeck         | G4397001   | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Log-Periodic Antenna            | UHALP9107 | Schwarzbeck         | 91071212   | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Log-Periodic Antenna            | UHALP9107 | Schwarzbeck         | 9107915    | May. 2000 | 1 Year   |
| <input checked="" type="checkbox"/> - Log-Periodic Antenna | UHALP9107 | Schwarzbeck         | G43597003  | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Dipole Antenna                  | KBA-511A  | Kyoritsu Electrical | 0-195-5    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Dipole Antenna                  | KBA-511A  | Kyoritsu Electrical | 0-230-6    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Dipole Antenna                  | KBA-611   | Kyoritsu Electrical | 0-196-8    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Dipole Antenna                  | KBA-611   | Kyoritsu Electrical | 0-228-13   | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable                        | 20D/5D-2W | Fujikura            | No.1       | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable                        | 20D/5D-2W | Fujikura            | No.2       | May. 2000 | 1 Year   |
| <input checked="" type="checkbox"/> - RF Cable             | 20D/5D-2W | Fujikura            | No.3       | May. 2000 | 1 Year   |



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#### 1.3.4 The measurement of the Radiated Emission(Above 1000 MHz)

☐ - was performed in the following test site.

☒ - was not applicable.

##### Test location :

Safety Testing Center EMC Engineering Dept. Tsuru EMC Branch  
2096 Ohhata, Tsuru-shi, Yamanashi-ken 402-0045, JAPAN

☐ - Open Site No. 1 (3, 10 or 30 meters)

☐ - Open Site No. 2 (3, 10 or 30 meters)

☐ - Anechoic Chamber(3 or 10 meters)

##### Validation of Site Attenuation :

1) Last Confirmed Date : N/A

2) Interval : N/A

##### Used test instruments :

| Type                                            | Model No.    | Manufacturer    | Serial No. | Last Cal. | Interval |
|-------------------------------------------------|--------------|-----------------|------------|-----------|----------|
| <input type="checkbox"/> - Spectrum Analyzer    | 8563E        | Hewlett Packard | 3438A00756 | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Spectrum Analyzer    | R4131C       | Advantest       | 717201249  | May. 2000 | 1 Year   |
| <input type="checkbox"/> - Log-Periodic Antenna | 94612-1      | Rohde & Schwarz | 97062301   | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Amplifier         | WJ-6611-513  | Watkins-Johnson | 0288       | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Amplifier         | WJ-6682-834  | Watkins-Johnson | 0052       | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Amplifier         | WJ-6870-506  | Watkins-Johnson | 0018       | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable(7m)         | SUCOFLEX 104 | Suhner          | 52146/4    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable(3m)         | SUCOFLEX 104 | Suhner          | 52053/4    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable(2m)         | SUCOFLEX 104 | Suhner          | 39934/4    | May. 2000 | 1 Year   |
| <input type="checkbox"/> - RF Cable(1m)         | SUCOFLEX 104 | Suhner          | 35687/4    | May. 2000 | 1 Year   |

### 1.3.5 The measurement of the Frequency Stability

- \_\_\_ - was performed.  
  x   - was not applicable.

#### Used test instruments :

| Type                    | Model No. | Manufacturer     | Serial No. | Last Cal. | Interval |
|-------------------------|-----------|------------------|------------|-----------|----------|
| ___ - Frequency Counter | 53131A    | Hewlett Packard  | 3546A11807 | May 2000  | 1 Year   |
| ___ - Oven              | -         | Ohnishi Co. Ltd. | -          | Aug. 1999 | 1 Year   |
| ___ - DC Power Supply   | 6628A     | Hewlett Packard  | 3224A00284 | July 2000 | 1 Year   |

### 1.3.6 The measurement of the Occupied Bandwidth

- \_\_\_ - was performed.  
  x   - was not applicable.

#### Used test instruments :

| Type                     | Model No. | Manufacturer    | Serial No. | Last Cal. | Interval |
|--------------------------|-----------|-----------------|------------|-----------|----------|
| ___ - Spectrum Analyzer  | 8560E     | Hewlett Packard | 3240A00189 | Sep. 1999 | 1 Year   |
| ___ - Spectrum Analyzer  | 8563E     | Hewlett Packard | 3221A00201 | May. 2000 | 1 Year   |
| ___ - Spectrum Analyzer  | 8566B     | Hewlett Packard | 2140A01091 | Apr. 2000 | 1 Year   |
| ___ - Spectrum Analyzer  | 8566B     | Hewlett Packard | 2747A05855 | May. 2000 | 1 Year   |
| ___ - Function Generator | 3325A     | Hewlett Packard | 2512A21776 | May. 2000 | 1 Year   |
| ___ - FM Linear Detector | MS61A     | Anritsu Corp.   | M77486     | Sep. 1999 | 1 Year   |
| ___ - Level Meter        | ML422C    | Anritsu Corp.   | M87571     | June 2000 | 1 Year   |



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## 1.4 EUT MODIFICATION / Deviation from Standard

### 1.4.1 EUT MODIFICATION

- ☒ -No modifications were conducted by JQA to achieve compliance to Class B levels.  
☐ -To achieve compliance to Class B levels, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant :

Date :

Typed Name :

Position :

### 1.4.2 Deviation from Standard:

- ☒ - No deviations from the standard described in clause 1.1.  
☐ - The following deviations were employed from the standard described in clause 1.1:

\_\_\_\_\_  
\_\_\_\_\_



## 1.5 TEST RESULTS

**AC Power Line Conducted Emission**                           - Applicable        x   - NOT Applicable

The requirements are                           - PASSED                           - NOT PASSED

Remarks :

**Radiated Emission [§15.209(a)(b)]**                        x   - Applicable           - NOT Applicable

The requirements are                        x   - PASSED                           - NOT PASSED

Remarks:

**Frequency Stability**                           - Applicable        x   - NOT Applicable

The requirements are                           - PASSED                           - NOT PASSED

Remarks:

**Occupied Bandwidth**                           - Applicable        x   - NOT Applicable

The requirements are                           - PASSED                           - NOT PASSED

Remarks:

## 1.6 SUMMARY

### General Remarks :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) under the test configuration, as shown in clause 1.7 to 1.10.

The conclusion for the test items of which are required by the applied regulation is indicated under the final judgment.

### Final Judgment :

The "as received" sample;

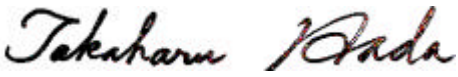
- x   - fulfill the test requirements of the regulation mentioned on clause 1.1.
- fulfill the test requirements of the regulation mentioned on clause 1.1, but with certain qualifications.
- doesn't fulfill the test regulation mentioned on clause 1.1.

Begin of testing : February 1, 2001

End of testing : February 1, 2001

- JAPAN QUALITY ASSURANCE ORGANIZATION -  
Approved by:

Signatories:  
Issued by:



Takaharu Hada  
Director  
Tsuru EMC Branch  
JQA EMC Engineering Dept.



Yuichi Fukumoto  
Manager  
Tsuru EMC Branch  
JQA EMC Engineering Dept.

## 1.7 TEST CONFIGURATION / OPERATION OF EUT

### 1.7.1 Test Configuration

The equipment under test (EUT) consists of :

| Symbol | Item        | Manufacturer         | Model No. | FCC ID      | Serial No. |
|--------|-------------|----------------------|-----------|-------------|------------|
| A      | Immobilizer | TOKAI RIKA CO., LTD. | RI-19BTY  | MOZRI-19BTY | -          |

The measurement was carried out with the following support equipment connected :

| Symbol | Item            | Manufacturer        | Model No.    | FCC ID | Serial No. |
|--------|-----------------|---------------------|--------------|--------|------------|
| B      | DC Power Supply | KIKUSUI ELECTRONICS | PAB 18-2.5DU | N/A    | 30079912   |

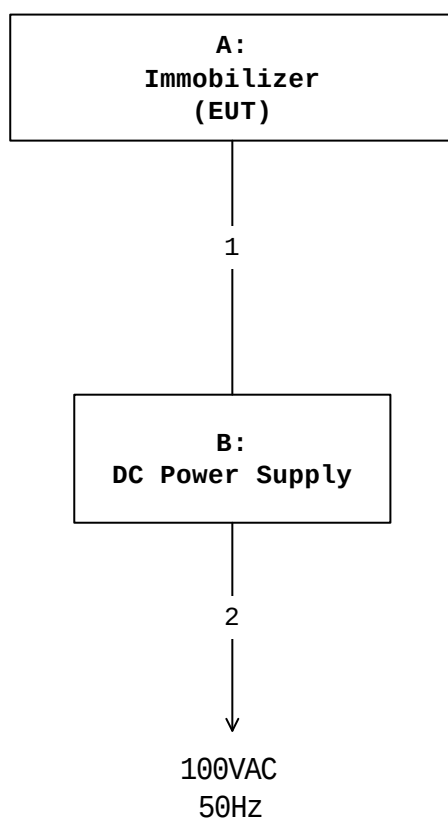
Type of Cable :

| Symbol | Description             | Identification<br>(Manufacturer etc.) | Shielded<br>YES / NO | Ferrite<br>Core | Connector type<br>Shielded<br>YES / NO | Length<br>(m) |
|--------|-------------------------|---------------------------------------|----------------------|-----------------|----------------------------------------|---------------|
| 1      | DC Power Cable(for EUT) | -                                     | NO                   | NO              | NO                                     | 1.0           |
| 2      | AC Power Cable          | -                                     | NO                   | NO              | NO                                     | 1.8           |

### 1.7.2 Operating condition

Power supply Voltage : 12.0 VDC(from DC Power Supply)

The tests have been carried out under the transmitting condition.

**1.8 EUT ARRANGEMENT (DRAWINGS)**

## 1.9 PRELIMINARY TEST AND TEST-SETUP (DRAWINGS)

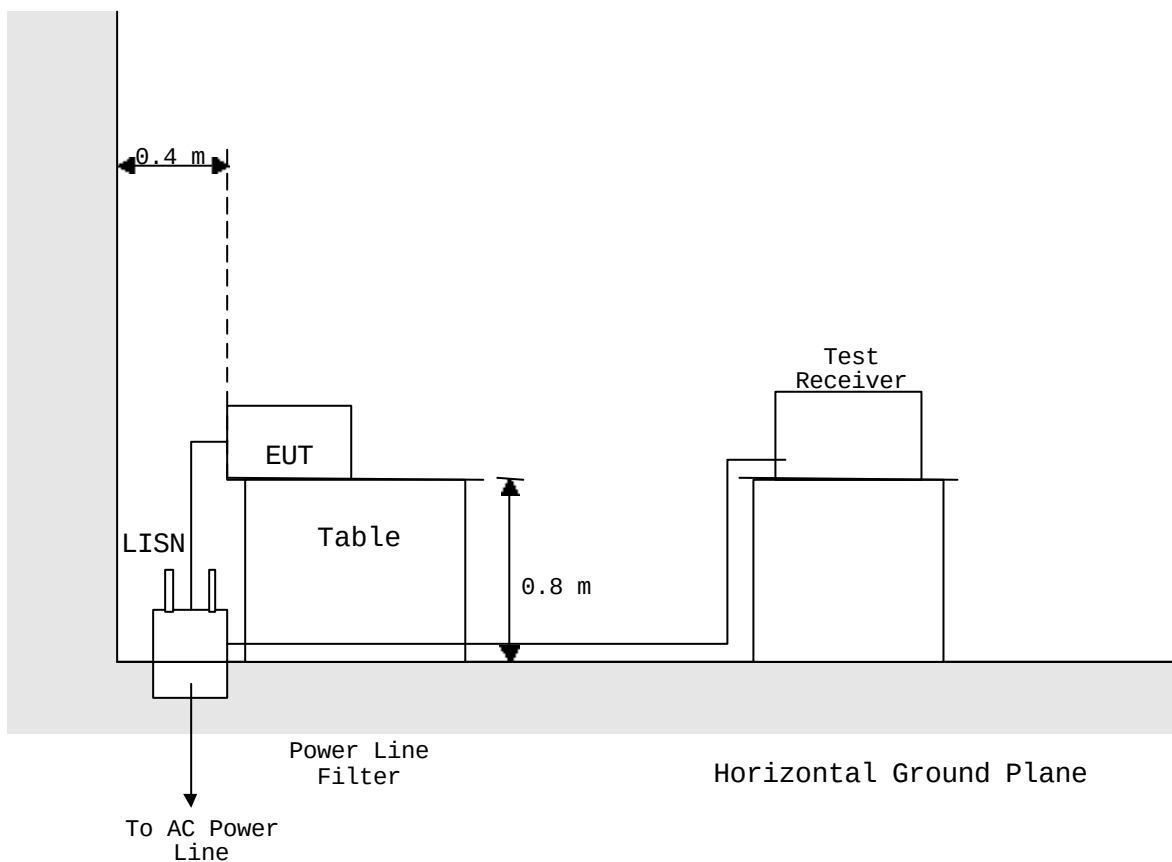
### 1.9.1 AC Power Line Conducted Emission ( 450 kHz - 30 MHz ) :

According to description of ANSI C63.4-1992 sec.13.1.3.1, the AC power line preliminary conducted emissions measurements were carried out.  
 The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.  
 The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements.

### Shielded Enclosure

#### - Side View -

Vertical  
Ground  
Plane

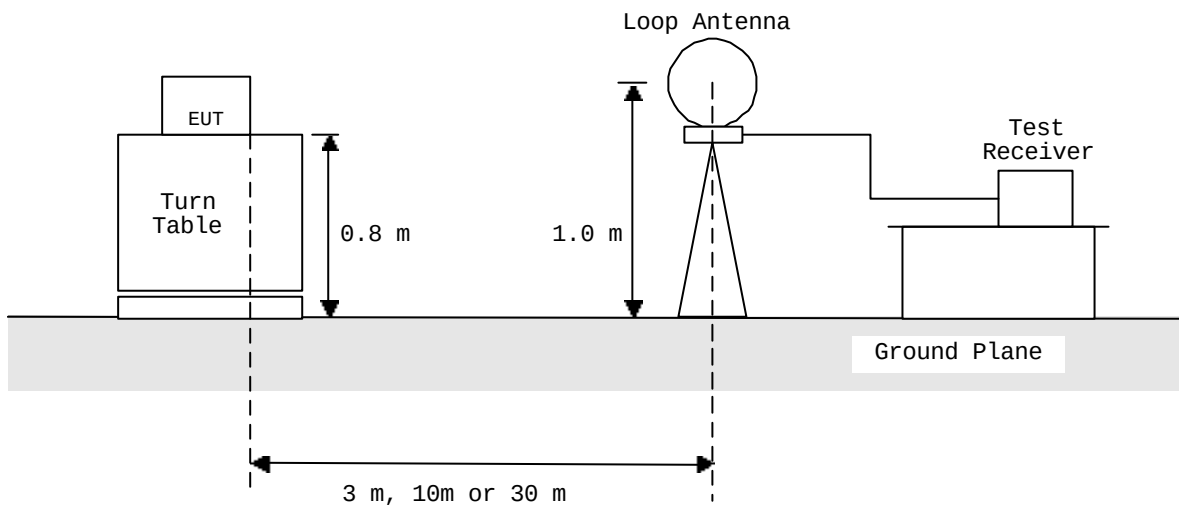


### 1.9.2 Radiated Emission ( 9 kHz - 30 MHz ) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

#### - Side View -



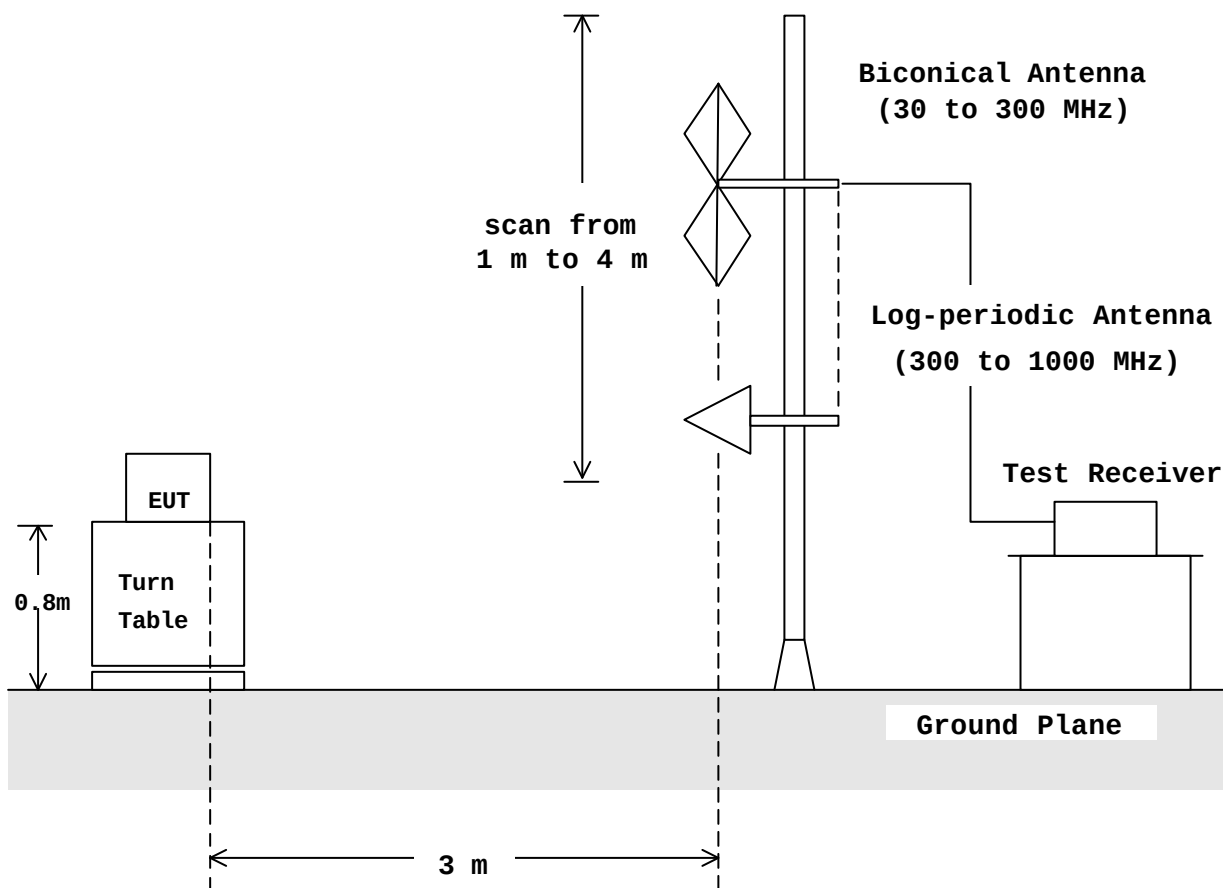
### 1.9.3 Radiated Emission ( 30 MHz - 1000 MHz ) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

### Anechoic Chamber

- Side View -



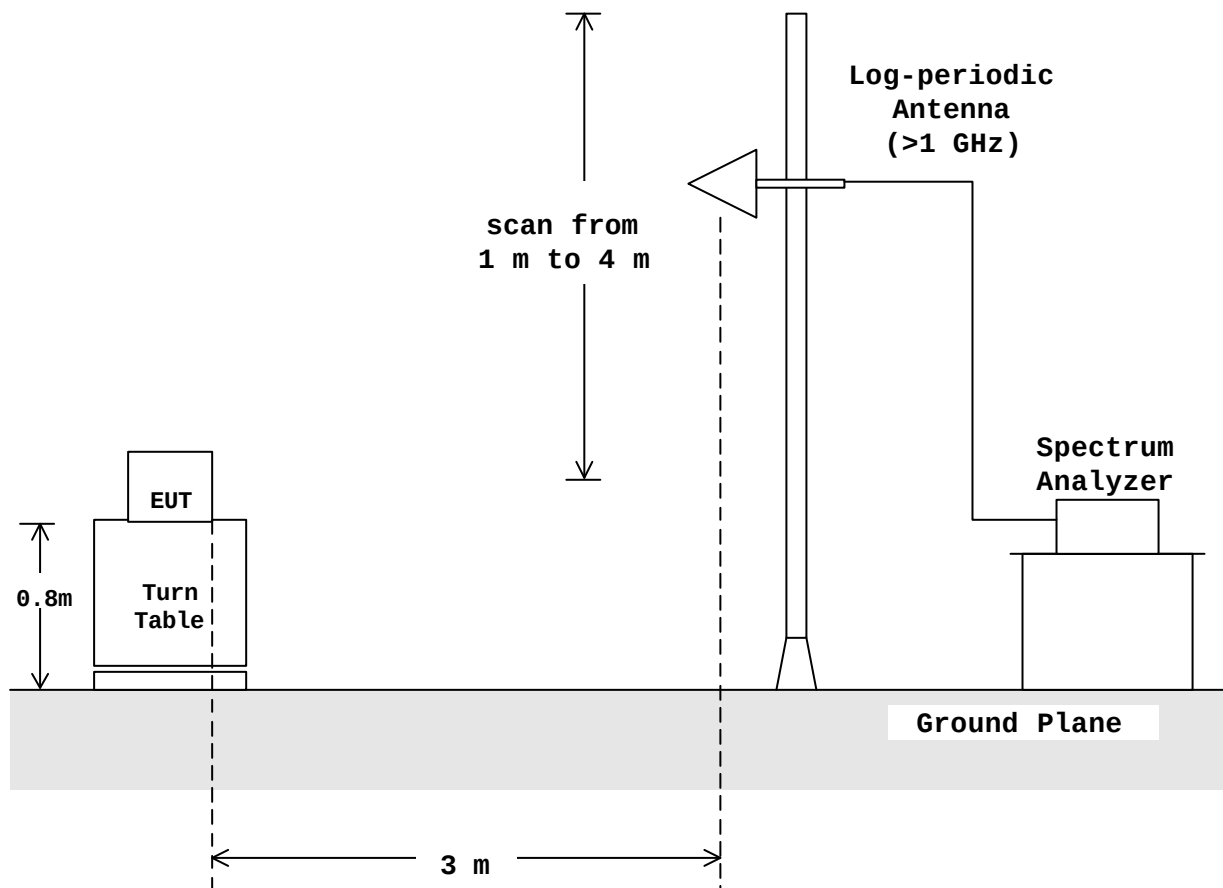
#### 1.9.4 Radiated Emission (Above 1 GHz) :

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurements were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

#### Anechoic Chamber

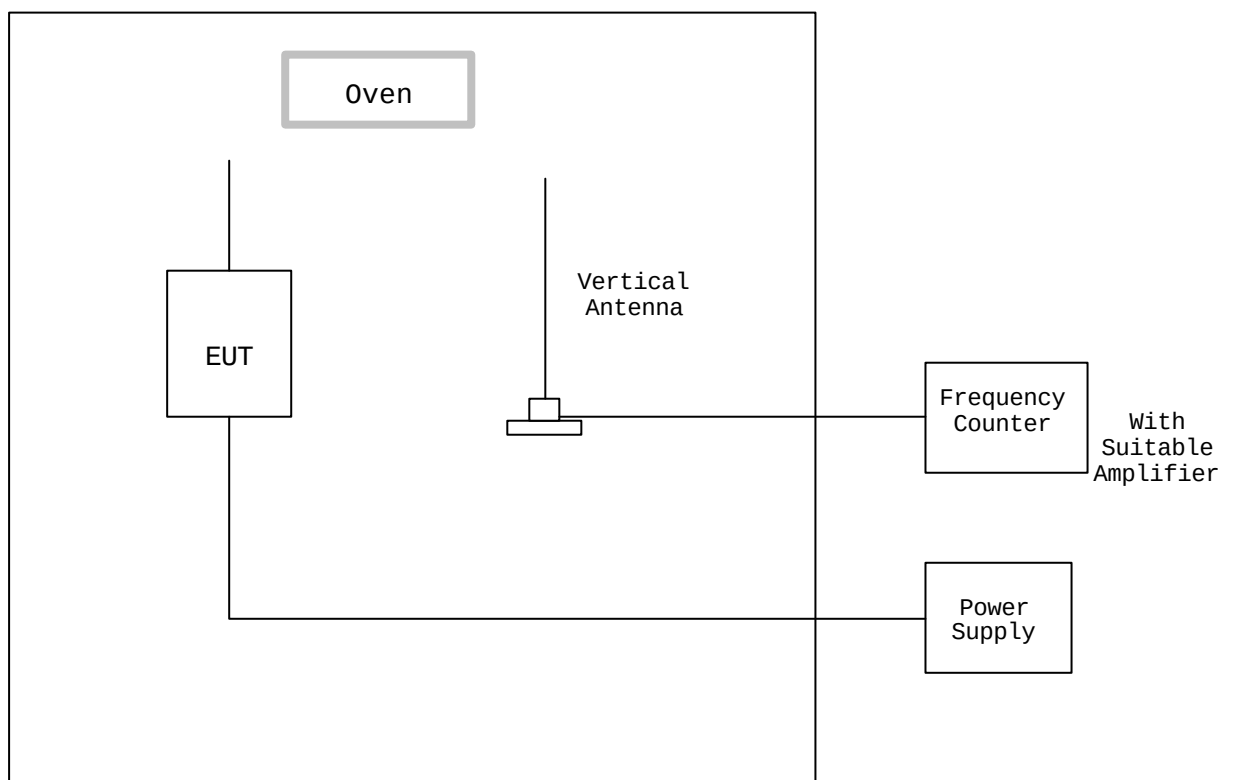
- Side View -



### 1.9.5 Frequency Stability :

According to description of ANSI C63.4-1992 sec.13.1.5 and sec.13.1.6, the frequency stability measurements were carried out. By using frequency counter with suitable RF amplifier, the carrier frequency of the transmitter under test was measured with a temperature variation of  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at the normal supply voltage, and if required, with a variation in the primary voltage from 85 % to 115 % the rated supply voltage at the temperature of  $+20^{\circ}\text{C}$ .

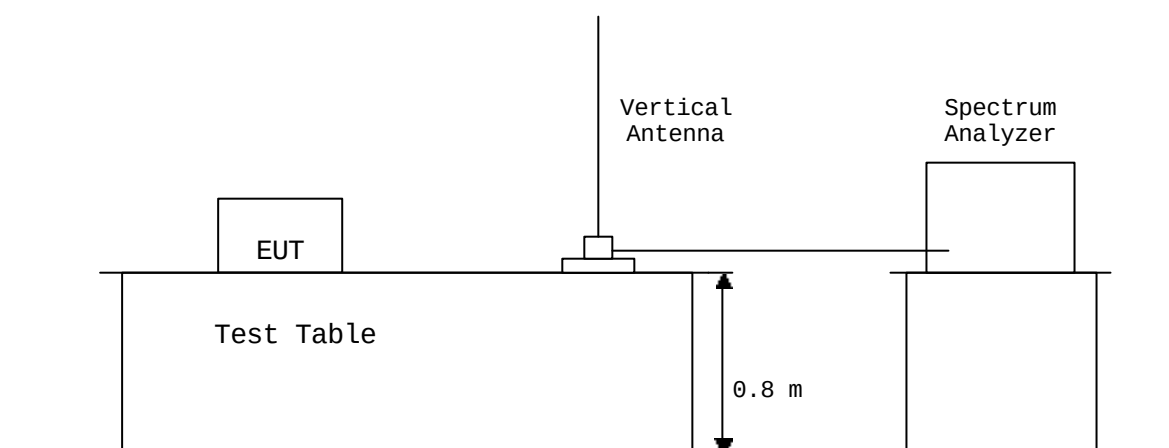
These measurements were carried out after allow sufficient time (approximately 1 hour) for the temperature of the chamber to stabilize.



**1.9.6 Occupied Bandwidth :**

According to description of ANSI C63.4-1992 sec.13.1.7, the occupied bandwidth measurements were carried out. By using a spectrum analyzer with a vertical antenna for picking up the signal, the measurements of the emission were made under the transmitting modes of the EUT.

The resolution bandwidth of spectrum analyzer was set to the value specified in sec.13.1.7.

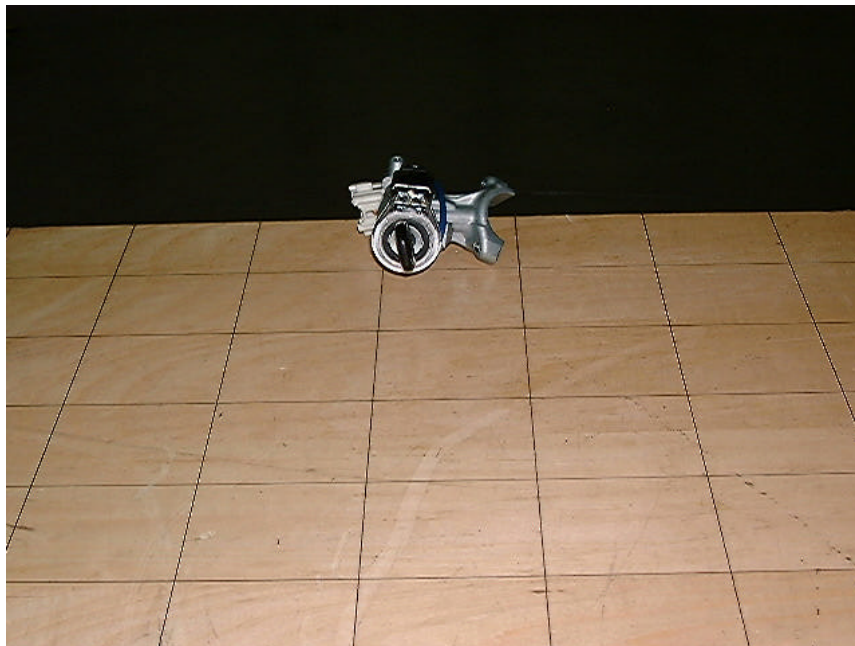


## 1.10 TEST ARRANGEMENT (PHOTOGRAPHS)

### PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

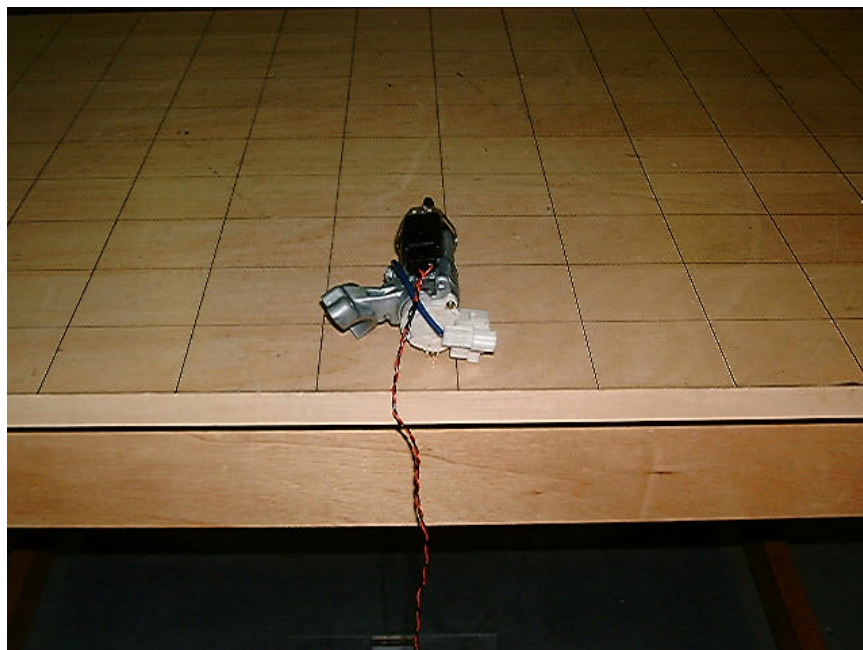
Photograph present configuration with maximum emission

- Front View -



- Rear View -

-





## TEST DATA

### 2.1 AC Power Line Conducted Emission Measurement( 0.45 MHz - 30 MHz )

Note : This test was not applicable.

### 2.2 Radiated Emissions Measurement( 9 kHz - 30 MHz )

Date : February 1, 2001

Temp.: 12 °C Humi.: 30 %

Operating Frequency : 134.2 kHz  
Distance of Measurement : 30 meters

| Frequency<br>(MHz) | Meter Reading<br>(dBμV/m) | Field Strength<br>(dBμV/m) |
|--------------------|---------------------------|----------------------------|
| Fundamental        |                           |                            |
| 0.1340             | < 30.0                    | < 30.0                     |
| Harmonic Frequency |                           |                            |
| 0.2680             | < 33.2                    | < 33.2                     |
| 0.4020             | < 31.4                    | < 31.4                     |
| 0.5360             | < 30.1                    | < 30.1                     |
| 0.6700             | < 29.0                    | < 29.0                     |
| 0.8040             | < 28.1                    | < 28.1                     |
| 0.9380             | < 27.3                    | < 27.3                     |
| 1.0720             | < 27.0                    | < 27.0                     |
| 1.2060             | < 27.0                    | < 27.0                     |
| 1.3400             | < 27.0                    | < 27.0                     |

Note : The fundamental field strength was found undetectable weak of the field strength meter.

Tested by :

*Y. Nakajima*

Yoichi Nakajima  
Testing Engineer



JQA Application No. :400-00588  
Model No. :RI-19BTY  
Standard :CFR 47 FCC Rules Part 15

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The distance of measurements was reduced to 3 meters.

Date : February 1, 2001  
Temp.: 12 °C Humi.: 30 %

Operating Frequency : 134.2 kHz  
Distance of Measurement : 10 meters

| Frequency<br>(MHz) | Meter Reading<br>(dBμV/m) | Field Strength<br>(dBμV/m) |
|--------------------|---------------------------|----------------------------|
| Fundamental        |                           |                            |
| 0.1340             | 43.0                      | 43.0                       |
| Harmonic Frequency |                           |                            |
| 0.2680             | < 33.2                    | < 33.2                     |
| 0.4020             | < 31.4                    | < 31.4                     |
| 0.5360             | < 30.1                    | < 30.1                     |
| 0.6700             | < 29.0                    | < 29.0                     |
| 0.8040             | < 28.1                    | < 28.1                     |
| 0.9380             | < 27.3                    | < 27.3                     |
| 1.0720             | < 27.0                    | < 27.0                     |
| 1.2060             | < 27.0                    | < 27.0                     |
| 1.3400             | < 27.0                    | < 27.0                     |

- Note: 1. Meter reading value shows field strength, because the value includes antenna factor.  
2. The symbol of "<" means "or less".  
3. Measuring Instrument Setting:

Frequency Range : 110 kHz to 490 kHz  
Detector Function : Average  
IF Band width : 10 kHz

Frequency Range : 536.8 kHz to 1345 kHz  
Detector Function : CISPR Quasi-peak Peak  
IF Band width : 9 kHz

For fundamental, the measured field strength was extrapolated to distance 300 meters, using the formula that field strength varies as the inverse distance square(40 dB per decade of distance).

Calculation :

$$43.0 \text{ dB}\mu\text{V/m} - 20\log_{10}((300/10)^2) = 43.0 - 59.1 \\ = -16.1 \text{ dB}\mu\text{V/m at 300 meters}$$

$$\text{Limits for fundamental}(\S 15.209(a)) = 20\log_{10}(2400/134.0) = 25.1 \text{ dB}\mu\text{V/m}$$

Tested by :

*Y. Nakajima*

Yoichi Nakajima  
Testing Engineer



## 2.3 Radiated Emissions Measurement( 30 MHz - 1000 MHz )

Date : February 1, 2001

Temp.: 19 °C Humi.: 30 %

| Frequency<br>(MHz) | Antenna<br>Factor<br>(dB/m) | Meter Reading<br>(dBuV) |        | Limits<br>(dBuV/m) | Emission Level<br>(dBuV/m) |        | Margin<br>(dB) |        | Comment |
|--------------------|-----------------------------|-------------------------|--------|--------------------|----------------------------|--------|----------------|--------|---------|
|                    |                             | Horiz.                  | Ver.   |                    | Horiz.                     | Ver.   | Horiz.         | Ver.   |         |
| 30.5               | 19.4                        | < -2.0                  | 0.7    | 40.0               | < 17.4                     | 20.1   | > 22.6         | 19.9   |         |
| 42.7               | 14.9                        | < -2.0                  | 4.6    | 40.0               | < 12.9                     | 19.5   | > 27.1         | 20.5   |         |
| 51.4               | 12.3                        | 9.1                     | 24.4   | 40.0               | 21.4                       | 36.7   | 18.6           | 3.3    |         |
| 55.5               | 10.9                        | 1.5                     | 13.6   | 40.0               | 12.4                       | 24.5   | 27.6           | 15.5   |         |
| 65.1               | 8.6                         | 1.2                     | 16.6   | 40.0               | 9.8                        | 25.2   | 30.2           | 14.8   |         |
| 73.8               | 7.7                         | 2.9                     | 17.0   | 40.0               | 10.6                       | 24.7   | 29.4           | 15.3   |         |
| 85.6               | 8.6                         | 0.5                     | 16.1   | 40.0               | 9.1                        | 24.7   | 30.9           | 15.3   |         |
| 91.6               | 9.9                         | < -2.0                  | 11.3   | 43.5               | < 7.9                      | 21.2   | > 35.6         | 22.3   |         |
| 105.6              | 12.3                        | < -2.0                  | 3.9    | 43.5               | < 10.3                     | 16.2   | > 33.2         | 27.3   |         |
| 120.0              | 13.9                        | < -2.0                  | < -2.0 | 43.5               | < 11.9                     | < 11.9 | > 31.6         | > 31.6 |         |
| 140.0              | 15.7                        | < -2.0                  | < -2.0 | 43.5               | < 13.7                     | < 13.7 | > 29.8         | > 29.8 |         |
| 171.4              | 17.4                        | 3.8                     | 2.9    | 43.5               | 21.2                       | 20.3   | 22.3           | 23.2   |         |
| 205.7              | 18.2                        | 0.1                     | 2.1    | 43.5               | 18.3                       | 20.3   | 25.2           | 23.2   |         |
| 239.9              | 18.9                        | < -2.0                  | < -2.0 | 46.0               | < 16.9                     | < 16.9 | > 29.1         | > 29.1 |         |
| 270.0              | 20.0                        | < -2.0                  | < -2.0 | 46.0               | < 18.0                     | < 18.0 | > 28.0         | > 28.0 |         |
| 308.6              | 18.4                        | 5.6                     | 5.0    | 46.0               | 24.0                       | 23.4   | 22.0           | 22.6   |         |
| 400.0              | 19.9                        | < -2.0                  | < -2.0 | 46.0               | < 17.9                     | < 17.9 | > 28.1         | > 28.1 |         |
| 500.0              | 22.1                        | < -2.0                  | < -2.0 | 46.0               | < 20.1                     | < 20.1 | > 25.9         | > 25.9 |         |
| 600.0              | 24.3                        | < -2.0                  | < -2.0 | 46.0               | < 22.3                     | < 22.3 | > 23.7         | > 23.7 |         |
| 800.0              | 27.2                        | < -2.0                  | < -2.0 | 46.0               | < 25.2                     | < 25.2 | > 20.8         | > 20.8 |         |
| 1000.0             | 30.1                        | < -2.0                  | < -2.0 | 54.0               | < 28.1                     | < 28.1 | > 25.9         | > 25.9 |         |

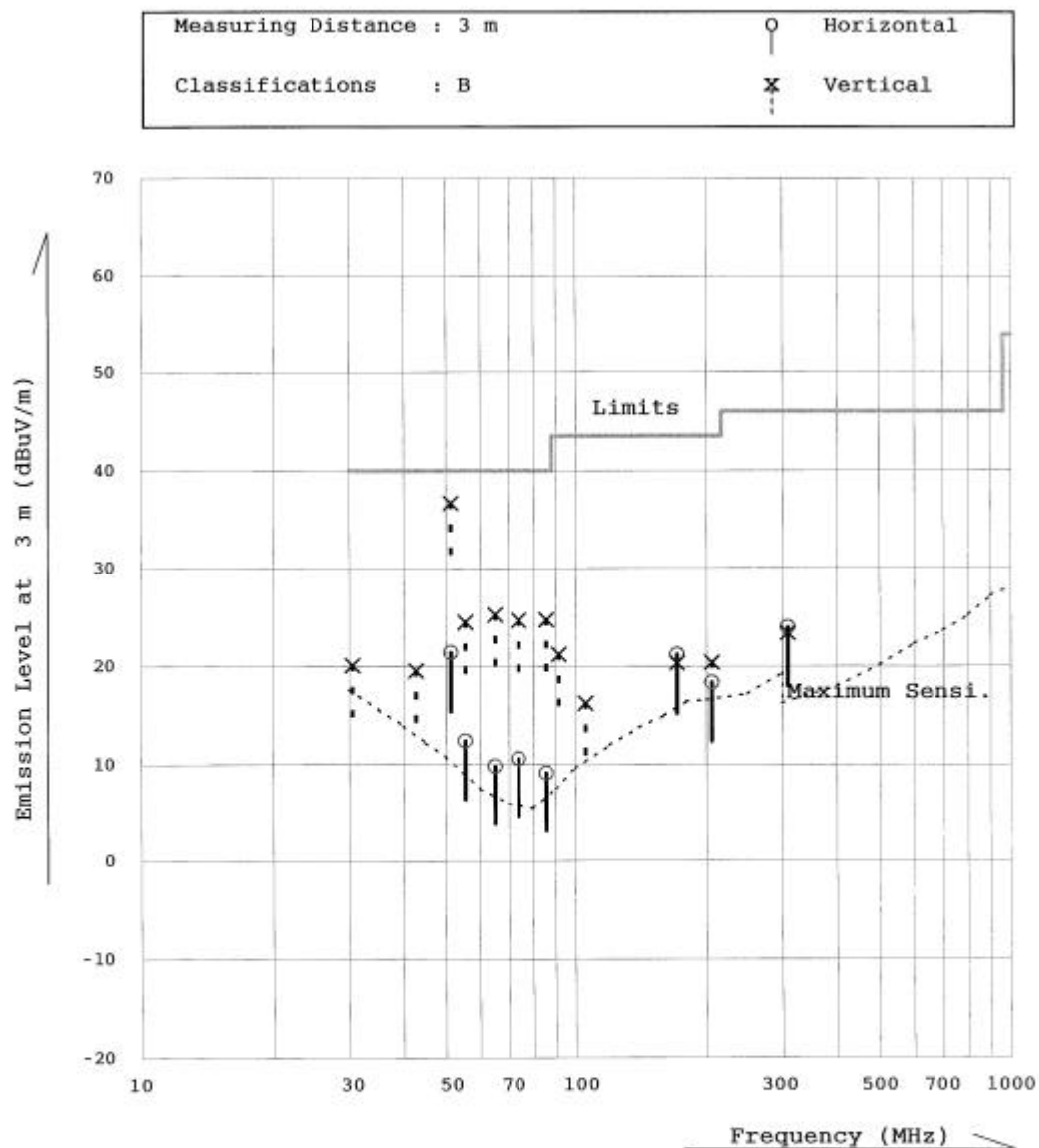
- Notes: 1) Test Location : Anechoic Chamber  
2) Test Distance : 3 m  
3) Test spectrum was checked from 30 MHz to 1000 MHz.  
4) Antenna factor includes the cable loss for 33 meter.  
5) The symbol of "<" means "or less".  
6) The symbol of ">" means "more than".  
7) A sample calculation was made at 30.5 MHz  
 $Af + Mr = 19.4 + 0.7 = 20.1 \text{ dBuV/m}$   
Af : Antenna Factor Mr : Meter Reading  
8) Setting of measuring instrument :  
Detector Function : CISPR Quasi-Peak  
IF Bandwidth : 120 kHz

*Y. Nakajima*

Tested by :

Yoichi Nakajima  
Testing Engineer

**Radiated Emissions Measurements (30 MHz - 1000 MHz)**





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## **2.4 Radiated Emissions Measurement( Above 1 GHz )**

Note : This test was not applicable.

## **2.5 Frequency Stability Measurement**

Note : This test was not applicable.

## **2.6 Occupied Bandwidth Measurement**

Note : This test was not applicable.