



**JAPAN QUALITY ASSURANCE ORGANIZATION**

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JQA APPLICATION NO.: 400-10521

Issue Date : January 10, 2002

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## **EMI TEST REPORT**

JQA APPLICATION NO. : 400-10521

Model No. : SBLM04001

Type of Equipment : Remote Control Unit

Regulations Applied : CFR 47 FCC Rules and Regulations Part 15

FCC ID : OHELM04001

Applicant : ALPS MECHATRONIC DEVICES DIVISION WAKUYA PLANT

Address : 230, Shibue, Wakuya-cho, Tohda-gun,  
Miyagi-pref 987-0195 Japan

Manufacture : ALPS MECHATRONIC DEVICES DIVISION WAKUYA PLANT

Address : 230, Shibue, Wakuya-cho, Tohda-gun,  
Miyagi-pref 987-0195 Japan

Received date of EUT : December 19, 2001

**Final Judgment : Passed**

**TEST RESULTS IN THIS REPORT** are obtained in use of equipment that is traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and Communication Research Laboratory (CRL) of Japan.

**The test results** only respond to the tested sample. This report should not be reproduced except in full, without the written approval of 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 04, 2002

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, 2002)

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

- |                                      |                                       |
|--------------------------------------|---------------------------------------|
| 1) Type of Equipment                 | : Remote Control Unit                 |
| 2) Product Type                      | : Production                          |
| 3) Category                          | : Security/Remote Control Transmitter |
| 4) EUT Authorization                 | : Certification                       |
| 5) FCC ID                            | : OHELM04001                          |
| 6) Trade Name                        | : KENWOOD                             |
| 7) Model No.                         | : SBLM04001                           |
| 8) Operating Frequency Range         | : 309.5 MHz, 315 MHz                  |
| 9) Highest Frequency Used in the EUT | : 315 MHz                             |
| 10) Serial No.                       | : None                                |
| 11) Date of Manufacture              | : November 2001                       |
| 12) Power Rating                     | : DC 3.0V(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"/> - Test Receiver        | ESH-2     | Rohde & Schwarz     | 880370/016   | June 2001 | 1 Year   |
| <input type="checkbox"/> - Test Receiver        | ESH-3     | Rohde & Schwarz     | 881460/030   | May 2001  | 1 Year   |
| <input type="checkbox"/> - Test Receiver        | ESHS10    | Rohde & Schwarz     | 835871/004   | Aug. 2001 | 1 Year   |
| <input type="checkbox"/> - LISN(for Peripheral) | KNW-407   | Kyoritsu Electrical | 8-833-6      | Apr. 2001 | 1 Year   |
| <input type="checkbox"/> - LISN(for EUT)        | KNW-407   | Kyoritsu Electrical | 8-855-2      | Apr. 2001 | 1 Year   |
| <input type="checkbox"/> - LISN                 | KNW-407   | Kyoritsu Electrical | 8-757-1      | Apr. 2001 | 1 Year   |
| <input type="checkbox"/> - RF Cable             | 3D-2W     | Fujikura            | 155-21-006E0 | Apr. 2001 | 1 Year   |
| <input type="checkbox"/> - RF Cable             | 3D-2W     | Fujikura            | 155-21-007E0 | Apr. 2001 | 1 Year   |
| <input type="checkbox"/> - 50ohm Termination    | -         | SUHNER              | 154-06-501E0 | Jan. 2001 | 1 Year   |
| <input type="checkbox"/> - 50ohm Termination    | -         | SUHNER              | 154-06-502E0 | Jan. 2001 | 1 Year   |

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

\_\_\_ - was performed in the following test site.

x - was not applicable.

**Test location :**

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

\_\_\_ - Anechoic Chamber No. 2 (3 meters)

\_\_\_ - Anechoic Chamber No. 3 (3 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 |
|---------------------|-----------|-----------------|--------------|-----------|----------|
| ___ - Test Receiver | ESH-2     | Rohde & Schwarz | 880370/016   | June 2001 | 1 Year   |
| ___ - Test Receiver | ESH-3     | Rohde & Schwarz | 881460/030   | May 2001  | 1 Year   |
| ___ - Test Receiver | ESHS10    | Rohde & Schwarz | 835871/004   | Aug 2001  | 1 Year   |
| ___ - Antenna       | HFH2-Z2   | Rohde & Schwarz | 881058/62    | Nov 2001  | 1 Year   |
| ___ - RF Cable      | RG-213/U  | F & G           | 155-21-010E0 | Apr. 2001 | 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. Testing Div.  
21-25, Kinuta 1-chome, Setagaya-ku, Tokyo 157-8573, Japan

- ☐ - Anechoic Chamber No. 2 (3 meters)  
☒ - Anechoic Chamber No. 3 (3 meters)

#### Validation of Site Attenuation :

- 1) Last Confirmed Date :March, 2001  
2) Interval :1 year

#### Used test instruments :

| Type                                                    | Model No. | Manufacturer        | Serial No.   | Last Cal. | Interval |
|---------------------------------------------------------|-----------|---------------------|--------------|-----------|----------|
| <input type="checkbox"/> - Spectrum Analyzer            | 8560E     | Hewlett Packard     | 3240A00189   | Nov. 2001 | 1 Year   |
| <input type="checkbox"/> - Spectrum Analyzer            | 8566B     | Hewlett Packard     | 2140A01091   | Apr. 2001 | 1 Year   |
| <input type="checkbox"/> - RF Pre-selector              | 85685A    | Hewlett Packard     | 2648A00522   | Apr. 2001 | 1 Year   |
| <input checked="" type="checkbox"/> - Spectrum Analyzer | 8566B     | Hewlett Packard     | 2747A05855   | June 2001 | 1 Year   |
| <input checked="" type="checkbox"/> - RF Pre-selector   | 85685A    | Hewlett Packard     | 2091A00933   | June 2001 | 1 Year   |
| <input type="checkbox"/> - Test Receiver                | ESV       | Rohde & Schwarz     | 872148/039   | June 2000 | 1 Year   |
| <input type="checkbox"/> - Test Receiver                | ESVS10    | Rohde & Schwarz     | 826148/002   | May 2001  | 1 Year   |
| <input checked="" type="checkbox"/> - Test Receiver     | ESVS10    | Rohde & Schwarz     | 832699/001   | May 2001  | 1 Year   |
| <input type="checkbox"/> - Antenna                      | KBA-511   | Kyoritsu Electrical | 0-170-1      | Nov. 2001 | 1 Year   |
| <input checked="" type="checkbox"/> - Antenna           | KBA-511A  | Kyoritsu Electrical | 0-201-13     | Nov. 2001 | 1 Year   |
| <input type="checkbox"/> - Antenna                      | KBA-611   | Kyoritsu Electrical | 0-147-14     | Nov. 2001 | 1 Year   |
| <input checked="" type="checkbox"/> - Antenna           | KBA-611   | Kyoritsu Electrical | 0-210-5      | Nov. 2001 | 1 Year   |
| <input type="checkbox"/> - Biconical Antenna            | BBA9106   | Schwarzbeck         | VHA91031150  | Nov. 2001 | 1 Year   |
| <input type="checkbox"/> - Biconical Antenna            | BBA9106   | Schwarzbeck         | 11905078E0   | Nov. 2001 | 1 Year   |
| <input type="checkbox"/> - Log-Periodic Antenna         | UHALP9107 | Schwarzbeck         | 11905079E0   | Nov. 2001 | 1 Year   |
| <input type="checkbox"/> - Log-Periodic Antenna         | UHALP9107 | Schwarzbeck         | 11905110     | Nov. 2001 | 1 Year   |
| <input type="checkbox"/> - RF Cable                     | 5D-2W     | Fujikura            | 155-21-001E0 | Feb. 2001 | 1 Year   |
| <input checked="" type="checkbox"/> - RF Cable          | 5D-2W     | Fujikura            | 155-21-002E0 | Feb. 2001 | 1 Year   |

**1.3.4 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 : N/A

2) Interval : N/A

**Used test instruments :**

| Type                                | Model No.         | Manufacturer       | Serial No.   | Last Cal. | Interval |
|-------------------------------------|-------------------|--------------------|--------------|-----------|----------|
| <u>      </u> - Spectrum Analyzer   | 8560E             | Hewlett Packard    | 3240A00189   | Nov. 2001 | 1 Year   |
| <u>      </u> - Spectrum Analyzer   | 8566B             | Hewlett Packard    | 2140A01091   | Apr. 2001 | 1 Year   |
| <u>      </u> - RF Pre-selector     | 85685A            | Hewlett Packard    | 2648A00522   | Apr. 2001 | 1 Year   |
| <u>  x  </u> - Spectrum Analyzer    | 8566B             | Hewlett Packard    | 2747A05855   | June 2001 | 1 Year   |
| <u>  x  </u> - RF Pre-selector      | 85685A            | Hewlett Packard    | 2091A00933   | June 2001 | 1 Year   |
| <u>  x  </u> - Log-Periodic Antenna | HL 025            | Rohde & Schwarz    | 340182/015   | Nov. 2001 | 1 Year   |
| <u>      </u> - RF Amplifier        | DBP-0102N5334272B | DBS Microwave Inc. | 012          | Mar. 2001 | 1 Year   |
| <u>  x  </u> - RF Amplifier         | WJ-6882-814       | Watkins-Johnson    | 0414         | June 2001 | 1 Year   |
| <u>      </u> - RF Amplifier        | WJ-5315-556       | Watkins-Johnson    | 106          | June 2001 | 1 Year   |
| <u>      </u> - RF Amplifier        | WJ-5320-307       | Watkins-Johnson    | 645          | June 2001 | 1 Year   |
| <u>  x  </u> - RF Cable(10m)        | S 04272B          | Suhner             | 155-21-011E0 | May 2001  | 1 Year   |
| <u>      </u> - RF Cable(2m)        | SUCOFLEX 104      | Suhner             | 155-21-012E0 | May 2001  | 1 Year   |
| <u>  x  </u> - RF Cable(1m)         | SUCOFLEX 104      | Suhner             | 155-21-013E0 | May 2001  | 1 Year   |
| <u>      </u> - RF Cable(1m)        | S 04272B          | Suhner             | 155-21-015E0 | June 2001 | 1 Year   |

### 1.3.5 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 | May 2001  | 1 Year   |
| <input type="checkbox"/> - Oven              | -         | Ohnishi Co. Ltd. | -          | May 2001  | 1 Year   |
| <input type="checkbox"/> - DC Power Supply   | 6628A     | Hewlett Packard  | 3224A00284 | June 2001 | 1 Year   |

### 1.3.6 The measurement of the Occupied Bandwidth

☒ - was performed.

☐ - was not applicable.

#### Used test instruments :

| Type                                                    | Model No. | Manufacturer    | Serial No. | Last Cal. | Interval |
|---------------------------------------------------------|-----------|-----------------|------------|-----------|----------|
| <input type="checkbox"/> - Spectrum Analyzer            | 8560E     | Hewlett Packard | 3240A00189 | Nov. 2001 | 1 Year   |
| <input type="checkbox"/> - Spectrum Analyzer            | 8566B     | Hewlett Packard | 2140A01091 | Apr. 2001 | 1 Year   |
| <input checked="" type="checkbox"/> - Spectrum Analyzer | 8566B     | Hewlett Packard | 2747A05855 | June 2001 | 1 Year   |
| <input type="checkbox"/> - Function Generator           | 3325A     | Hewlett Packard | 2512A21776 | May 2001  | 1 Year   |
| <input type="checkbox"/> - FM Linear Detector           | MS61A     | Anritsu Corp.   | M77486     | Sep. 2001 | 1 Year   |
| <input type="checkbox"/> - Level Meter                  | ML422C    | Anritsu Corp.   | M87571     | June 2001 | 1 Year   |
| <input type="checkbox"/> - Measuring Amplifier          | 2636      | B & K           | 1614851    | June 2001 | 1 Year   |
| <input type="checkbox"/> - AF Amplifier                 | P-500L    | Accuphase       | BOY806     | June 2001 | 1 Year   |
| <input type="checkbox"/> - Microphone                   | 4134      | B & K           | 1269477    | May 2001  | 1 Year   |
| <input type="checkbox"/> - Preamplifier                 | 2639      | B & K           | 1268763    | May 2001  | 1 Year   |
| <input type="checkbox"/> - Pistonphone                  | 4220      | B & K           | 1165008    | Apr. 2001 | 1 Year   |
| <input type="checkbox"/> - Artificial Mouth             | 4227      | B & K           | 1274869    | N/A       | N/A      |

## 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 ☒ - NOT Applicable

The requirements are ☐ - PASSED ☐ - NOT PASSED

Remarks :

**Radiated Emission [§15.231(b)]** ☒ - Applicable ☐ - NOT Applicable

The requirements are ☒ - PASSED ☐ - NOT PASSED

Remarks:

**Frequency Stability** ☐ - Applicable ☒ - NOT Applicable

The requirements are ☐ - PASSED ☐ - NOT PASSED

Remarks:

**Occupied Bandwidth [§15.231(c)]** ☒ - Applicable ☐ - 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 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 : December 26, 2001

End of testing : December 26, 2001

- JAPAN QUALITY ASSURANCE ORGANIZATION -  
Approved by:

Signatories:  
Issued by:



Masaaki Takahashi  
Manager  
JQA EMC Engineering Dept.



Shigeru Osawa  
Assistant Manager  
JQA EMC Engineering Dept.

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## 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. |
|---------------------|------------------------------------------------------|-----------|------------|------------|
| Remote Control Unit | ALPS MECHATRONIC<br>DEVICES DIVISION<br>WAKUYA PLANT | SBLM04001 | OHELM04001 | None       |

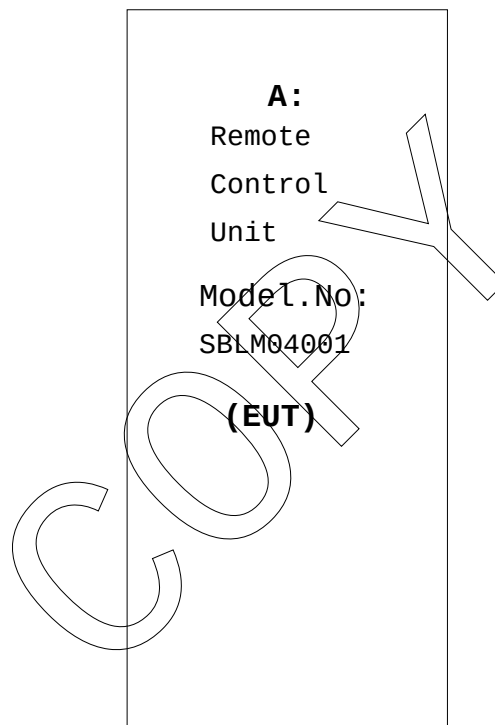
### 1.7.2 Operating condition

Power supply Voltage : 3.0 VDC(Battery)

The tests have been carried out under the transmitting condition.

COPY

## 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.

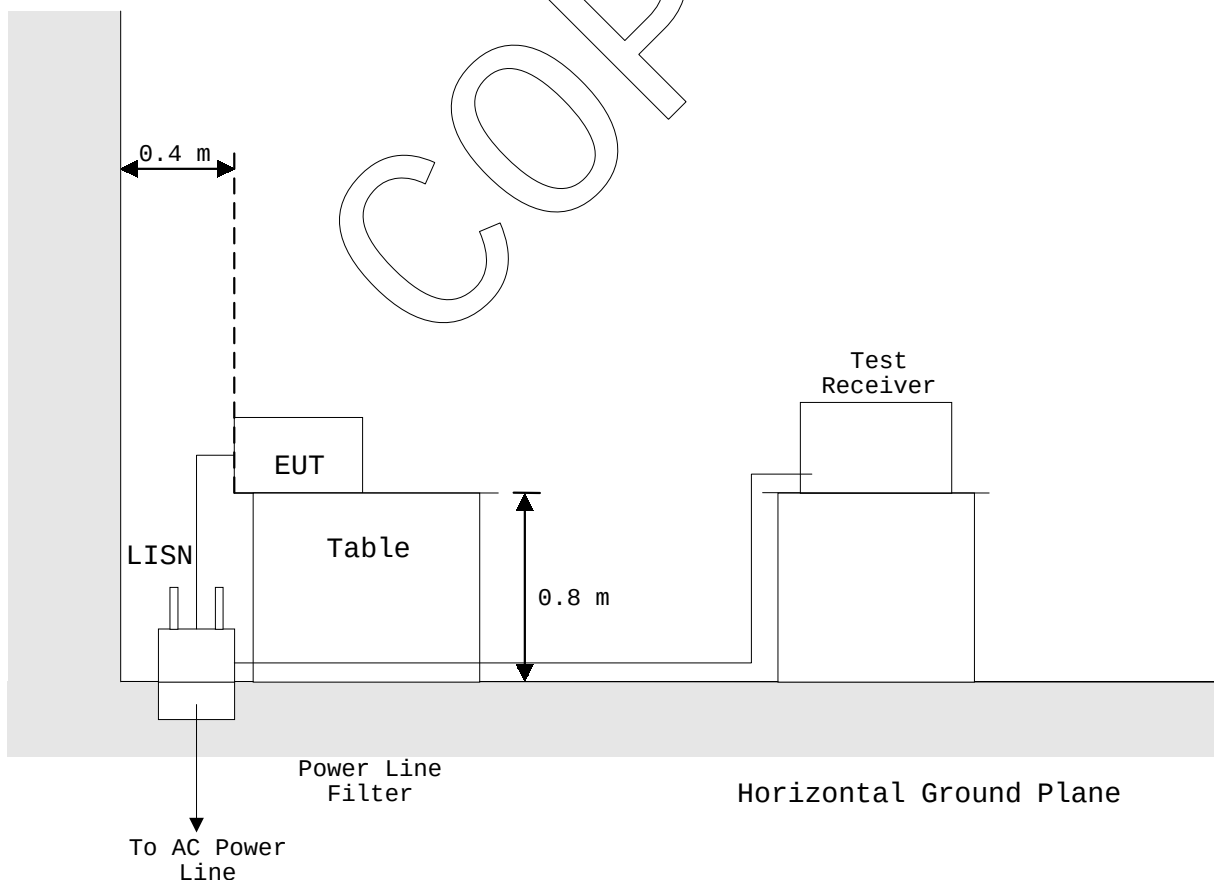
The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.

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

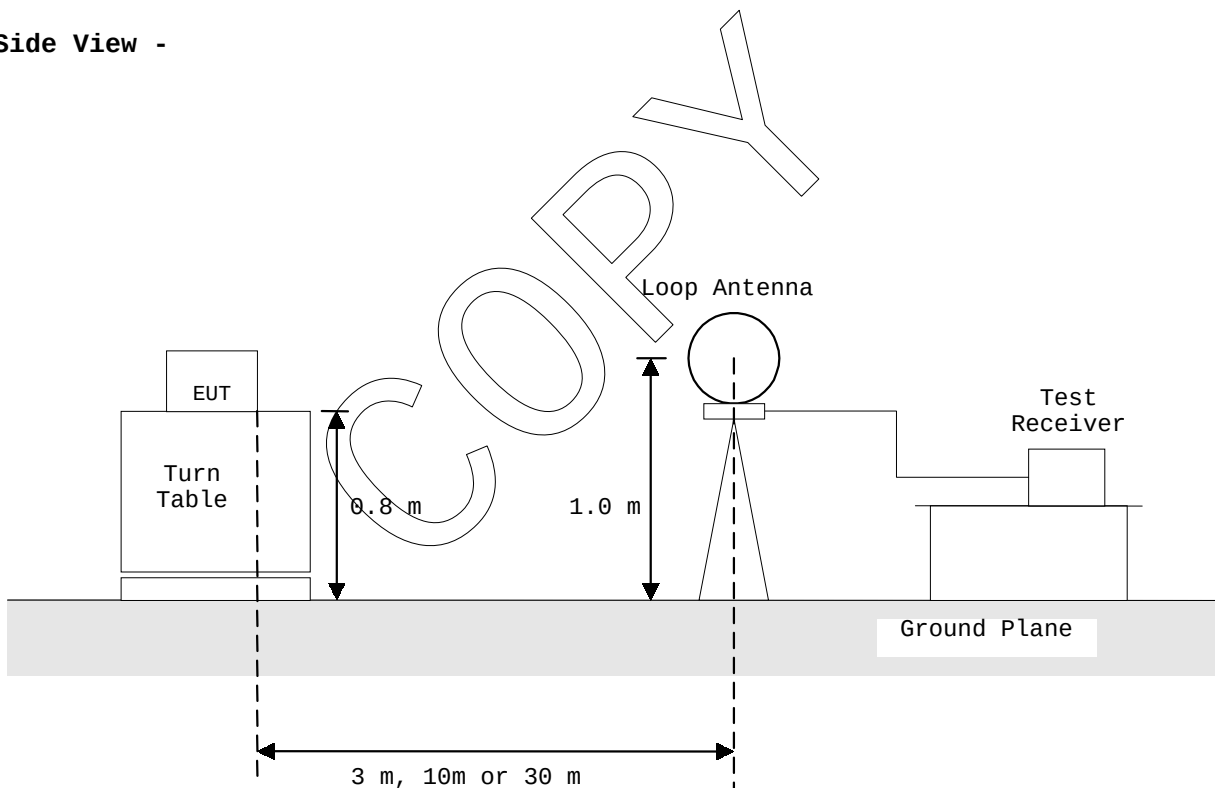


### 1.9.2 Radiated Emission ( 9 kHz - 30 MHz ) :

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 -



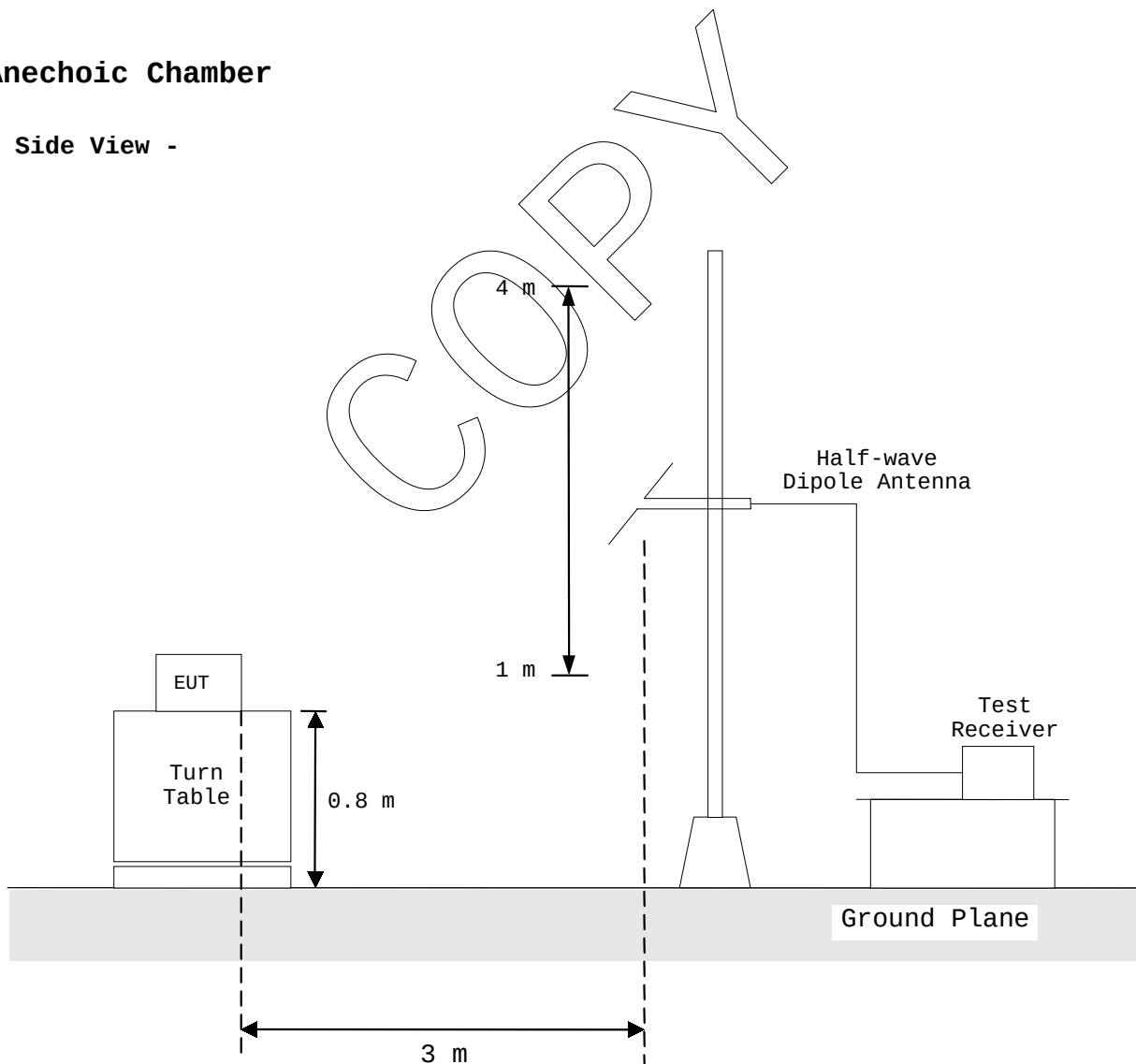
### 1.9.3 Radiated Emission ( 30 MHz - 1000 MHz ) :

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 -



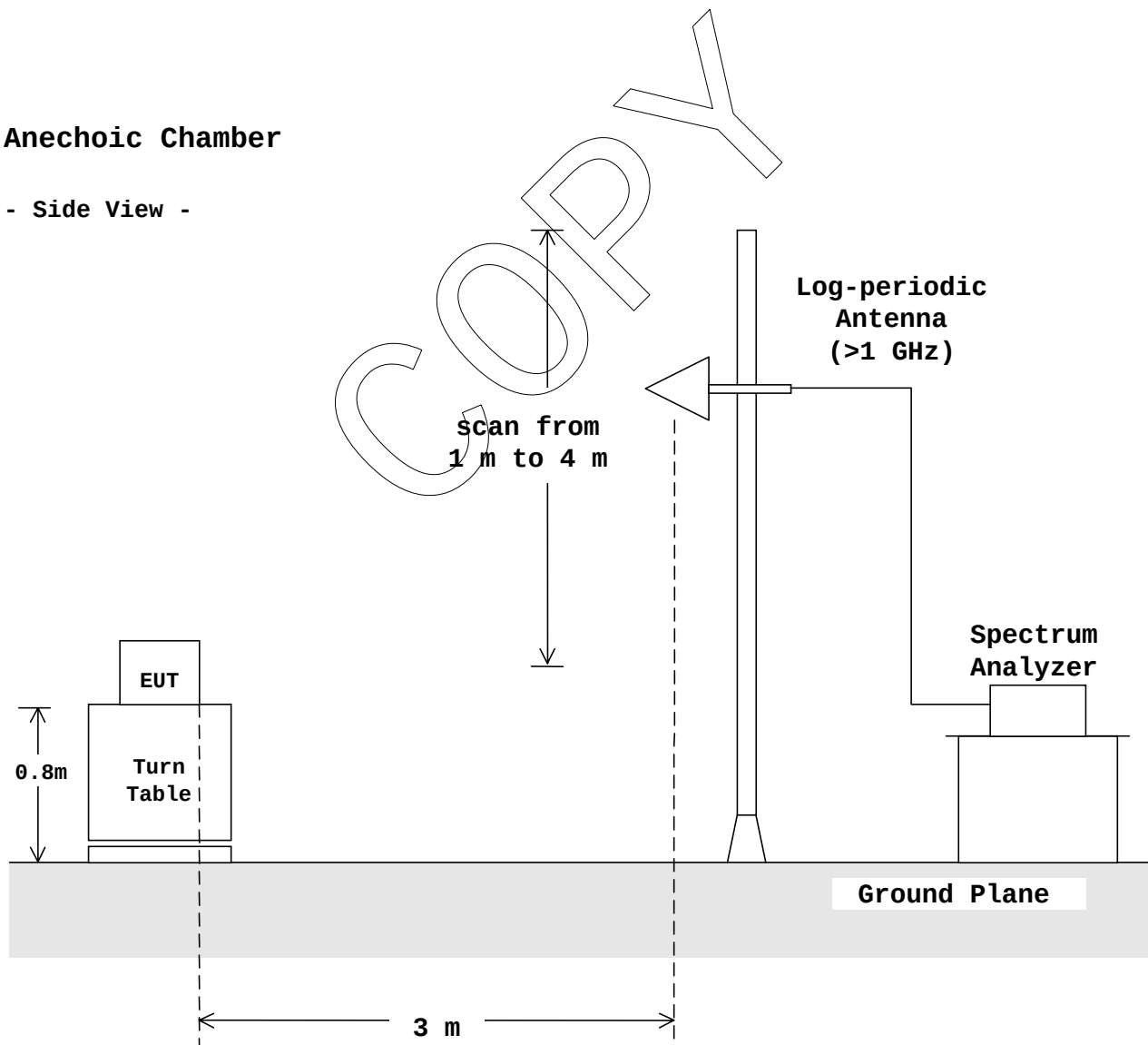
#### 1.9.4 Radiated Emission (Above 1 GHz) :

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

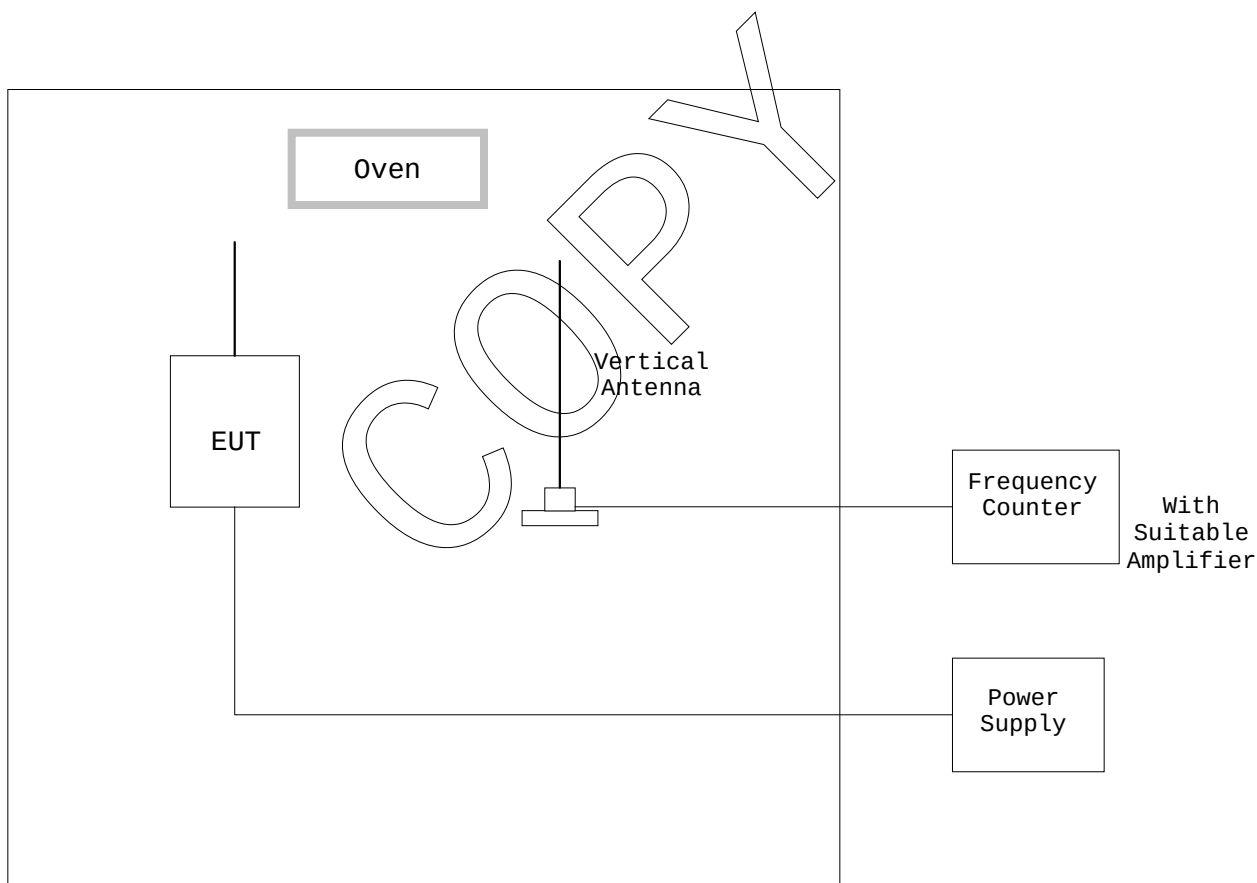
- Side View -



### 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  $+20^{\circ}\text{C}$ .

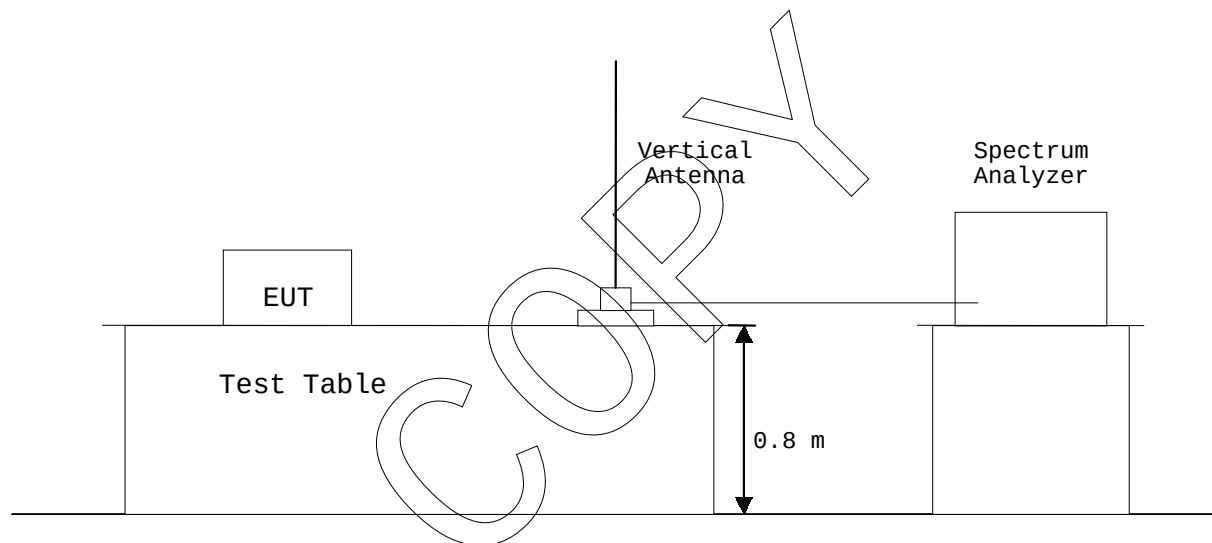
These measurements were carried out after allow sufficient time (approximately 1 hour) for the temperature of the chamber to stabilize.



**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





## TEST DATA

### 2.2 Radiated Emissions Measurement

Operating Frequency : 309.5 MHz

Distance of Measurement : 3.0 meters

Date : December 26, 2001

Temp. : 24 °C Humi. : 35 %

| Frequency<br>(MHz) | P-A<br>Factor<br>(dB) | Antenna<br>Factor<br>(dB) | Meter Reading<br>(dBuV) |       | Limits<br>(dBuV/m) | Emission Levels<br>(dBuV/m) |       | Margins<br>(dB) |       |
|--------------------|-----------------------|---------------------------|-------------------------|-------|--------------------|-----------------------------|-------|-----------------|-------|
|                    |                       |                           | Horiz.                  | Vert. |                    | Horiz.                      | Vert. | Horiz.          | Vert. |
| 309.5              | -16.0                 | 20.6                      | 58.9                    | 55.8  | 75.3               | 63.5                        | 60.4  | 11.8            | 14.9  |
| 619.0              | -16.0                 | 27.6                      | 34.3                    | 33.0  | 55.3               | 45.9                        | 44.6  | 9.4             | 10.7  |
| 928.5              | -16.0                 | 32.6                      | 16.1                    | 14.0  | 55.3               | 32.7                        | 30.6  | 22.6            | 24.7  |

Notes :

- The spectrum was checked from 30 MHz to 1000 MHz.
- The cable loss is included in the antenna factor.
- The symbol of "<" means "or less".
- The symbol of ">" means "or greater".
- A sample calculation was made at 309.5 (MHz).  
 $PA + Af + Mr = -16 + 20.6 + 58.9 = 63.5 \text{ (dBuV/m)}$   
 PA = Peak to Average Factor (P-A Factor)  
 Af = Antenna Factor  
 Mr = Meter Reading
- Measuring Instrument Setting :  
 Detector Function : Peak  
 Resolution Bandwidth : 1 MHz

| Frequency<br>(GHz) | P-A<br>Factor<br>(dB) | Correction<br>Factor<br>(dB) | Meter Reading<br>(dBuV) |       | Limits<br>(dBuV/m) | Emission Levels<br>(dBuV/m) |        | Margins<br>(dB) |        |
|--------------------|-----------------------|------------------------------|-------------------------|-------|--------------------|-----------------------------|--------|-----------------|--------|
|                    |                       |                              | Horiz.                  | Vert. |                    | Horiz.                      | Vert.  | Horiz.          | Vert.  |
| 1.2380             | -16.0                 | 26.4                         | 15.6                    | 13.8  | 54.0               | 26.0                        | 24.2   | 28.0            | 29.8   |
| 1.5475             | -16.0                 | 29.2                         | < 6.0                   | < 6.0 | 54.0               | < 19.2                      | < 19.2 | > 34.8          | > 34.8 |
| 1.8575             | -16.0                 | 30.7                         | 19.5                    | 17.8  | 55.3               | 34.2                        | 32.5   | 21.1            | 22.8   |
| 2.1665             | -16.0                 | -13.1                        | 68.3                    | 64.7  | 55.3               | 39.2                        | 35.6   | 16.1            | 19.7   |
| 2.4760             | -16.0                 | -12.3                        | 68.3                    | 67.7  | 55.3               | 40.0                        | 39.4   | 15.3            | 15.9   |
| 2.7855             | -16.0                 | -10.5                        | 76.2                    | 76.6  | 54.0               | 49.7                        | 50.1   | 4.3             | 3.9    |
| 3.0950             | -16.0                 | -8.8                         | 73.1                    | 72.6  | 55.3               | 48.3                        | 47.8   | 7.0             | 7.5    |

- Notes :
- 1) The spectrum was checked from 1.0 GHz to tenth harmonics.
  - 2) The cable loss, amp. gain and antenna factor are included in the correction factor.
  - 3) The symbol of "<" means "or less".
  - 4) The symbol of ">" means "or greater".
  - 5) A sample calculation was made at 1.238 (GHz).  
 $PA + Cf + Mr = -16 + 26.4 + 15.6 = 26 \text{ (dBuV/m)}$   
 PA = Peak to Average Factor(P-A Factor)  
 Cf = Correction Factor  
 Mr = Meter Reading
  - 6) Measuring Instrument Setting :  
 Detector function : Peak  
 Resolution Bandwidth : 1 MHz

Operating Frequency : 315.0 MHz  
 Distance of Measurement : 3.0 meters

Date : December 26, 2001

Temp. : 24 °C Humi. : 35 %

| Frequency<br>(MHz) | P-A<br>Factor<br>(dB) | Antenna<br>Factor<br>(dB) | Meter Reading<br>(dBuV) |       | Limits<br>(dBuV/m) | Emission Levels<br>(dBuV/m) |       | Margins<br>(dB) |       |
|--------------------|-----------------------|---------------------------|-------------------------|-------|--------------------|-----------------------------|-------|-----------------|-------|
|                    |                       |                           | Horiz.                  | Vert. |                    | Horiz.                      | Vert. | Horiz.          | Vert. |
| 315.0              | -15.8                 | 20.8                      | 59.8                    | 56.9  | 75.6               | 64.8                        | 61.9  | 10.8            | 13.7  |
| 630.0              | -15.8                 | 27.8                      | 34.0                    | 32.7  | 55.6               | 46.0                        | 44.7  | 9.6             | 10.9  |
| 945.0              | -15.8                 | 32.9                      | 16.3                    | 14.2  | 55.6               | 33.4                        | 31.3  | 22.2            | 24.3  |

- Notes :
- 1) The spectrum was checked from 30 MHz to 1000 MHz.
  - 2) The cable loss is included in the antenna factor.
  - 3) The symbol of "<" means "or less".
  - 4) The symbol of ">" means "or greater".
  - 5) A sample calculation was made at 315 (MHz).  
 $PA + Af + Mr = -15.8 + 20.8 + 59.8 = 64.8 \text{ (dBuV/m)}$   
 PA = Peak to Average Factor(P-A Factor)  
 Af = Antenna Factor  
 Mr = Meter Reading
  - 6) Measuring Instrument Setting :  
 Detector function : Peak  
 Resolution Bandwidth : 1 MHz

| Frequency<br>(GHz) | P-A<br>Factor<br>(dB) | Correction<br>Factor<br>(dB) | Meter Reading<br>(dBuV) |       | Limits<br>(dBuV/m) | Emission Levels<br>(dBuV/m) |        | Margins<br>(dB) |        |
|--------------------|-----------------------|------------------------------|-------------------------|-------|--------------------|-----------------------------|--------|-----------------|--------|
|                    |                       |                              | Horiz.                  | Vert. |                    | Horiz.                      | Vert.  | Horiz.          | Vert.  |
| 1.2600             | -15.8                 | 26.6                         | < 6.0                   | < 6.0 | 55.6               | < 16.8                      | < 16.8 | > 38.8          | > 38.8 |
| 1.5750             | -15.8                 | 29.5                         | < 6.0                   | < 6.0 | 54.0               | < 19.7                      | < 19.7 | > 34.3          | > 34.3 |
| 1.8900             | -15.8                 | 30.8                         | 22.2                    | 20.1  | 55.6               | 37.2                        | 35.1   | 18.4            | 20.5   |
| 2.2050             | -15.8                 | -13.0                        | 63.2                    | 59.1  | 54.0               | 34.4                        | 30.3   | 19.6            | 23.7   |
| 2.5200             | -15.8                 | -12.2                        | 68.6                    | 66.8  | 55.6               | 40.6                        | 38.8   | 15.0            | 16.8   |
| 2.8350             | -15.8                 | -10.1                        | 68.1                    | 68.5  | 54.0               | 42.2                        | 42.6   | 11.8            | 11.4   |
| 3.1500             | -15.8                 | -8.6                         | 73.5                    | 73.6  | 55.6               | 49.1                        | 49.2   | 6.5             | 6.4    |

Notes : 1) The spectrum was checked from 1.0 GHz to tenth harmonics.  
2) The cable loss, amp. gain and antenna factor are included in the correction factor.

3) The symbol of "<" means "or less".

4) The symbol of ">" means "or greater".

5) A sample calculation was made at 1.26 (GHz).

$$PA + Cf + Mr = -15.8 + 26.6 + 6 = 16.8 \text{ (dBuV/m)}$$

PA = Peak to Average Factor(P-A Factor)

Cf = Correction Factor

Mr = Meter Reading

6) Measuring Instrument Setting :

Detector function : Peak

Resolution Bandwidth : 1 MHz

Tested by :

*Shigeru Osawa*

Shigeru Osawa

Testing Engineer

## RADIATED EMISSION MEASUREMENT

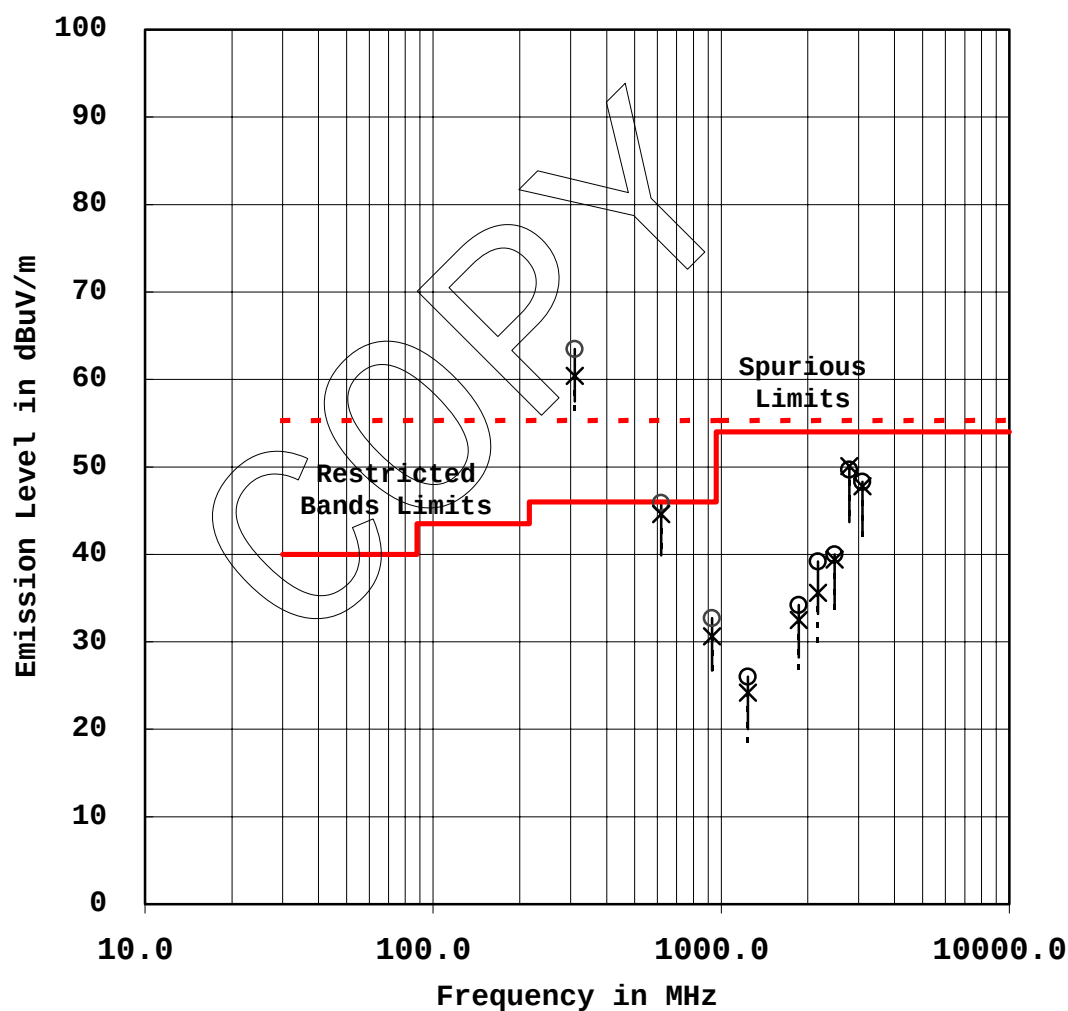
Model No. : SBLM04001

Standard : CFR 47 FCC Rules Part 15

○ Horizontal

Operating Frequency(MHz) : 309.5

× Vertical



## RADIATED EMISSION MEASUREMENT

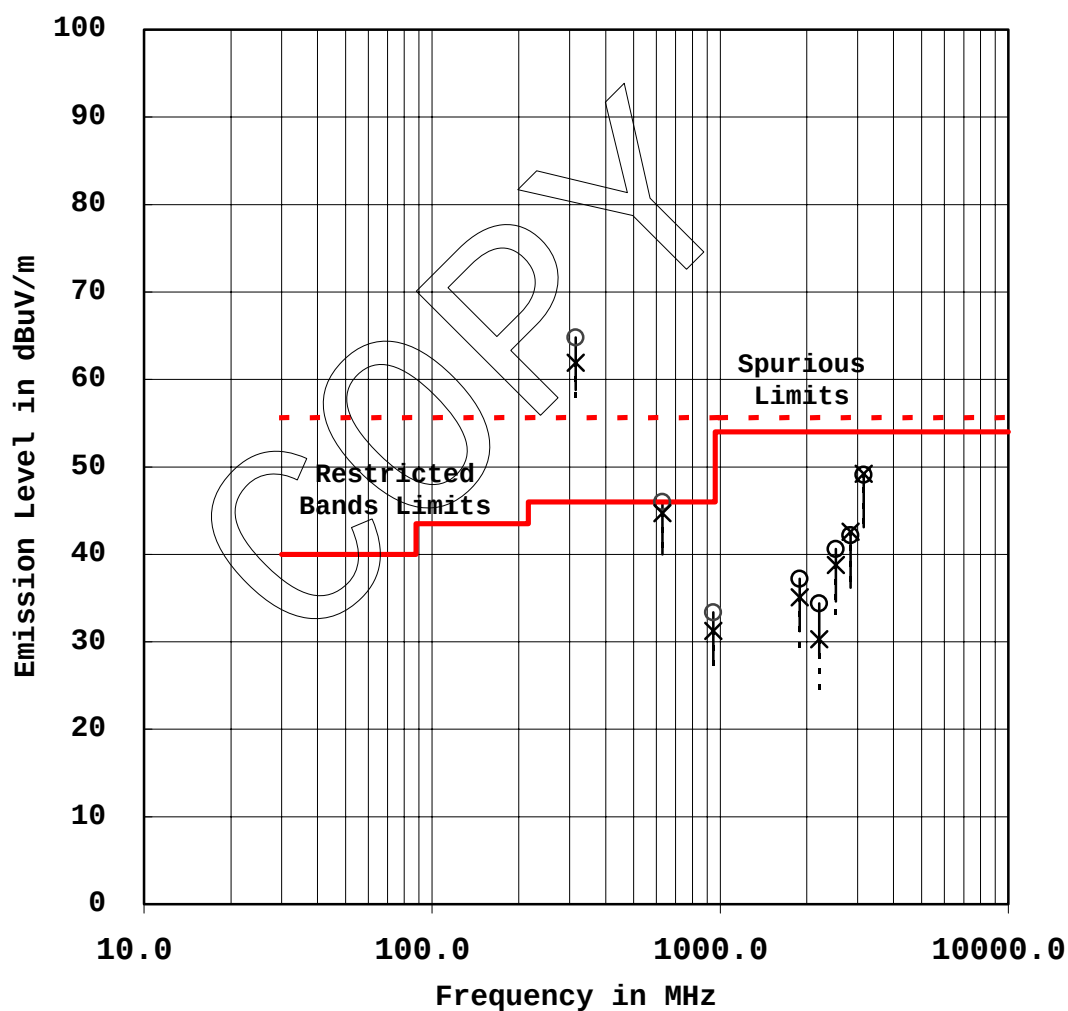
Model No. : SBLM04001

Standard : CFR 47 FCC Rules Part 15

○ Horizontal

Operating Frequency(MHz) : 315

× Vertical

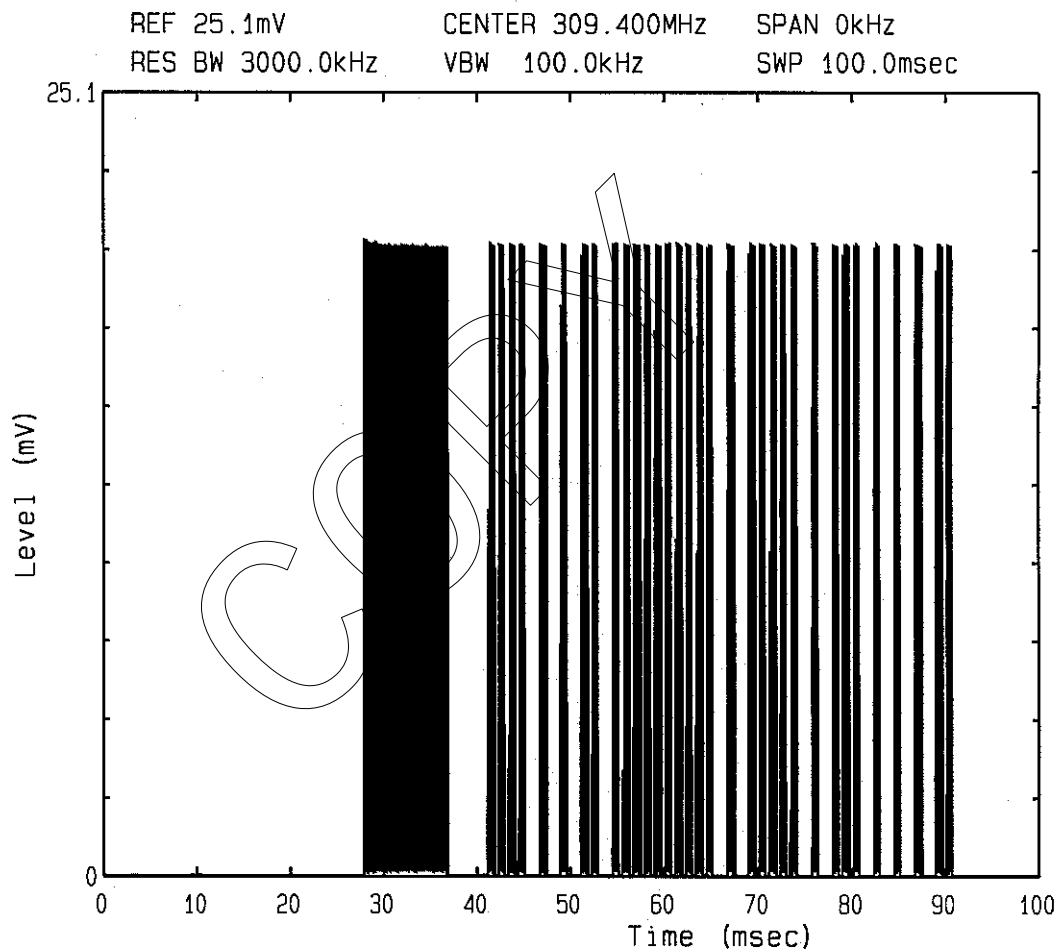


## The encoded waveform in the time domain

FCC ID : OHELM04001

Model : SBLM04001

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.

$$\begin{aligned} \text{Duty cycle} &= (\text{Maximum total on-time} / 100 \text{ msec}) \times 100 \\ &= (15.8 \text{ msec} / 100 \text{ msec}) \times 100 = 15.8 \% \end{aligned}$$

Therefore

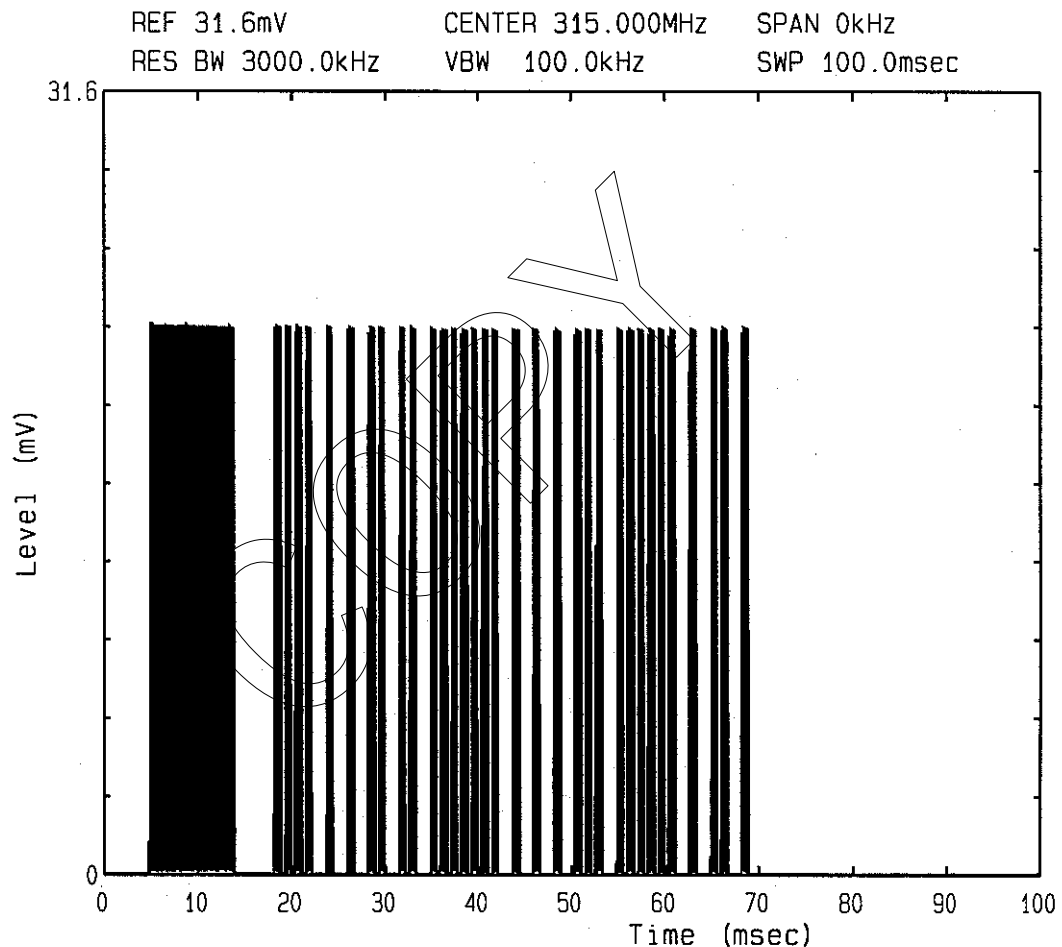
$$\text{Factor is } 20\log(0.1580) = -16.0 \text{ dB}$$

# The encoded waveform in the time domain

FCC ID : OHELM04001

Model : SBLM04001

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.

$$\begin{aligned} \text{Duty cycle} &= (\text{Maximum total on-time} / 100 \text{ msec}) \times 100 \\ &= (16.3 \text{ msec} / 100 \text{ msec}) \times 100 = 16.3 \% \end{aligned}$$

Therefore

$$\text{Factor is } 20\log(0.1630) = -15.8 \text{ dB}$$

## 2.4 Occupied Bandwidth Measurement

Date : December 26, 2001Temp.: 24 °C Humi.: 35 %

### Measurements Results :

Specified Limits : 0.25 % of the fundamental frequency

$$309.5 \text{ MHz} \times 0.0025 = 773.8 \text{ kHz}$$

$$315.0 \text{ MHz} \times 0.0025 = 787.5 \text{ kHz}$$

Refer to the attached graphs.

Tested by :



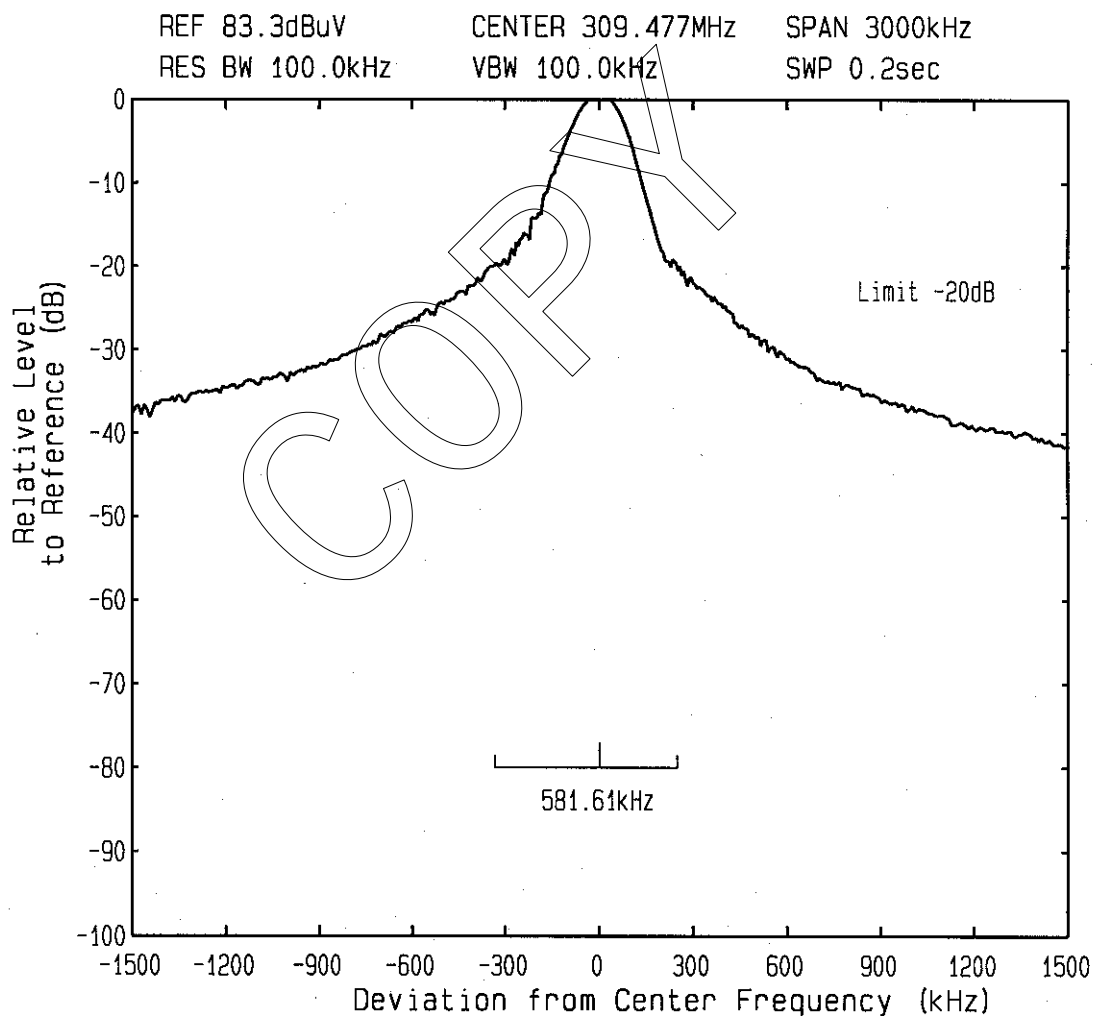
Shigeru Osawa

Testing Engineer

## Emission Limitation

FCC ID : OHELM04001  
 Model : SBLM04001

Mode of EUT : Transmit



## Emission Limitation

FCC ID : OHELM04001

Model : SBLM04001

Mode of EUT : Transmit

