

# **FCC TEST REPORT**

for

**CISPR PUB. 22 Class B**

Equipment : VGA CARD

Model No. : A4-R128ZXSD-A1-L

FCC ID : FQIR128ZX

Filing Type : Original Grant

Applicant : **JOYTECH COMPUTER CO., LTD.**  
3F, No. 1, ALLEY2, SZU-WEI LANE,  
CHUNG CHENG RD., HSIN TIEN CITY,  
TAIPEI HSIEN, TAIWAN, R.O.C.

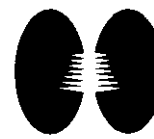
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- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**

***SPORTON International Inc.***

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

## Table of Contents

|                                                                  |           |
|------------------------------------------------------------------|-----------|
| <b>CERTIFICATE OF COMPLIANCE .....</b>                           | <b>3</b>  |
| <b>1. General Description of Equipment under Test .....</b>      | <b>4</b>  |
| 1.1. Applicant .....                                             | 4         |
| 1.2. Manufacturer .....                                          | 4         |
| 1.3. Basic Description of Equipment under Test .....             | 4         |
| 1.4. Feature of Equipment under Test .....                       | 4         |
| <b>2. Test Configuration of Equipment under Test .....</b>       | <b>5</b>  |
| 2.1. Test Manner .....                                           | 5         |
| 2.2. Description of Test System .....                            | 5         |
| 2.3. Connection Diagram of Test System .....                     | 7         |
| <b>3. Test Software .....</b>                                    | <b>8</b>  |
| <b>4. General Information of Test .....</b>                      | <b>9</b>  |
| 4.1. Test Facility .....                                         | 9         |
| 4.2. Standard for Methods of Measurement .....                   | 9         |
| 4.3. Test in Compliance with .....                               | 9         |
| 4.4. Frequency Range Investigated .....                          | 9         |
| 4.5. Test Distance .....                                         | 9         |
| <b>5. Test of Conducted Powerline .....</b>                      | <b>10</b> |
| 5.1. Major Measuring Instruments .....                           | 10        |
| 5.2. Test Procedures .....                                       | 11        |
| 5.3. Typical Test Setup Layout of Conducted Powerline .....      | 12        |
| 5.4. Test Result of AC Powerline Conducted Emission .....        | 13        |
| 5.5. Photographs of Conducted Powerline Test Configuration ..... | 15        |
| <b>6. Test of Radiated Emission .....</b>                        | <b>17</b> |
| 6.1. Major Measuring Instruments .....                           | 17        |
| 6.2. Test Procedures .....                                       | 18        |
| 6.3. Typical Test Setup Layout of Radiated Emission .....        | 19        |
| 6.4. Test Result of Radiated Emission .....                      | 20        |
| 6.5. Photographs of Radiated Emission Test Configuration .....   | 22        |
| <b>7. Antenna Factor &amp; Cable Loss .....</b>                  | <b>23</b> |
| <b>8. List of Measuring Equipments Used .....</b>                | <b>23</b> |



## CERTIFICATE OF COMPLIANCE

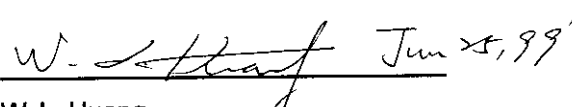
for

### CISPR PUB. 22 Class B

Equipment : VGA CARD  
Model No. : A4-R128ZXSD-A1-L  
FCC ID : FQIR128ZX  
Applicant : JOYTECH COMPUTER CO., LTD.  
3F, No. 1, ALLEY2, SZU-WEI LANE,  
CHUNG CHENG RD., HSIN TIEN CITY,  
TAIPEI HSIEN, 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 Jun. 16, 1999 at **SPORTON International Inc.** LAB. in Lin Kou.

  
W. L. Huang  
General Manager

**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**

JOYTECH COMPUTER CO., LTD.  
3F, No. 1, ALLEY2, SZU-WEI LANE,  
CHUNG CHENG RD., HSIN TIEN CITY,  
TAIPEI HSIEN, TAIWAN, R.O.C.

**1.2. Manufacturer**

Same as 1.1.

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

Equipment : VGA CARD  
Model No. : A4-R128ZXSD-A1-L  
FCC ID : FQIR128ZX  
Trade Name : JOYTECH  
Power Supply Type : N/A  
Power Cord : N/A

**1.4. Feature of Equipment under Test**

- Fast 32-bit VGA/SVGA
- High performance 128-bit 2D/GUI/DirectDraw Acceleration
- Interactive, Photorealistic Direct3D Acceleration with advanced effects
- 206MHz Palette-DAC supporting up to 1600x1200@75Hz

## **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 HITACHI Monitor, DELL PS/2 Keyboard, WINIC Mouse, HP Printer, ACEEX Modem and EUT were connected to the FIC PC for EMI test.
- c. The Following display resolution were investigated during the compliance test:
  1. Horizontal frequency (640x480 to 1,600x1,200, 31.5 KHz to 109 KHz)
  2. Vertical frequency (60 Hz to 100 Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
  1. 1,600x1,200 (non-interlanced 106 KHz), refresh rate 85 Hz.
  2. 1,280x1,024 (non-interlanced 109 KHz), refresh rate 100 Hz.
- e. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 2000MHz.

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

#### **Support Unit 1. -- Personal Computer (FIC)**

|                   |                                                                                                                 |
|-------------------|-----------------------------------------------------------------------------------------------------------------|
| FCC ID            | : N/A                                                                                                           |
| Model No.         | : P2L97                                                                                                         |
| Power Supply Type | : Switching                                                                                                     |
| Power Cord        | : Non-Shielded                                                                                                  |
| Serial No.        | : SP0006                                                                                                        |
| 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. |

#### **Support Unit 2. -- Monitor (HITACHI)**

|                   |                                                    |
|-------------------|----------------------------------------------------|
| FCC ID            | : M9U9705C97BMD                                    |
| Model No.         | : CM803ET                                          |
| Power Supply Type | : Switching                                        |
| Power Cord        | : N/A                                              |
| Serial No.        | : SP0181                                           |
| Data Cable        | : Shielded, 360 degree via metal backshells, 1.15m |

**FCC TEST REPORT****Report No. : F961105****Support Unit 3. -- PS/2 Keyboard (DELL)**

FCC ID : GYUM92SK  
Model No. : AT101(DE8M)  
Serial No. : SP0054  
Data Cable : Shielded, 360 degree via metal backshells, 1.9m

**Support Unit 4. -- Mouse (WINIC)**

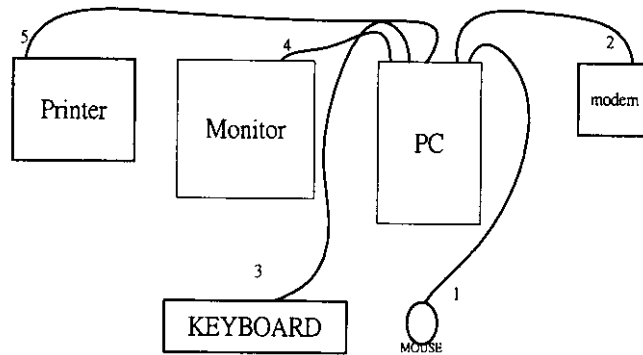
FCC ID : F4ZFDM-A50  
Model No. : FDM-A50  
Serial No. : SP0088  
Data Cable : Shielded, 360 degree via metal backshells, 1.5m

**Support Unit 5. -- 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 6. -- Modem (ACEEX)**

FCC ID : IFAXDM1414  
Model No. : DM1414  
Power Supply Type : Linear  
Power Cord : Non-Shielded  
Serial No. : SP0059  
Data Cable : Braided-Shielded, 360 degree via metal backshells, 1.15m

**2.3. Connection Diagram of Test System**

1. The I/O cable is connected from PC to the support unit 4.
2. The I/O cable is connected from PC to the support unit 6.
3. The I/O cable is connected from PC to the support unit 3.
4. The I/O cable is connected from PC to the support unit 2.
5. The I/O cable is connected from PC to the support unit 5.

### **3. Test Software**

An executive program, WINFCC.EXE under WIN98, which generates a complete line of continuously repeating "H" pattern is 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. in an openarea test site.

Openarea 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 2,000 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.

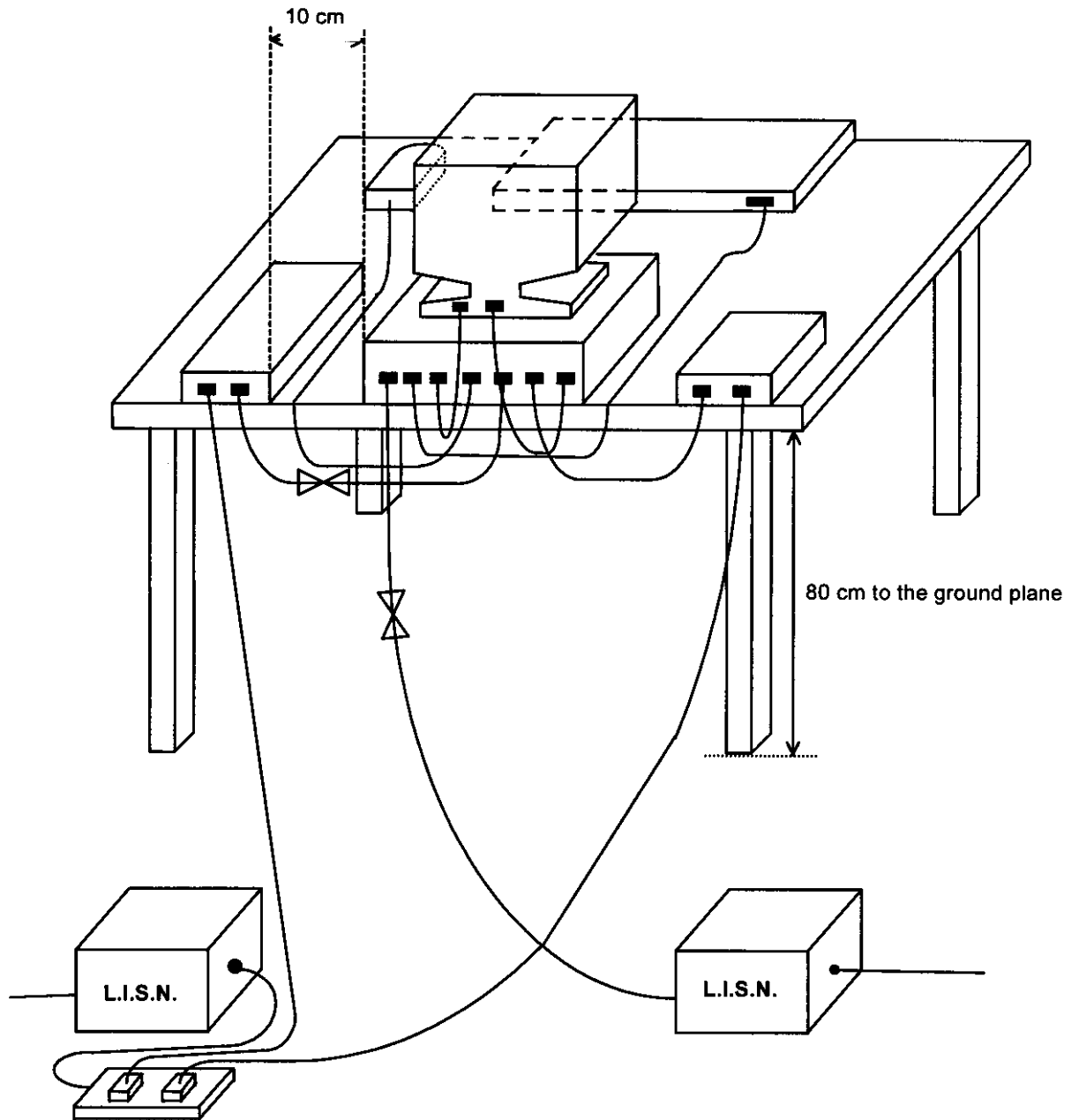
### **5.1. Major Measuring Instruments**

|                 |           |
|-----------------|-----------|
| 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**

5.4.1. Test mode : 1600x1200 85Hz/106K

- Temperature : 24°C
- Relative Humidity : 56 %
- Test Date : Jun. 16, 1999

**The Conducted Emission test was passed at minimum margin****NEUTRAL 0.196 MHz / 46.00 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) |
| 0.257          | L                     | 36.40          | 34.70          | 66.07        | 54.33        | 61.53          | 51.53          | 1192.76      | 377.18       | -25.13       | -16.83       |
| 0.403          | L                     | 38.10          | 37.20          | 80.35        | 72.44        | 57.79          | 47.79          | 775.33       | 245.18       | -19.69       | -10.59       |
| 0.551          | L                     | 37.60          | 36.60          | 75.86        | 67.61        | 56.00          | 46.00          | 630.96       | 199.53       | -18.40       | -9.40        |
| 0.196          | N                     | 46.00          | 45.10          | 199.53       | 179.89       | 63.78          | 53.78          | 1545.81      | 488.83       | -17.78       | -8.68        |
| 0.549          | N                     | 38.00          | 36.80          | 79.43        | 69.18        | 56.00          | 46.00          | 630.96       | 199.53       | -18.00       | -9.20        |
| 0.989          | N                     | 30.80          | 28.50          | 34.67        | 26.61        | 56.00          | 46.00          | 630.96       | 199.53       | -25.20       | -17.50       |

Test Engineer : Kenny Chuang  
KENNY CHUANG

**FCC TEST REPORT**

Report No. : F961105

5.4.2. Test mode : 1280x1024 100Hz/109K

- Temperature : 24°C
- Relative Humidity : 56 %
- Test Date : Jun. 16, 1999

**The Conducted Emission test was passed at minimum margin****NEUTRAL 0.550 MHz / 38.20 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) |
| 0.403          | L                     | 38.20          | 37.20          | 81.28        | 72.44        | 57.79          | 47.79          | 775.11       | 245.11       | -19.59       | -10.59       |
| 0.697          | L                     | 36.00          | 34.50          | 63.10        | 53.09        | 56.00          | 46.00          | 630.96       | 199.53       | -20.00       | -11.50       |
| 1.135          | L                     | 31.40          | 28.50          | 37.15        | 26.61        | 56.00          | 46.00          | 630.96       | 199.53       | -24.60       | -17.50       |
| 0.195          | N                     | 46.00          | 45.10          | 199.53       | 179.89       | 63.80          | 53.80          | 1549.29      | 489.93       | -17.80       | -8.70        |
| 0.550          | N                     | 38.20          | 37.00          | 81.28        | 70.79        | 56.00          | 46.00          | 630.96       | 199.53       | -17.80       | -9.00        |
| 1.137          | N                     | 29.90          | 27.20          | 31.26        | 22.91        | 56.00          | 46.00          | 630.96       | 199.53       | -26.10       | -18.80       |

Test Engineer :

  
KENNY CHUANG

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

Radiated emissions from 30 MHz to 2,000 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.

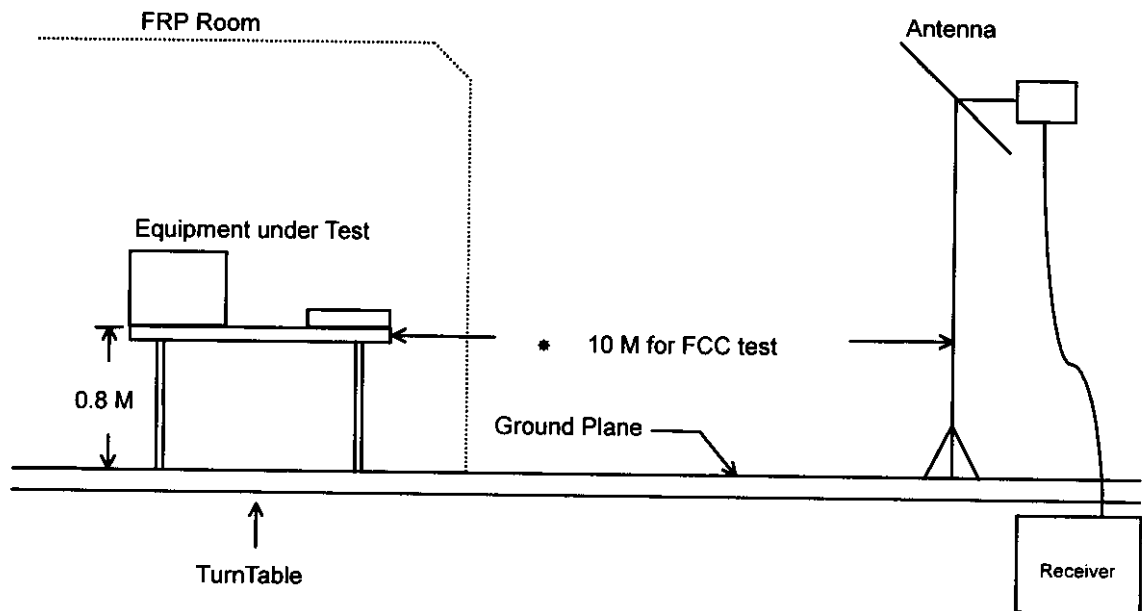
### **6.1. Major Measuring Instruments**

|                      |                                             |
|----------------------|---------------------------------------------|
| Amplifier            | (HP 87405A)                                 |
| Attenuation          | 0 dB                                        |
| RF Gain              | 20 dB                                       |
| Signal Input         | 10 MHz to 3 GHz                             |
| Spectrum Analyzer    | (HP 8594A)                                  |
| Attenuation          | 0 dB                                        |
| Start Frequency      | 30 MHz                                      |
| Stop Frequency       | 2,000 MHz                                   |
| Resolution Bandwidth | 1 MHz                                       |
| Video Bandwidth      | 1 MHz                                       |
| Signal Input         | 9 KHz to 2.9 GHz                            |
| Quasi-Peak Adapter   | (HP 8594A)                                  |
| Resolution Bandwidth | 120 KHz                                     |
| Frequency Band       | 30 MHz to 1 GHz                             |
| Quasi-Peak Detector  | ON for Quasi-Peak Mode<br>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

6.4.1. Test mode : 1600x1200 85Hz/106K

- Test Distance : 10 M
- Temperature : 31°C
- Relative Humidity : 64 %
- Test Date : Jun. 11, 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

528.000 MHz / 32.79 dBuV (VERTICAL) Antenna Height 2.5 Meter, Turntable Degree 315 °.

| 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) |                      |                 |                |
| 469.600            | H        | 17.10                       | 2.41                  | 11.95             | 37.00    | 70.79  | 31.46                | 37.41           | -5.54          |
| 118.600            | V        | 12.28                       | 1.09                  | 11.81             | 30.00    | 31.62  | 25.18                | 18.16           | -4.82          |
| 200.700            | V        | 9.05                        | 1.50                  | 14.92             | 30.00    | 31.62  | 25.47                | 18.77           | -4.53          |
| 469.420            | V        | 17.10                       | 2.41                  | 13.04             | 37.00    | 70.79  | 32.55                | 42.41           | -4.45          |
| 528.000            | V        | 18.40                       | 2.44                  | 11.95             | 37.00    | 70.79  | 32.79                | 43.60           | -4.21          |
| 587.200            | V        | 19.01                       | 2.85                  | 10.85             | 37.00    | 70.79  | 32.71                | 43.20           | -4.29          |

Test Engineer : William Lee  
WILLIAM LEE

## FCC TEST REPORT

Report No. : F961105

6.4.2. Test mode : 1280x1024 100Hz/109K

- Test Distance : 10 M
- Temperature : 31°C
- Relative Humidity : 64 %
- Test Date : Jun. 11, 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**

**190.945 MHz / 26.91 dBuV (HORIZONTAL) Antenna Height 4 Meter, Turntable Degree 294 °.**

| 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) |                      |                 |                |
| 190.945            | H        | 9.33                        | 1.50                  | 16.08             | 30.00    | 31.62  | 26.91                | 22.16           | -3.09          |
| 469.600            | H        | 17.10                       | 2.41                  | 13.85             | 37.00    | 70.79  | 33.36                | 46.56           | -3.64          |
| 72.100             | V        | 6.27                        | 0.95                  | 18.83             | 30.00    | 31.62  | 26.05                | 20.07           | -3.95          |
| 143.700            | V        | 10.77                       | 1.26                  | 14.75             | 30.00    | 31.62  | 26.78                | 21.83           | -3.22          |
| 191.900            | V        | 9.29                        | 1.49                  | 14.47             | 30.00    | 31.62  | 25.25                | 18.30           | -4.75          |
| 382.400            | V        | 16.12                       | 2.13                  | 14.02             | 37.00    | 70.79  | 32.27                | 41.07           | -4.73          |

Test Engineer : William Lee  
WILLIAM LEE

## 7. Antenna Factor &amp; Cable Loss

| Frequency ( Mhz ) | Antenna Factor ( dB ) | Cable Loss ( dB ) |
|-------------------|-----------------------|-------------------|
| 30                | 16.7                  | 0.7               |
| 35                | 15.5                  | 0.7               |
| 40                | 14.2                  | 0.9               |
| 45                | 11.3                  | 0.8               |
| 50                | 8.4                   | 0.8               |
| 55                | 6.8                   | 0.9               |
| 60                | 5.1                   | 0.9               |
| 65                | 5.6                   | 1.0               |
| 70                | 6.1                   | 0.9               |
| 75                | 6.6                   | 1.0               |
| 80                | 7.2                   | 0.9               |
| 85                | 8.2                   | 1.1               |
| 90                | 9.2                   | 1.0               |
| 95                | 10.0                  | 1.1               |
| 100               | 10.8                  | 1.1               |
| 110               | 11.7                  | 1.0               |
| 120               | 12.4                  | 1.1               |
| 130               | 11.8                  | 1.4               |
| 140               | 10.8                  | 1.2               |
| 150               | 10.8                  | 1.4               |
| 160               | 10.5                  | 1.3               |
| 170               | 10.1                  | 1.6               |
| 180               | 9.7                   | 1.5               |
| 190               | 9.4                   | 1.5               |
| 200               | 9.0                   | 1.5               |
| 220               | 10.0                  | 1.7               |
| 240               | 11.0                  | 1.6               |
| 260               | 11.8                  | 1.7               |
| 280               | 12.3                  | 1.6               |
| 300               | 12.9                  | 1.9               |
| 320               | 13.8                  | 1.9               |
| 340               | 14.8                  | 2.0               |
| 360               | 15.6                  | 2.0               |
| 380               | 16.1                  | 2.1               |
| 400               | 16.6                  | 2.2               |
| 450               | 16.7                  | 2.6               |
| 500               | 17.7                  | 2.1               |
| 550               | 19.0                  | 2.7               |
| 600               | 19.0                  | 2.9               |
| 650               | 18.7                  | 2.9               |
| 700               | 18.7                  | 3.0               |
| 750               | 19.9                  | 3.0               |
| 800               | 21.3                  | 2.9               |
| 850               | 21.4                  | 3.3               |
| 900               | 21.2                  | 3.5               |
| 950               | 22.4                  | 3.7               |
| 1000              | 23.0                  | 3.3               |
| 2000              | 31.57                 | 6.2               |

**8. List of Measuring Equipments Used**

| Instrument                           | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark     |
|--------------------------------------|--------------|-----------|------------|-----------------|------------------|------------|
| EMC Receiver<br>(site 2)             | HP           | 8591EM    | 3710A01187 | 9 KHz – 1.8 GHz | Sep. 18, 1998    | Conduction |
| LISN (EUT)<br>(site 2)               | Telemeter    | NNB-2/16Z | 98009      | 50 ohm / 50 uH  | Jan. 22, 1999    | Conduction |
| LISN (Support Unit)<br>(site 2)      | EMCO         | 3810/2NM  | 9703-1839  | 50 ohm / 50 uH  | Jul. 06, 1998    | Conduction |
| Amplifier (Site 3)                   | HP           | 87405A    | 3207A01437 | 10MHz –3.0GHz   | Jun. 26, 1998    | Radiation  |
| Spectrum Analyzer<br>(site 3)        | HP           | 8594A     | 3051A00172 | 9KHz –2.9GHz    | Apr. 16, 1999    | Radiation  |
| Bilog Antenna<br>(Site 3)            | CHASE        | CBL6112A  | 2320       | 30MHz -2GHz     | Sep. 10, 1998    | Radiation  |
| Half-wave dipole<br>antenna (Site 3) | EMCO         | 3121C     | 9705-1285  | 28M - 1GHz      | May 19, 1999     | Radiation  |
| Turn Table (site 3)                  | EMCO         | 2080      | 9711-2022  | 0 ~ 360 degree  | N/A              | Radiation  |
| Antenna Mast<br>(site 3)             | EMCO         | 2075      | 9710-2101  | 1 m - 4 m       | N/A              | Radiation  |