

# **FCC TEST REPORT**

for

**CISPR PUB. 22 Class B**

Equipment : Keyboard

Model No. : SK-1800

FCC ID : GYUR85SK

Filing Type : Original Certification

Applicant : **SILITEK CORPORATION**  
10F, No. 25, Sec. 1, Tung Hwa S. Rd.,  
Taipei, Taiwan, R.O.C.

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- Without the written authorization of the test lab., the Test Report may not be copied.
- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**

***SPORTON International Inc.***

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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# **CERTIFICATE OF COMPLIANCE**

**for**

## **CISPR PUB. 22 Class B**

Equipment : Keyboard

Model No. : SK-1800

FCC ID : GYUR85SK

Applicant : **SILITEK CORPORATION**  
10F, No. 25, Sec. 1, Tung Hwa S. Rd.,  
Taipei, Taiwan, R.O.C.

### **I HEREBY CERTIFY THAT :**

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 1992** and the energy emitted by this equipment was ***passed* CISPR PUB. 22** both radiated and conducted emission class B limits. Testing was carried out on Oct. 29, 1999 at **SPORTON International Inc.** LAB. in Lin Kou.

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Lenore Chang  
President

***SPORTON International Inc.***

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

## **1. General Description of Equipment under Test**

### **1.1. Applicant**

SILITEK CORPORATION  
10F, No. 25, Sec. 1, Tung Hwa S. Rd.,  
Taipei, Taiwan, R.O.C.

### **1.2. Manufacturer**

Same as 1.1.

### **1.3. Basic Description of Equipment under Test**

|                   |                  |
|-------------------|------------------|
| Equipment         | : Keyboard       |
| Model No.         | : SK-1800        |
| FCC ID            | : GYUR85SK       |
| Trade Name        | : COMPAQ         |
| EUT Cable         | : Shielded, 2.2m |
| Power Supply Type | : From PC        |
| Power Cord        | : N/A            |

### **1.4. Feature of Equipment under Test**

- Electrical:
  - Input Power: +5 Vdc, 50mA Max
  - Characteristics Power Consumption: 0.25 watts Max
- Mechanical:
  - Total Travel: 4.0 +/- 0.3 mm
  - Characteristics Pretravel: 2.3 +/- 0.2mm
  - Operating Life: 200 million cycles
  - Dimension: 478\*186\*47 mm (W\*D\*H)
- Environmental Specifications:
  - Operating Temperature: -10 to 50
  - Storage Temperature: -20 to 60
  - Relative Humidity: under 95% non-condensing

## **2. Test Configuration of Equipment under Test**

### **2.1. Test Manner**

- a. The EUT has been associated with personal computer and peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The SONY Monitor, PRIMAX PS/2 Mouse, HP Printer, ACEEX Modem and EUT were connected to the DELL PC for EMI test.
- c. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 1000MHz.

### **2.2. Description of Test System**

#### **Support Unit 1. -- Monitor (SONY)**

|                   |                                                    |
|-------------------|----------------------------------------------------|
| FCC ID            | : AK8GDM17SE2T                                     |
| Model No.         | : GDM-17SE2T                                       |
| Power Supply Type | : Switching                                        |
| Power Cord        | : Non-Shielded                                     |
| Serial No.        | : SP0013                                           |
| Data Cable        | : Shielded, 360 degree via metal backshells, 1.15m |

#### **Support Unit 2. -- PS/2 Mouse (PRIMAX)**

|            |                                                   |
|------------|---------------------------------------------------|
| FCC ID     | : EMJMUSJQ                                        |
| Model No.  | : MUS9J                                           |
| Serial No. | : SP0045                                          |
| Data Cable | : Shielded, 360 degree via metal backshells, 1.7m |

#### **Support Unit 3. -- Printer (HP)**

|                   |                                                            |
|-------------------|------------------------------------------------------------|
| FCC ID            | : B94C2642X                                                |
| Model No.         | : DeskJet 400                                              |
| Power Supply Type | : Linear                                                   |
| Power Cord        | : Non-Shielded                                             |
| Serial No.        | : SP0048                                                   |
| Data Cable        | : Braided-Shielded, 360 degree via metal backshells, 1.35m |

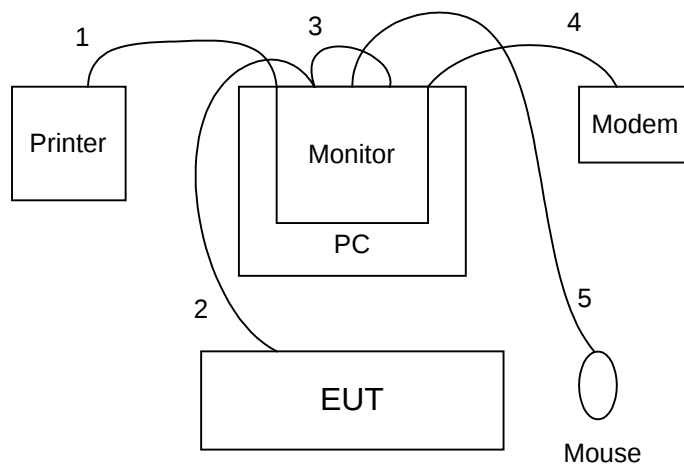
## Support Unit 4. -- Modem (ACEEX)

|                   |                                                    |
|-------------------|----------------------------------------------------|
| FCC ID            | : IFAXDM1414                                       |
| Model No.         | : DM1414                                           |
| Power Supply Type | : Linear                                           |
| Power Cord        | : Non-Shielded                                     |
| Serial No.        | : SP0015                                           |
| Data Cable        | : Shielded, 360 degree via metal backshells, 1.15m |

## Support Unit 5. -- Personal Computer (DELL)

|                   |                                                                                                                 |
|-------------------|-----------------------------------------------------------------------------------------------------------------|
| FCC ID            | : N/A                                                                                                           |
| Model No.         | : DCS                                                                                                           |
| Power Supply Type | : Switching                                                                                                     |
| Power Cord        | : Non-Shielded                                                                                                  |
| Serial No.        | : SP0038                                                                                                        |
| Data Cable        | : Shielded, 360 degree via metal backshells                                                                     |
| Remark            | : This support device was tested to comply with FCC standards and authorized under a declaration of conformity. |

### 2.3. Connection Diagram of Test System



1. The I/O cable is connected to the support unit 3.
2. The I/O cable is connected to the EUT.
3. The I/O cable is connected to the support unit 1.
4. The I/O cable is connected to the support unit 4.
5. The I/O cable is connected to the support unit 2.

### **3. Test Software**

An executive program, EMITEST.EXE under WIN 98, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows :

- a. Turn on the power of all equipment.
- b. The PC reads the test program from the floppy disk drive and runs it.
- c. The PC sends " H " messages to the monitor, and the monitor displays " H " patterns on the screen.
- d. The PC sends " H " messages to the printer, then the printer prints them on the paper.
- e. The PC sends " H " messages to the modem.
- f. The PC sends " H " messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
- g. Repeat the steps from b to f.

## **4. General Information of Test**

### **4.1. Test Facility**

This test was carried out by SPORTON International Inc.

Test Site Location : No. 30-2, Lin 6, Diing-Fwu Tsuen, Lin-Kou-Hsiang,  
Taipei Hsien, Taiwan, R.O.C.

TEL : 886-2-2601-1640

FAX : 886-2-2601-1695

### **4.2. Standard for Methods of Measurement**

ANSI C63.4-1992

### **4.3. Test in Compliance with**

CISPR PUB. 22 Class B

### **4.4. Frequency Range Investigated**

- a. Conduction: from 150 kHz to 30 MHz
- b. Radiation : from 30 MHz to 1,000 MHz

### **4.5. Test Distance**

The test distance of radiated emission from antenna to EUT is 10 M.

## **5. Test of Conducted Powerline**

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 115 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

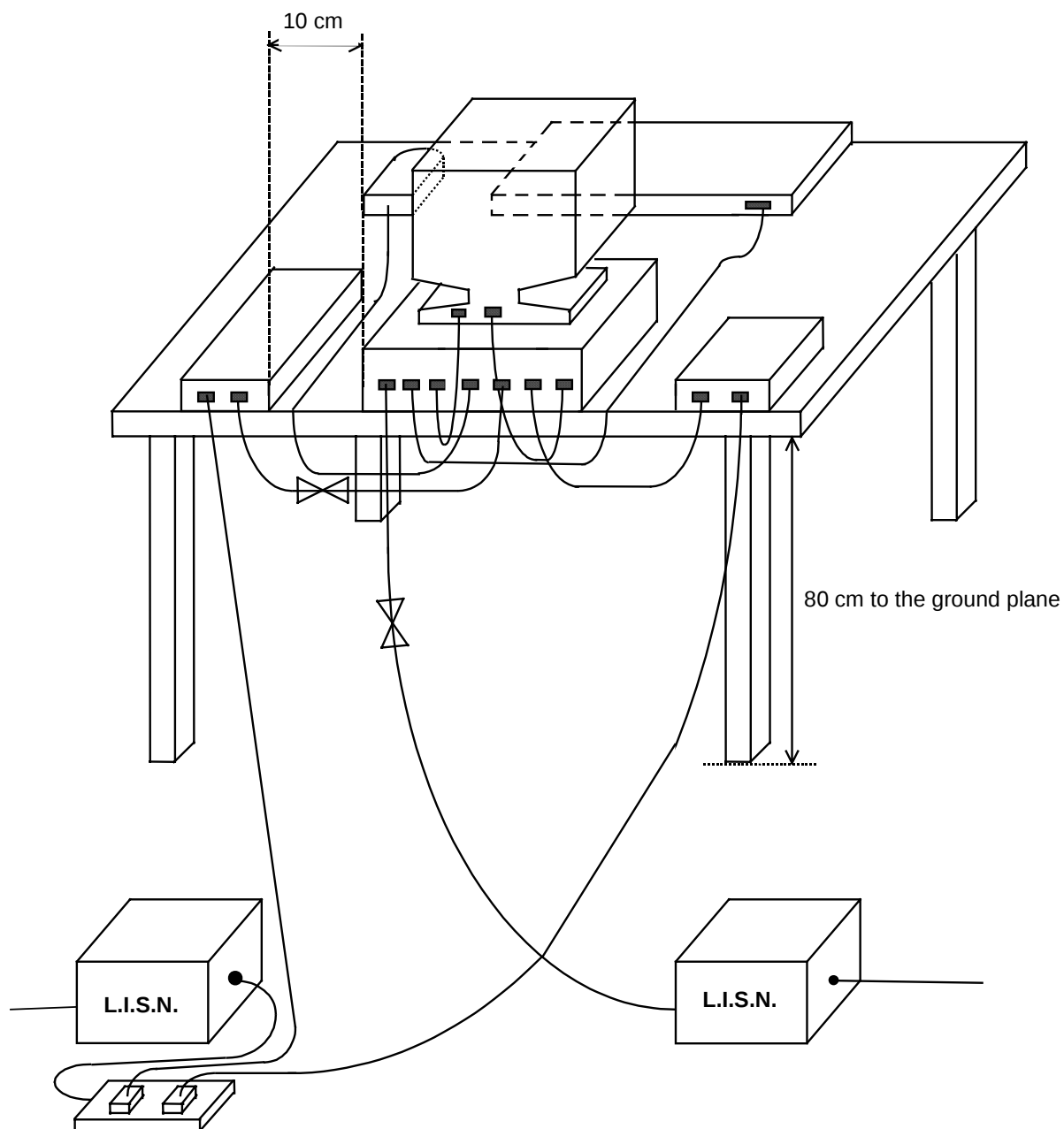
### **5.1. Major Measuring Instruments**

|                 |           |
|-----------------|-----------|
| Test Receiver   | HP 8591EM |
| Attenuation     | 0 dB      |
| Start Frequency | 0.15 MHz  |
| Stop Frequency  | 30 MHz    |
| Step MHz        | 0.007 MHz |
| IF Bandwidth    | 9 kHz     |

## **5.2. Test Procedures**

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- i. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be retested one by one using the quasi-peak method and reported.

### 5.3. Typical Test Setup Layout of Conducted Powerline



#### 5.4. Test Result of AC Powerline Conducted Emission

- Frequency Range of Test : from 0.15 MHz to 30 MHz
- Temperature : 24°C
- Relative Humidity : 64 %
- Test Date : Oct. 29, 1999

The Conducted Emission test was passed at minimum margin

##### NEUTRAL 0.498 MHz / 38.80 dBuV.

| Freq.<br>(MHz) | Line<br>or<br>Neutral | Meter Reading  |                |              |              | Limits         |                |              |              | Margin       |              |
|----------------|-----------------------|----------------|----------------|--------------|--------------|----------------|----------------|--------------|--------------|--------------|--------------|
|                |                       | Q.P.<br>(dBuV) | A.V.<br>(dBuV) | Q.P.<br>(uV) | A.V.<br>(uV) | Q.P.<br>(dBuV) | A.V.<br>(dBuV) | Q.P.<br>(uV) | A.V.<br>(uV) | Q.P.<br>(dB) | A.V.<br>(dB) |
| 0.199          | L                     | 45.70          | 45.20          | 192.75       | 181.97       | 63.67          | 53.67          | 1526.32      | 482.67       | -18.0        | -8.5         |
| 0.496          | L                     | 39.10          | 38.60          | 90.16        | 85.11        | 56.07          | 46.07          | 635.82       | 201.06       | -17.0        | -7.5         |
| 11.700         | L                     | 39.00          | 35.60          | 89.13        | 60.26        | 60.00          | 50.00          | 1000.00      | 316.23       | -21.0        | -14.4        |
| 0.201          | N                     | 45.70          | 44.70          | 192.75       | 171.79       | 63.59          | 53.59          | 1511.55      | 477.99       | -17.9        | -8.9         |
| 0.498          | N                     | 39.20          | 38.80          | 91.20        | 87.10        | 56.04          | 46.04          | 633.73       | 200.40       | -16.8        | -7.2         |
| 11.742         | N                     | 38.60          | 34.80          | 85.11        | 54.95        | 60.00          | 50.00          | 1000.00      | 316.23       | -21.4        | -15.2        |

Test Engineer : \_\_\_\_\_  
Aldrich Hong

**5.5. Photographs of Counducted Powerline Test Configuration**

- The photographs show the configuration that generates the maximum emission.

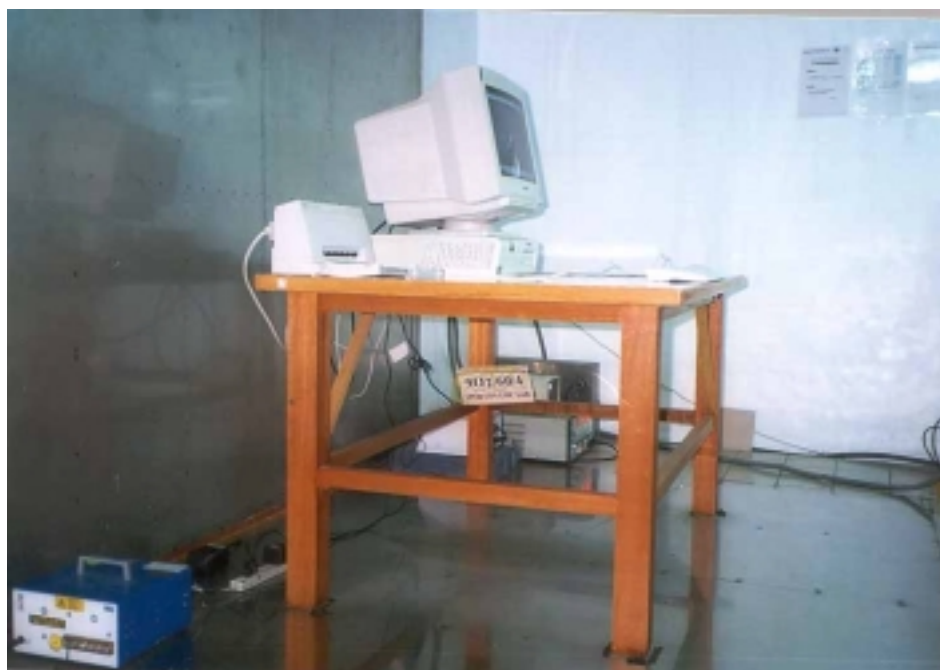
FRONT VIEW



REAR VIEW



**SIDE VIEW**



## **6. Test of Radiated Emission**

Radiated emissions from 30 MHz to 1,000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

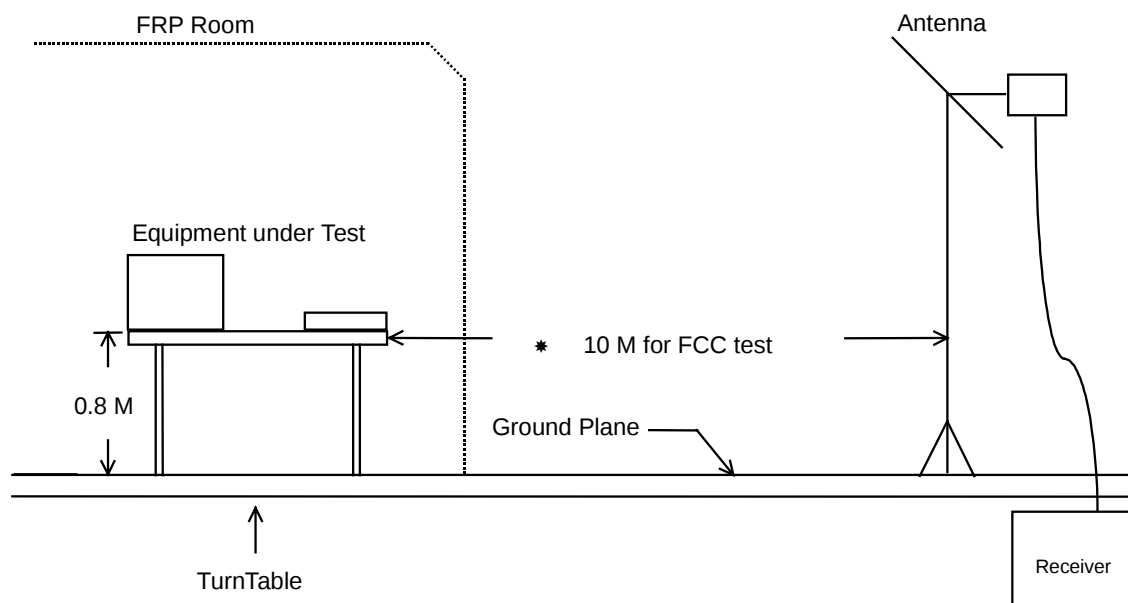
### **6.1. Major Measuring Instruments**

- Amplifier (HP 8447D)
  - Attenuation 0 dB
  - RF Gain 25 dB
  - Signal Input 0.1 MHz to 1.3 GHz
  
- Spectrum Analyzer ( HP 8568B )
  - Attenuation 0 dB
  - Start Frequency 30 MHz
  - Stop Frequency 1000 MHz
  - Resolution Bandwidth 1 MHz
  - Video Bandwidth 1 MHz
  - Signal Input 100 Hz to 1.5 GHz
  
- Quasi-Peak Adapte ( HP 85650A )
  - Resolution Bandwidth 120 KHz
  - Frequency Band 30 MHz to 1 GHz
  - Quasi-Peak Detector ON for Quasi-Peak Mode  
OFF for Peak Mode

## **6.2. Test Procedures**

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.

### 6.3. Typical Test Setup Layout of Radiated Emission



#### 6.4. Test Result of Radiated Emission

- Frequency Range of Test : from 30 MHz to 1,000 MHz
- Test Distance : 10 M
- Temperature : 25°C
- Relative Humidity : 71 %
- Test Date : Oct. 14, 1999
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

65.350 MHz / 26.84 dBuV (VERTICAL) Antenna Height 1.5 Meter, Turntable Degree 299 °.

| Frequency<br>(MHz) | Polarity | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Limits   |        | Emission<br>(dBuV/m) | Level<br>(uV/m) | Margin<br>(dB) |
|--------------------|----------|-----------------------------|-----------------------|-------------------|----------|--------|----------------------|-----------------|----------------|
|                    |          |                             |                       |                   | (dBuV/m) | (uV/m) |                      |                 |                |
| 198.900            | H        | 9.25                        | 1.50                  | 11.71             | 30.00    | 31.62  | 22.46                | 13.27           | -7.54          |
| 213.600            | H        | 10.09                       | 1.55                  | 11.76             | 30.00    | 31.62  | 23.40                | 14.79           | -6.60          |
| 65.350             | V        | 5.19                        | 0.95                  | 20.70             | 30.00    | 31.62  | 26.84                | 21.98           | -3.16          |
| 134.300            | V        | 11.26                       | 1.20                  | 9.39              | 30.00    | 31.62  | 21.85                | 12.37           | -8.15          |
| 170.900            | V        | 9.88                        | 1.20                  | 11.08             | 30.00    | 31.62  | 22.16                | 12.82           | -7.84          |
| 181.200            | V        | 10.48                       | 1.50                  | 12.42             | 30.00    | 31.62  | 24.40                | 16.60           | -5.60          |

Test Engineer : \_\_\_\_\_  
WILLIAM LEE

**6.5. Photographs of Radiated Emission Test Configuration**

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



## 7. Antenna Factor & Cable Loss

| Frequency (MHz) | Antenna Factor (dB) | Cable Loss (dB) |
|-----------------|---------------------|-----------------|
| 30              | 16.2                | 0.8             |
| 35              | 15.3                | 0.8             |
| 40              | 13.8                | 0.7             |
| 45              | 10.7                | 0.9             |
| 50              | 8.7                 | 0.8             |
| 55              | 6.6                 | 0.8             |
| 60              | 4.5                 | 0.9             |
| 65              | 5.2                 | 1.0             |
| 70              | 5.9                 | 1.0             |
| 75              | 6.6                 | 1.0             |
| 80              | 7.5                 | 1.0             |
| 85              | 7.9                 | 1.1             |
| 90              | 8.2                 | 1.2             |
| 95              | 9.3                 | 1.2             |
| 100             | 10.4                | 1.2             |
| 110             | 11.6                | 1.2             |
| 120             | 12.8                | 1.3             |
| 130             | 11.6                | 1.2             |
| 140             | 10.9                | 1.2             |
| 150             | 11.4                | 1.5             |
| 160             | 10.2                | 1.2             |
| 170             | 9.9                 | 1.2             |
| 180             | 10.5                | 1.5             |
| 190             | 9.9                 | 1.5             |
| 200             | 9.2                 | 1.5             |
| 220             | 10.5                | 1.6             |
| 240             | 11.8                | 1.7             |
| 260             | 12.9                | 1.7             |
| 280             | 13.5                | 1.8             |
| 300             | 14.2                | 1.9             |
| 320             | 14.4                | 2.0             |
| 340             | 14.5                | 2.0             |
| 360             | 14.8                | 2.1             |
| 380             | 15.0                | 2.1             |
| 400             | 15.2                | 2.2             |
| 450             | 16.5                | 2.4             |
| 500             | 17.9                | 2.5             |
| 550             | 18.3                | 2.5             |
| 600             | 18.7                | 2.6             |
| 650             | 19.2                | 2.8             |
| 700             | 19.6                | 3.1             |
| 750             | 19.7                | 3.2             |
| 800             | 19.7                | 3.3             |
| 850             | 19.7                | 3.5             |
| 900             | 19.6                | 3.7             |
| 950             | 21.4                | 3.7             |
| 1000            | 23.3                | 3.7             |

LKOP3

## 8. List of Measuring Equipment Used

| Instrument                        | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark     |
|-----------------------------------|--------------|-----------|------------|-----------------|------------------|------------|
| EMC Receiver (site 2)             | HP           | 8591EM    | 3710A01187 | 9 KHz - 18 GHz  | Sep. 06. 1999    | Conduction |
| LISN (EUT) (site 2)               | Telemeter    | NNB-2/16Z | 98009      | 50 ohm / 50 uH  | Jan. 26, 1999    | Conduction |
| LISN (Support Unit) (site 2)      | Telemeter    | NNB-2/16Z | 98089      | 50 ohm / 50 uH  | Dec. 01, 1998    | Conduction |
| Quasi-peak Adapter (site 3)       | HP           | 85650A    | 2811A01116 | 9KHz -1GHz      | Jun. 19, 1999    | Radiation  |
| Amplifier (Site 3)                | HP           | 8447D     | 2944A09068 | 0.1MHz -1.3GHz  | Sep. 02, 1999    | Radiation  |
| Spectrum Analyzer (site 3)        | HP           | 8568B     | 2732A04100 | 100Hz – 1.5GHz  | Jun. 19, 1999    | Radiation  |
| Bilog Antenna (Site 3)            | CHASE        | CBL6112A  | 2320       | 30MHz -2GHz     | Sep. 08. 1999    | Radiation  |
| Half-wave dipole antenna (Site 3) | EMCO         | 3121C     | 9705-1285  | 28M - 1GHz      | May 18, 1999     | Radiation  |
| Turn Table (site 3)               | EMCO         | 2080      | 9711-2022  | 0 ~ 360 degree  | N/A              | Radiation  |
| Antenna Mast (site 3)             | EMCO         | 2075      | 9710-2101  | 1 m- 4 m        | N/A              | Radiation  |