



JAPAN QUALITY ASSURANCE ORGANIZATION
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JQA APPLICATION NO.: 80-90448
Issue Date : October 13, 1999
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EMI TEST REPORT

JQA APPLICATION NO. : 80-90448

Model No. : KBRASTU10

Type of Equipment : Keyless Entry System
(Transmitter)

Regulations Applied : CFR 47 FCC Rules and Regulations Part 15

FCC ID : KBRASTU10

Applicant : KANSEI Corporation

Address : 2-1910 Nisshin-cho, Omiya,
Saitama 331-0044, Japan

Manufacture : KANSEI Corporation

Address : 2-1910 Nisshin-cho, Omiya,
Saitama 331-0044, Japan

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)
FCC filing No. : 31040/SIT 1300F2

2) EMC Engineering Dept. Testing Div. is 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, 2000)

1.2.2 Description of the Equipment Under Test (EUT) :

| | |
|--------------------------------------|---------------------------------------|
| 1) Type of Equipment | : Keyless Entry System(Transmitter) |
| 2) Product Type | : Pre-Production |
| 3) Category | : Security/Remote Control Transmitter |
| 4) EUT Authorization | : Certification |
| 5) FCC ID | : KBRASTU10 |
| 6) Trade Name | : NISSAN |
| 7) Model No. | : KBRASTU10 |
| 8) Operating Frequency Range | : 315 MHz |
| 9) Highest Frequency Used in the EUT | : 315 MHz |
| 10) Serial No. | : None |
| 11) Date of Manufacture | : - |
| 12) Power Rating | : DC 3.0(Battery) |
| 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. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

☐ - Shielded Enclosure

☐ - Anechoic Chamber No. 2 (portable Type)

Used test instruments :

| Type | Model No. | Manufacturer | Serial No. | Last Cal. | Interval |
|---|-----------|---------------------|------------|-----------|----------|
| <input type="checkbox"/> - Field Strength Meter | ESH-2 | Rohde & Schwarz | 880370/016 | May 1999 | 1 Year |
| <input type="checkbox"/> - Field Strength Meter | ESH-3 | Rohde & Schwarz | 881460/016 | May 1999 | 1 Year |
| <input type="checkbox"/> - Field Strength Meter | ESH-3 | Rohde & Schwarz | 881460/030 | Nov 1999 | 1 Year |
| <input type="checkbox"/> - LISN | KNW-407 | Kyoritsu Electrical | 8-833-6 | Apr. 1999 | 1 Year |
| <input type="checkbox"/> - LISN | KNW-407 | Kyoritsu Electrical | 8-855-2 | Apr. 1999 | 1 Year |
| <input type="checkbox"/> - LISN | KNW-407 | Kyoritsu Electrical | 8-757-1 | Apr. 1999 | 1 Year |
| <input type="checkbox"/> - RF Cable | 3D-2W | Fujikura | 155-21-005 | Apr. 1999 | 1 Year |
| <input type="checkbox"/> - RF Cable | 3D-2W | Fujikura | 155-21-006 | Apr. 1999 | 1 Year |

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

 x - was performed in the following test site.

 - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

 x - Anechoic Chamber No. 2 (3 meters)

 - Anechoic Chamber No. 3 (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date :March, 1999

2) Interval :1 year

Used test instruments :

| Type | Model No. | Manufacturer | Serial No. | Last Cal. | Interval |
|--------------------------------------|-----------|---------------------|------------|-----------|----------|
| <u> </u> - Field Strength Meter | ESV | Rohde & Schwarz | 872148/039 | May 1999 | 1 Year |
| <u> </u> - Field Strength Meter | ESVP | Rohde & Schwarz | 879783/030 | May 1999 | 1 Year |
| <u> x </u> - Field Strength Meter | ESVP | Rohde & Schwarz | 881478/004 | May 1999 | 1 Year |
| <u> </u> - Field Strength Meter | ESVP | Rohde & Schwarz | 881478/005 | May 1999 | 1 Year |
| <u> </u> - Antenna | KBA-511A | Kyoritsu Electrical | 0-201-13 | Nov. 1998 | 1 Year |
| <u> x </u> - Antenna | KBA-511A | Kyoritsu Electrical | 0-170-1 | Nov. 1998 | 1 Year |
| <u> </u> - Antenna | KBA-611 | Kyoritsu Electrical | 0-210-5 | Nov. 1998 | 1 Year |
| <u> x </u> - Antenna | KBA-611 | Kyoritsu Electrical | 0-147-14 | Nov. 1998 | 1 Year |
| <u> x </u> - RF Cable | 5D-2W | Fujikura | 155-21-001 | Feb. 1999 | 1 Year |
| <u> </u> - RF Cable | 5D-2W | Fujikura | 155-21-002 | Feb. 1999 | 1 Year |

**1.3.3 The measurement of the Radiated Emission(Above 1000 MHz)**

 x - was performed in the following test site.

 - was not applicable.

Test location :

Safety Testing Center EMC Engineering Dept. Testing Div.
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

 x - No. 2 site (3 meters)

 - No. 3 site (3 meters)

Validation of Site Attenuation :

1) Last Confirmed Date :March, 1999

2) Interval :1 year

Used test instruments :

| Type | Model No. | Manufacturer | Serial No. | Last Cal. | Interval |
|-------------------------------------|-----------|-----------------|------------|-----------|----------|
| <u> </u> - Spectrum Analyzer | 8566B | Hewlett Packard | 2140A01091 | Apr. 1999 | 1 Year |
| <u> x </u> - Spectrum Analyzer | 8566B | Hewlett Packard | 2747A05855 | May 1999 | 1 Year |
| <u> x </u> - Log-Periodic Antenna | HL 025 | Rohde & Schwarz | 340182/015 | Nov. 1998 | 1 Year |
| <u> x </u> - RF Cable | S 04272B | Suhner | 155-21-011 | May 1999 | 1 Year |

**1.3.4 The measurement of the Frequency Stability**

☐ - was performed.

☒ - was not applicable.

Used test instruments :

| Type | Model No. | Manufacturer | Serial No. | Last Cal. | Interval |
|--|-----------|------------------|------------|-----------|----------|
| <input type="checkbox"/> - Frequency Counter | 53131A | Hewlett Packard | 3546A11807 | June 1998 | 1 Year |
| <input type="checkbox"/> - Oven | - | Ohnishi Co. Ltd. | - | July 1998 | 1 Year |
| <input type="checkbox"/> - DC Power Supply | 6628A | Hewlett Packard | 3224A00284 | July 1998 | 1 Year |

1.3.5 The measurement of the Occupied Bandwidth

☒ - was performed.

☐ - was not applicable.

Used test instruments :

| Type | Model No. | Manufacturer | Serial No. | Last Cal. | Interval |
|---|-----------|-----------------|------------|-----------|----------|
| <input checked="" type="checkbox"/> - Spectrum Analyzer | 8566B | Hewlett Packard | 2140A01091 | Apr. 1999 | 1 Year |
| <input type="checkbox"/> - Spectrum Analyzer | 8566B | Hewlett Packard | 2747A05855 | May 1999 | 1 Year |
| <input type="checkbox"/> - Function Generator | 3325A | Hewlett Packard | 2512A21776 | June 1999 | 1 Year |
| <input type="checkbox"/> - FM Linear Detector | MS61A | Anritsu Corp. | M77486 | Sep. 1999 | 1 Year |
| <input type="checkbox"/> - Level Meter | ML422C | Anritsu Corp. | M87571 | June 1999 | 1 Year |



1.4 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 :



1.5 TEST RESULTS

AC Power Line Conducted Emission - Applicable x - NOT Applicable

The requirements are - PASSED - NOT PASSED

Remarks :

Radiated Emission [§15.231(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 [§15.231(c)] x - Applicable - NOT Applicable

The requirements are x - 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 1.9.

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 : October 7, 1999

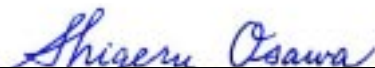
End of testing : October 7, 1999

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Signatories:



Masaaki Takahashi
Manager
JQA EMC Engineering Dept.



Shigeru Osawa
Assistant Manager
JQA EMC Engineering Dept.



1.7 TEST CONFIGURATION / OPERATION OF EUT

1.7.1 Test Configuration

The equipment under test (EUT) consists of :

| Item | Manufacturer | Model No. | FCC ID | Serial No. |
|---------------------------------------|--------------------|-----------|-----------|------------|
| Keyless Entry System (Transmitter) | KANSEI Corporation | KBRASTU10 | KBRASTU10 | - |

1.7.2 Operating condition

Power supply Voltage : 3.0 VDC(Battery)

The tests have been carried out under the transmitting condition.

1.8 PRELIMINARY TEST AND TEST-SETUP (DRAWINGS)

1.8.1 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.

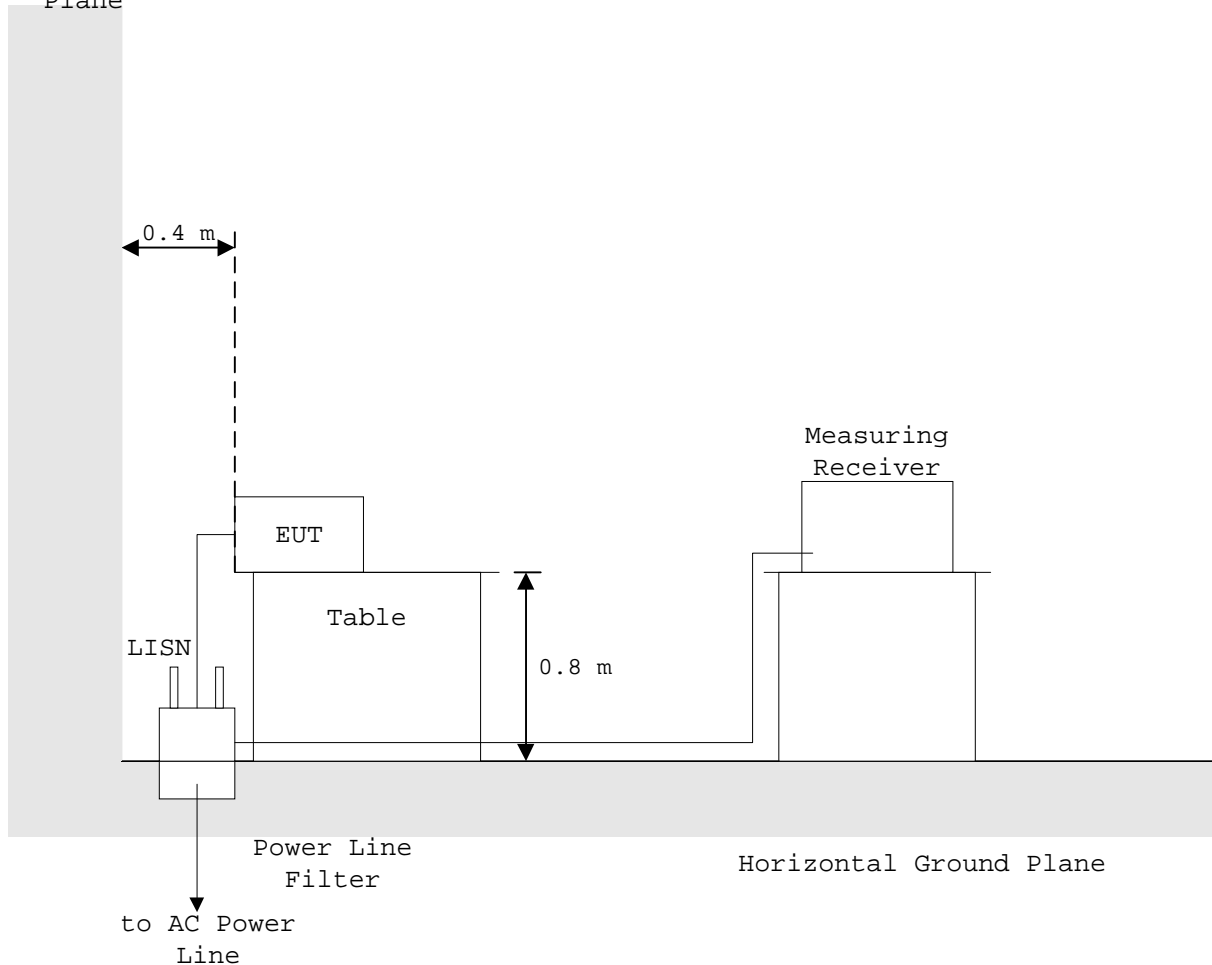
The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.

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



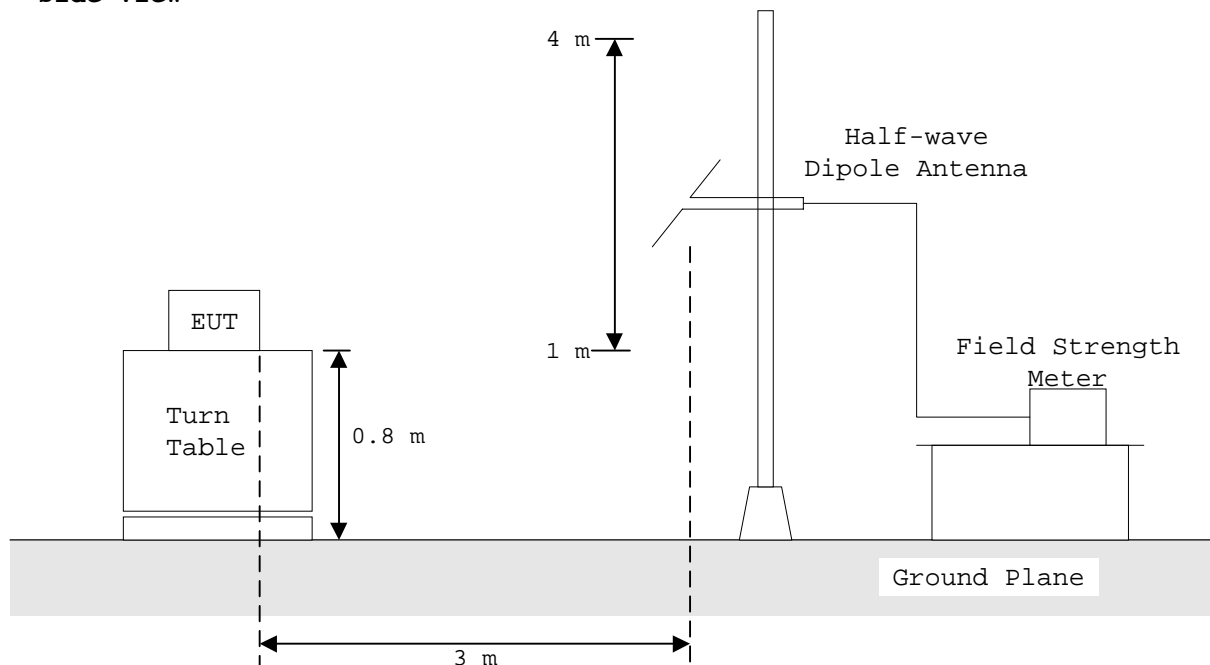
1.8.2 Radiated Emission (30 MHz - 1000 MHz) :

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 -



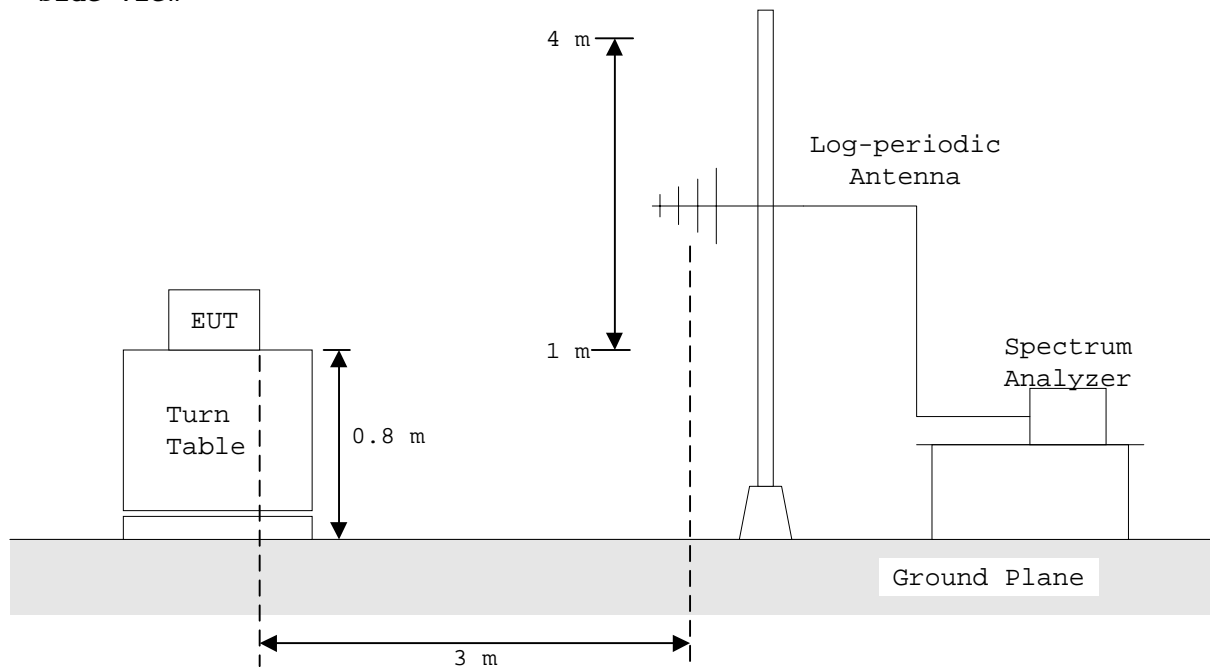
1.8.3 Radiated Emission (Above 1 GHz) :

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

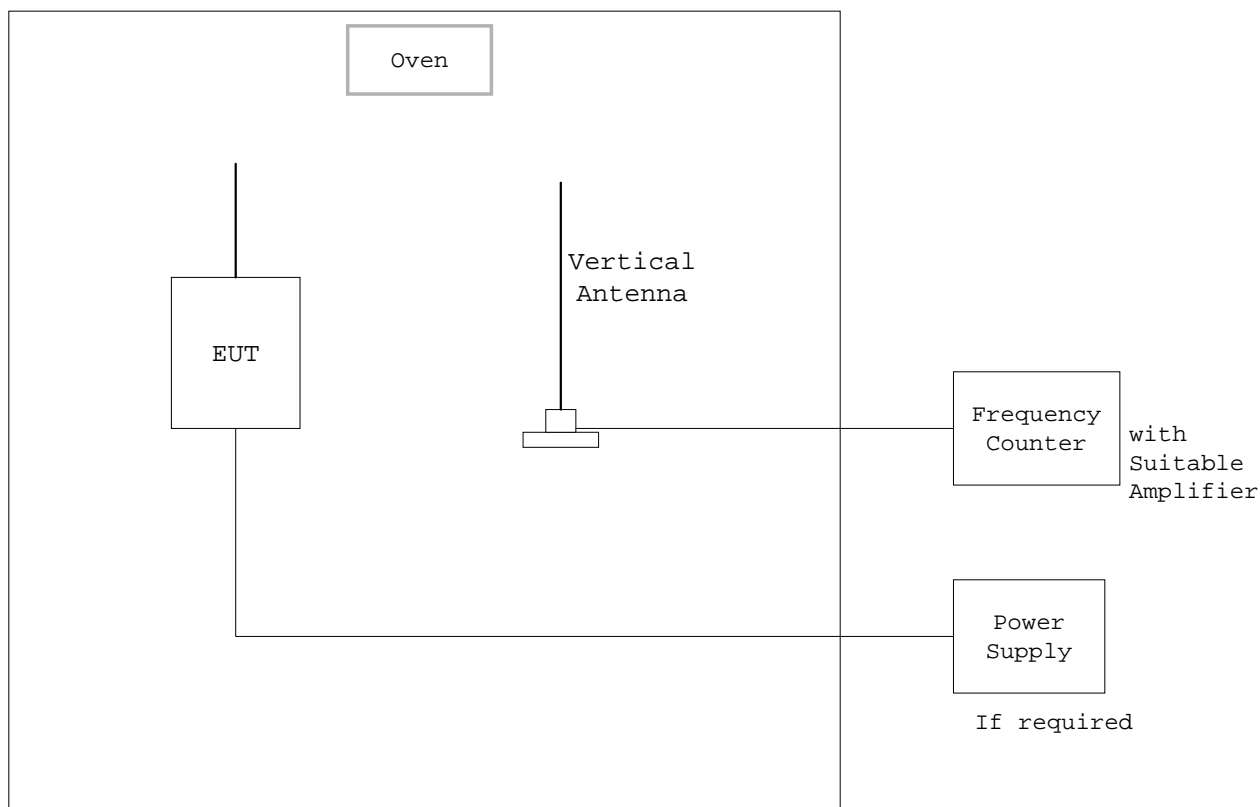
- Side View -



1.8.4 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°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 $+20^{\circ}\text{C}$.

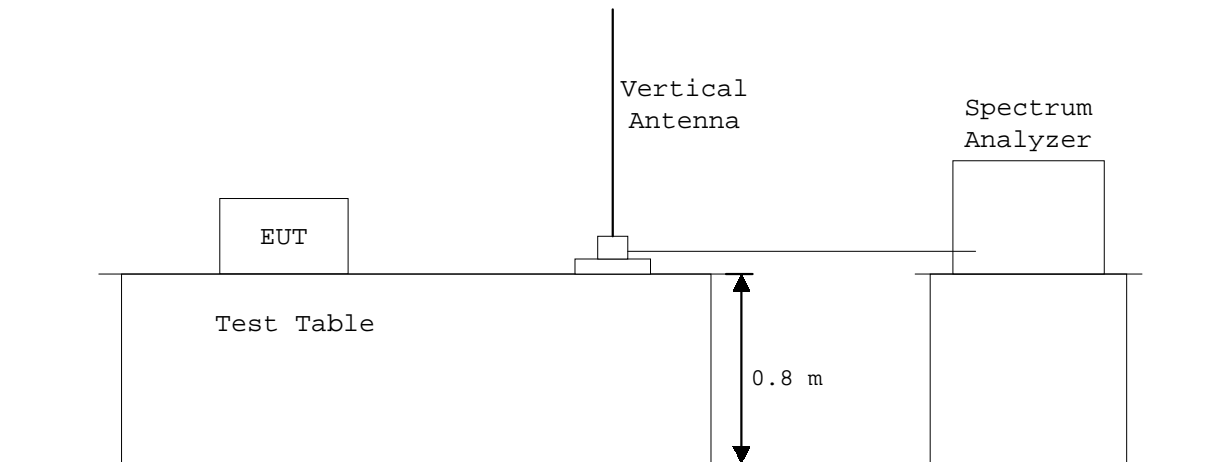
These measurements were carried out after allow sufficient time (approximately 1 hour) for the temperature of the chamber to stabilize.



1.8.5 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.



1.9 TEST ARRANGEMENT (PHOTOGRAPHS)**PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT**

Photograph present configuration with maximum emission
for Horizontal Plane



for Vertical Plane





TEST DATA

2.2 Radiated Emissions Measurement

Date : October 7, 1999Temp.: 23 °C Humi.: 63 %

Operating Frequency : 315 MHz

Distance of Measurement : 3.0 meters

| Correction | | Meter Reading | | Field Strength at 3 m | | | |
|--|--------|---------------|--------|-----------------------|----------|----------|----------|
| Frequency | Factor | Horiz. | Vert. | Factor* | Limits | Horiz. | Vert. |
| (MHz) | (dB/m) | (dBμV) | (dBμV) | (dB/m) | (dBμV/m) | (dBμV/m) | (dBμV/m) |
| Fundamental | | | | | | | |
| 315.000 | 20.8 | 57.1 | 53.9 | -6.1 | 75.6 | 71.8 | 68.6 |
| Harmonics & other Frequency components | | | | | | | |
| 630.000 | 27.8 | 4.7 | 5.0 | -6.1 | 55.6 | 26.4 | 26.7 |
| 945.000 | 32.9 | < 0.0 | < 0.0 | -6.1 | 55.6 | < 26.8 | < 26.8 |
| 1260.000 | 26.7 | 6.6 | 9.7 | -6.1 | 55.6 | 27.2 | 30.3 |
| 1575.000 | 29.5 | < 5.0 | < 5.0 | -6.1 | 55.6 | < 28.4 | < 28.4 |
| 1890.000 | 31.1 | < 5.0 | < 5.0 | -6.1 | 55.6 | < 30.0 | < 30.0 |
| 2205.000 | -13.2 | < 47.0 | < 47.0 | -6.1 | 55.6 | < 27.7 | < 27.7 |
| 2520.000 | -12.3 | < 47.0 | < 47.0 | -6.1 | 55.6 | < 28.6 | < 28.6 |
| 2835.000 | -10.8 | < 47.0 | < 47.0 | -6.1 | 55.6 | < 30.1 | < 30.1 |
| 3150.000 | -9.5 | < 47.0 | < 47.0 | -6.1 | 55.6 | < 31.4 | < 31.4 |



Note: 1. The spectrum was checked from 30 MHz to tenth harmonics.

All emissions not listed were found to be more than 20 dB below the limits.

2. The symbol of "<" means "or less".

3. The cable loss and amplifier gain were included in the correction factor.

4. Sample calculation :

at 315.000 MHz

$$Cf + Mr + F = 20.8 + 57.1 - 6.1 = 71.8 \text{ dB}\mu\text{V/m}$$

Where,

Cf = Correction Factor

Mr = Meter Reading

F = Peak to Average Factor

5. "": The factor due to the pulsed waveform as shown in the attached sheet.

6. Measuring Instrument Setting:

Less than 1000 MHz

Detector function : Peak

IF Bandwidth : 120 kHz

Above 1000 MHz

Resolution Bandwidth : 1 MHz

Tested by :

Shigeru Osawa

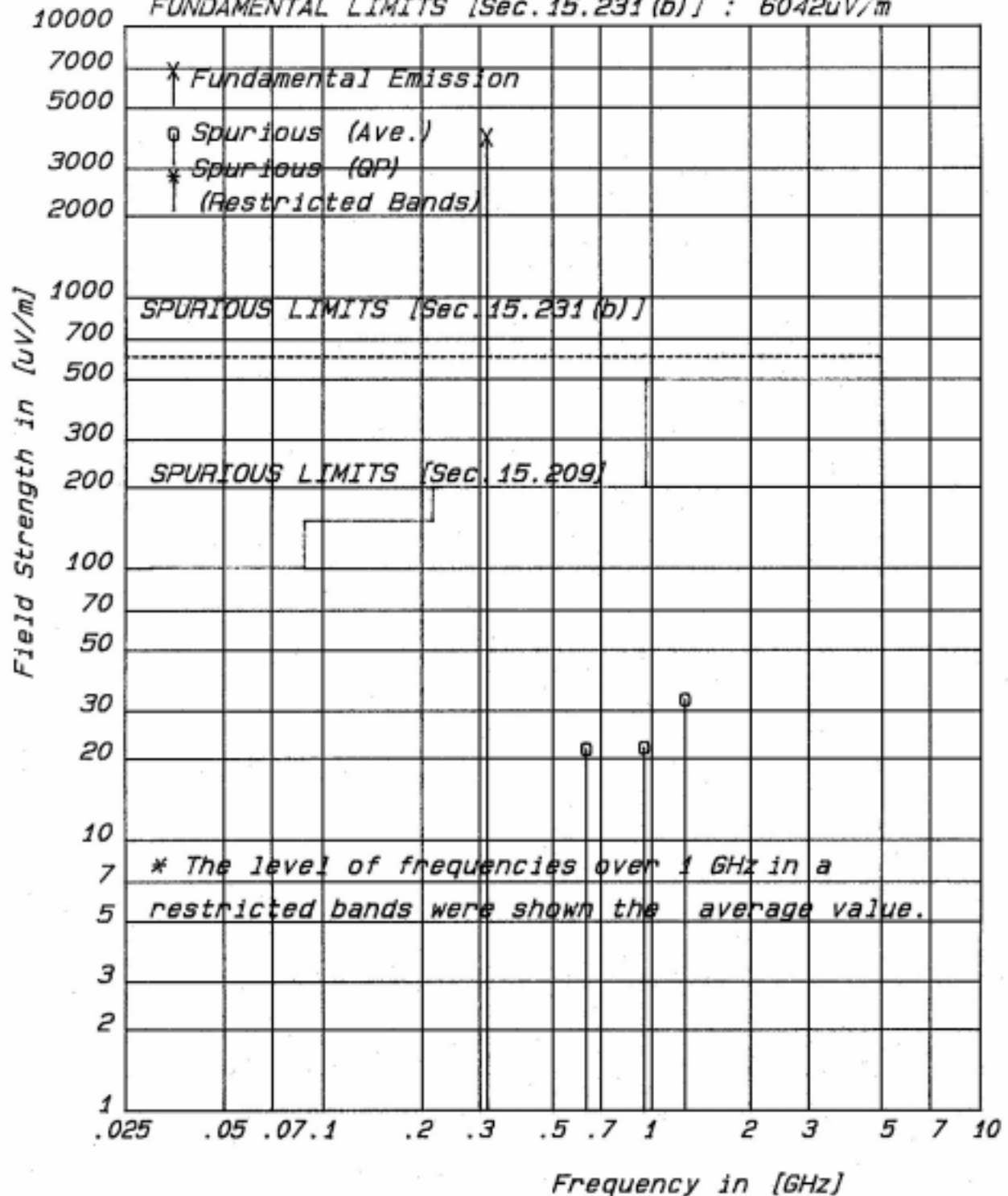
Testing Engineer

Radiated Fundamental & Spurious Emissions

FCC ID : KBRASTU10

Operating Frequency : 315 MHz

FUNDAMENTAL LIMITS [Sec.15.231(b)] : 6042uV/m

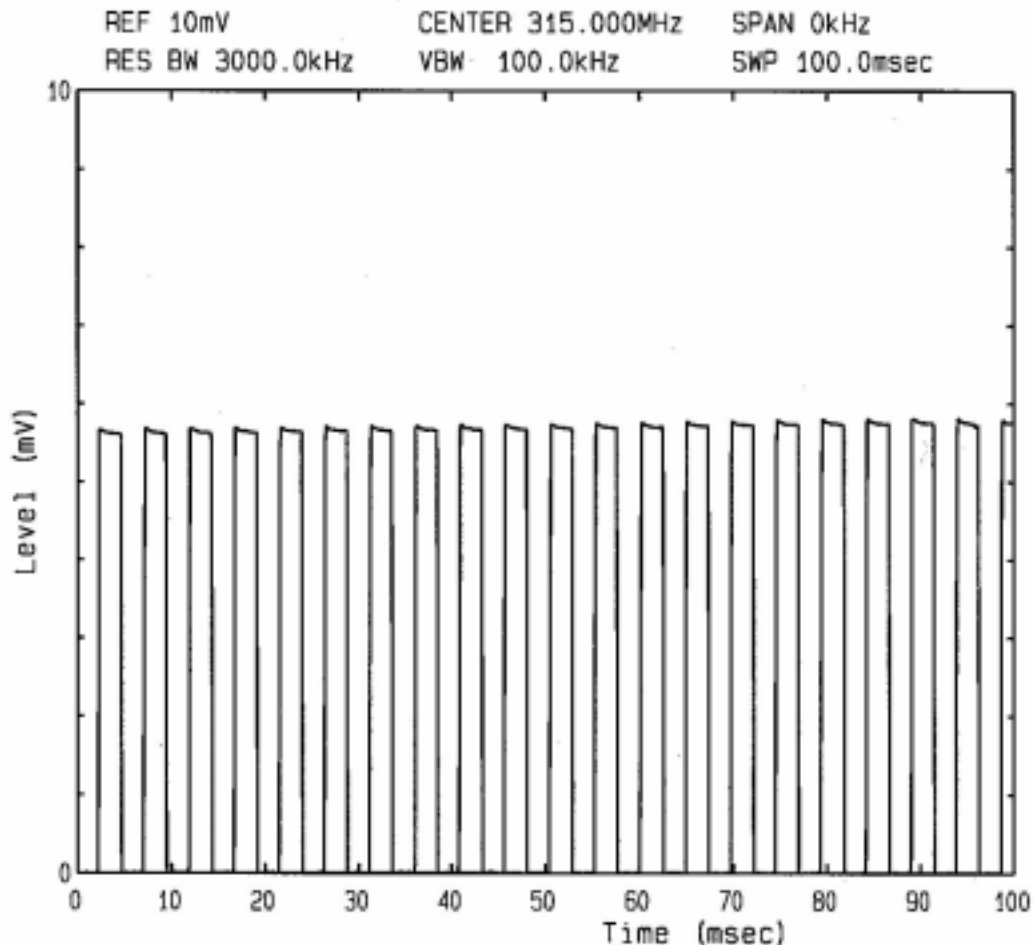


The encoded waveform in the time domain

FCC ID : KBRASTU10

Model : KBRASTU10

Mode of EUT : Transmit



The above waveform indicates the case when field strength averaged over 100 milliseconds was maximum value. In order to obtain the peak to average factor, calculation of the period of total on-time was computed by personal computer. Results was obtained by following.

$$\begin{aligned} \text{Duty cycle} &= (\text{Maximum total on-time} / 100 \text{ msec}) \times 100 \\ &= (49.4 \text{ msec} / 100 \text{ msec}) \times 100 = 49.4 \% \end{aligned}$$

Therefore

$$\text{Factor is } 20\log(0.4940) = -6.1 \text{ dB}$$



JQA Application No. :80-90448

Model No. :KBRASTU10

Standard :CFR 47 FCC Rules Part 15

FCC ID :KBRASTU10

Issue Date :October 13, 1999

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2.4 Occupied Bandwidth Measurement

Date : October 13, 1999

Temp.: 24 °C Humi.: 60 %

Measurements Results :

Specified Limits : 0.25 % of the fundamental frequency
 $315 \text{ MHz} \times 0.0025 = 787.5 \text{ kHz}$

Refer to the attached graphs.

Tested by : Shigeru Osawa
Shigeru Osawa
Testing Engineer



Emission Limitation

FCC ID : KBRASTU10

Model : KBRASTU10

Mode of EUT : Transmit

