

# **FCC TEST REPORT**

for

**CISPR PUB. 22 Class B**

Equipment : Color Monitor

Model No. : E74

Machine Type : 6332-92N

FCC ID : H4IE74

Filing Type : Original Grant

Applicant : **Lite-On Technology Corp.**  
5F, 16, Sec. 4, Nanking E. Rd., Taipei,  
Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
- 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 : Color Monitor  
Model No. : E74  
Machine Type : 6332-92N  
FCC ID : H4IE74  
Applicant : **Lite-On Technology Corp.**  
5F, 16, Sec. 4, Nanking E. 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 Jun. 10, 1999 at **SPORTON International Inc.** LAB. in Lin Kou.

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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

Lite-On Technology Corp.  
 5F, 16, Sec. 4, Nanking E. Rd., Taipei,  
 Taiwan, R.O.C.

## 1.2. Manufacturer

Same as 1.1.

## 1.3. Basic Description of Equipment under Test

Equipment : Color Monitor  
 Model No. : E74  
 Machine Type : 6332-92N  
 FCC ID : H4IE74  
 Trade Name : IBM  
 VGA Cable : Double-Shielded, 1.8 m  
 Power Supply Type : Switching  
 Power Cord : Non-Shielded

## 1.4. Feature of Equipment under Test

- Image: Maximum Height:9.5 inch (242 mm)  
 Maximum Width:12.7 inch (323 mm)  
 Dot Pitch:0.27 mm
- Power Input: Supply Voltage:100-240 Vac  
 50/60 Hz  
 Max Supply Current: 1.8A at 100 Vac
- Video input: Input Signal: Analogue Direct Drive, 75 ohm 0-0.7v  
 H. Addressability:1280 pels (max.)  
 V. Addressability:1024 lines (max.)  
 Clock Rate:110 Mpels/sec
- Synchronization Range: Horiz. Frequency: 30kHz – 69kHz  
 Vert. Frequency: 50Hz – 120Hz
- Power Consumption (Typical): Normal Operation: <110W

## **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 HP Printer, ACEEX Modem, IBM PS/2 Keyboard, IBM PS/2 Mouse and EUT were connected to the IBM PC for EMI test.
- c. The Following display resolution were investigated during the compliance test:
  - 1. Horizontal frequency (640x480 to 1280x1024, 31.5 KHz to 69 KHz)
  - 2. Vertical frequency (60 Hz to 85 Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
  - 1. 1280x1024, 64KHz, 60 Hz.
  - 2. 1024x768, 69KHz, 85 Hz.
- e. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 2,000 MHz.

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

#### Support Unit 1. -- 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 2. -- Modem (ACEEX)

FCC ID	: IFAXDM1414
Model No.	: DM1414
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0016
Data Cable	: Shielded, 360 degree via metal backshells, 1.15m

#### Support Unit 3. -- PS/2 Keyboard (IBM)

FCC ID	: N/A
Model No.	: KB-7953
Serial No.	: SP0023
Data Cable	: Shielded, 360 degree via metal backshells, 1.9m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

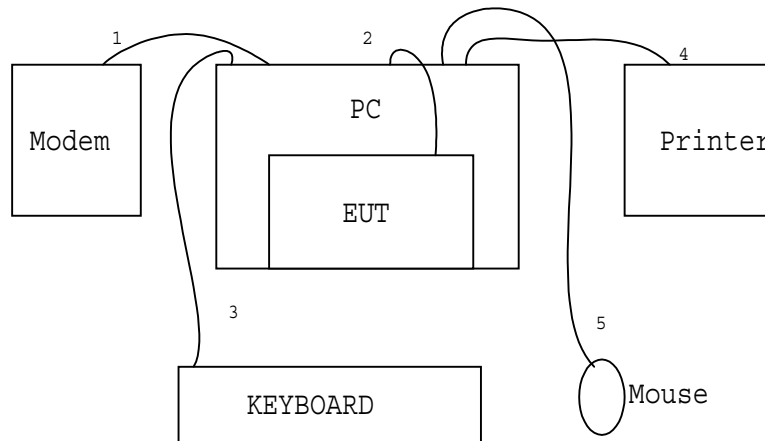
## Support Unit 4. -- PS/2 Mouse (IBM)

FCC ID : DZL211120  
Model No. : 12J3618  
Serial No. : SP0028  
Data Cable : Shielded, 360 degree via metal backshells, 1.8m

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

FCC ID : N/A  
Model No. : 310  
Serial No. : SP0148  
Data Cable : Shielded, 360 degree via metal backshells, 1.7m  
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 2.
2. The I/O cable is connected to EUT.
3. The I/O cable is connected to the support unit 3.
4. The I/O cable is connected to the support unit 1.
5. The I/O cable is connected to the support unit 4.

### **3. Test Software**

An executive program, TESTPATS, 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. 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.

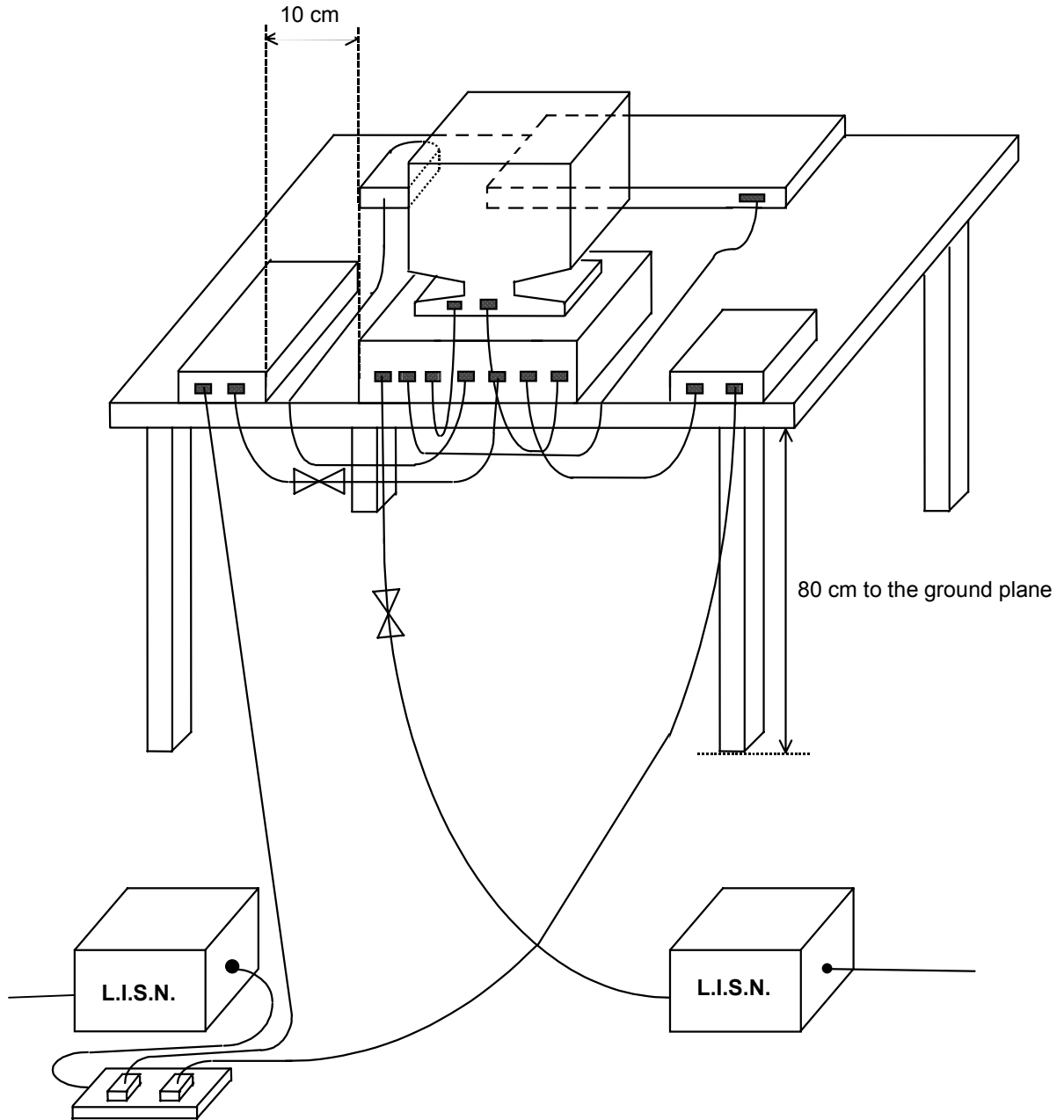
### 5.1. Major Measuring Instruments

- 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 : 1280\*1024 60Hz/64K(Desktop PC)

- Temperature : 28°C
- Relative Humidity : 53 %
- Test Date : Jun. 10, 1999

**The Conducted Emission test was passed at minimum margin**

**LINE 1.411 MHz / 43.10 dBuV.**

Freq. (MHz)	Line or Neutral	Meter Reading				Limits				Margin	
		Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dB)	A.V. (dB)
0.963	L	42.00	34.30	125.89	51.88	56.00	46.00	630.96	199.53	-14.00	-11.70
1.411	L	43.10	35.90	142.89	62.37	56.00	46.00	630.96	199.53	-12.90	-10.10
3.337	L	38.30	34.60	82.22	53.70	56.00	46.00	630.96	199.53	-17.70	-11.40
0.770	N	40.20	33.00	102.33	44.67	56.00	46.00	630.96	199.53	-15.80	-13.00
1.091	N	42.10	34.90	127.35	55.59	56.00	46.00	630.96	199.53	-13.90	-11.10
3.657	N	40.30	36.00	103.51	63.10	56.00	46.00	630.96	199.53	-15.70	-10.00

Test Engineer : \_\_\_\_\_  
 KENNY CHUANG

5.4.2. Test mode : 1024\*768 85Hz/69K(Desktop PC)

- Temperature : 28°C
- Relative Humidity : 53 %
- Test Date : Jun. 10, 1999

**The Conducted Emission test was passed at minimum margin**

**LINE 1.371 MHz / 43.20 dBuV.**

Freq. (MHz)	Line or Neutral	Meter Reading				Limits				Margin	
		Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dB)	A.V. (dB)
0.686	L	42.10	37.90	127.35	78.52	56.00	46.00	630.96	199.53	-13.90	-8.10
1.371	L	43.20	34.30	144.54	51.88	56.00	46.00	630.96	199.53	-12.80	-11.70
3.630	L	41.70	37.00	121.62	70.79	56.00	46.00	630.96	199.53	-14.30	-9.00
0.479	N	43.20	40.50	144.54	105.93	56.35	46.35	656.89	207.73	-13.15	-5.85
1.166	N	42.70	35.60	136.46	60.26	56.00	46.00	630.96	199.53	-13.30	-10.40
3.562	N	42.00	37.20	125.89	72.44	56.00	46.00	630.96	199.53	-14.00	-8.80

Test Engineer : \_\_\_\_\_  
KENNY CHUANG

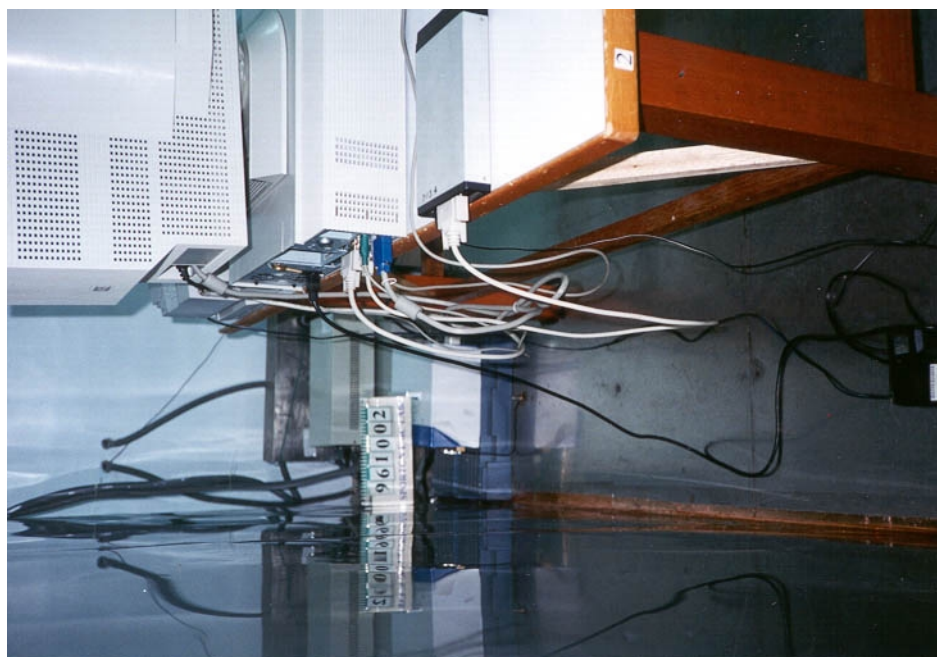
**5.5. Photographs of Conducted Powerline Test Configuration**

- 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 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.

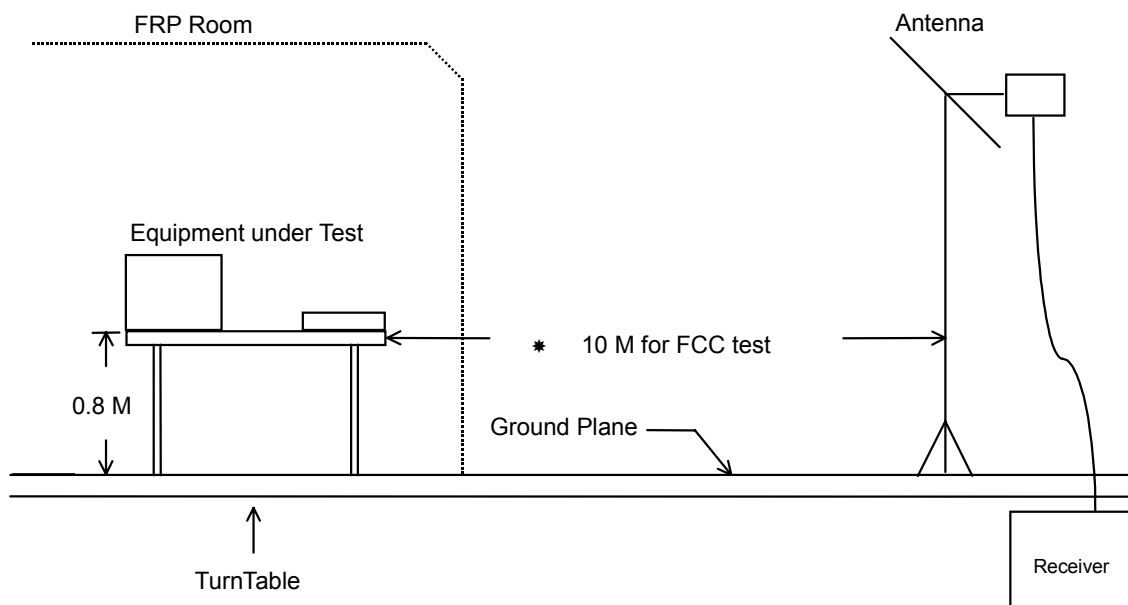
### 6.1. Major Measuring Instruments

- 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 2000 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  
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 : 1280\*1024 60Hz/64K(Desktop PC)

- Test Distance : 10 M
- Temperature : 29°C
- Relative Humidity : 67 %
- Test Date : Jun. 10, 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**

**169.400 MHz / 23.07 dBuV (VERTICAL) Antenna Height 1 Meter, Turntable Degree 243 °.**

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits		Emission (dBuV/m)	Level (uV/m)	Margin (dB)
					(dBuV/m)	(uV/m)			
30.500	V	17.56	0.62	4.25	30.00	31.62	22.43	13.23	-7.57
143.200	V	11.23	1.30	10.07	30.00	31.62	22.60	13.49	-7.40
169.400	V	9.89	1.40	11.78	30.00	31.62	23.07	14.24	-6.93
216.000	V	10.18	1.64	11.16	30.00	31.62	22.98	14.09	-7.02
208.000	H	9.52	1.53	11.32	30.00	31.62	22.37	13.14	-7.63
232.000	H	11.50	1.58	16.15	37.00	70.79	29.23	28.94	-7.77

Test Engineer : \_\_\_\_\_  
Terry Chang

6.4.2. Test mode : 1024\*768 85Hz/69K(Desktop PC)

- Test Distance : 10 M
- Temperature : 29°C
- Relative Humidity : 67 %
- Test Date : Jun. 10, 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**

**125.589 MHz / 23.65 dBuV (VERTICAL) Antenna Height 1 Meter, Turntable Degree 148 °.**

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits		Emission (dBuV/m)	Level (uV/m)	Margin (dB)
					(dBuV/m)	(uV/m)			
31.442	V	17.56	0.62	4.93	30.00	31.62	23.11	14.31	-6.89
32.907	V	16.82	0.66	5.30	30.00	31.62	22.78	13.77	-7.22
52.230	V	7.43	0.74	13.90	30.00	31.62	22.07	12.69	-7.93
62.832	V	5.53	0.94	16.73	30.00	31.62	23.20	14.45	-6.80
125.589	V	12.18	1.26	10.21	30.00	31.62	23.65	15.22	-6.35
188.517	V	9.06	1.58	12.45	30.00	31.62	23.09	14.27	-6.91

Test Engineer : \_\_\_\_\_  
 Terry Chang

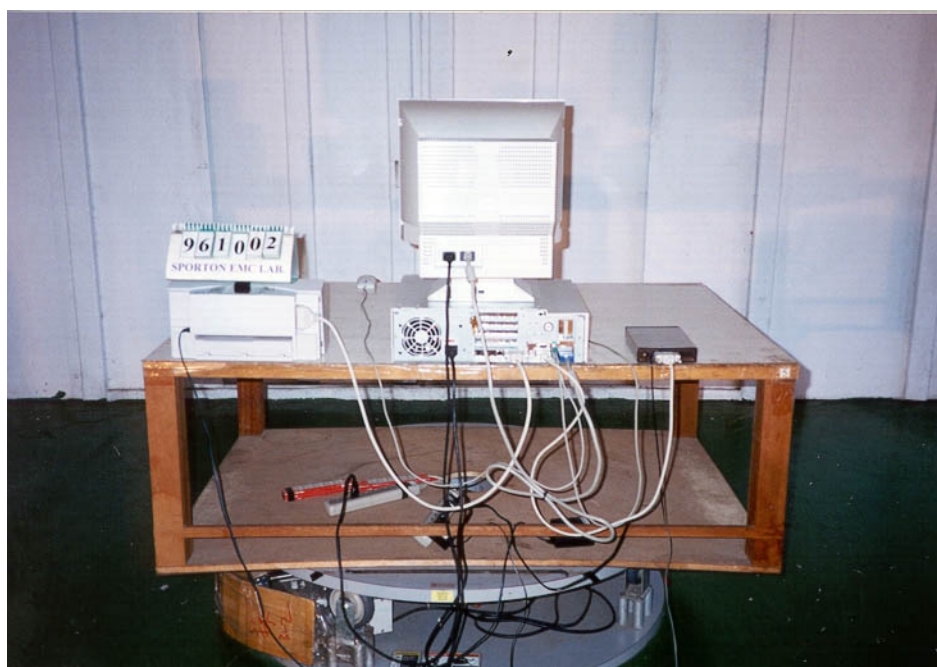
**6.5. Photographs of Radiated Emission Test Configuration**

- 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	17.9	0.6
35	16.1	0.7
40	14.0	0.7
45	10.5	0.8
50	7.9	0.7
55	6.7	0.8
60	5.5	1.0
65	5.5	0.9
70	5.6	0.9
75	6.5	1.0
80	7.5	0.9
85	8.5	1.0
90	9.4	1.0
95	10.4	1.1
100	11.5	1.1
110	12.1	1.2
120	12.6	1.2
130	12.0	1.3
140	11.6	1.3
150	10.5	1.3
160	10.5	1.4
170	9.8	1.4
180	9.2	1.5
190	9.0	1.6
200	8.8	1.4
220	10.5	1.7
240	12.2	1.5
260	13.1	1.8
280	13.2	1.8
300	13.4	1.9
320	13.4	1.9
340	13.4	2.0
360	13.9	2.2
380	14.9	2.1
400	15.6	2.1
450	16.4	2.3
500	16.6	2.5
550	19.7	2.4
600	19.3	2.8
650	20.0	2.9
700	19.5	2.9
750	18.5	2.7
800	17.8	3.5
850	18.3	3.3
900	20.5	3.2
950	21.4	4.5
1000	21.2	3.5
2000	31.57	6.4

LKOP5

**8. List of Measuring Equipments Used**

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver (site 2)	HP	8591EM	3710A01187	9 KHz - 18 GHz	Sep. 18, 1998	Conduction
LISN (EUT) (site 2)	Telemeter	NNB-2/16Z	98009	50 ohm / 50 uH	Jan. 22, 1999	Conduction
LISN (Support Unit) (site 2)	EMCO	3810/2NM	9703-1839	50 ohm / 50 uH	Jul. 06, 1998	Conduction
Amplifier (Site 5)	HP	87405A	3207A01437	10MHz -3.0GHz	June 26, 1998	Radiation
Spectrum Analyzer (Site 5)	HP	8594A	3051A00172	9KHz -2.9GHz	Apr. 17, 1998	Radiation
Bilog Antenna (Site 5)	CHASE	CBL6112A	2287	30MHz -2GHz	Jan. 07, 1999	Radiation
Half-wave dipole antenna (Site 5)	EMCO	3121C	9705-1285	28 M - 1GHz	May 18, 1999	Radiation
Turn Table (site 5)	EMCO	2080	9711-2021	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 5)	EMCO	2075	9711-2115	1 m- 4 m	N/A	Radiation

- The column of Remark indicates that the instruments used for conduction (“C”) or radiation (“R”) test.