

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : VGA Card

MODEL NO. : VL01

F C C I D : I27MM-VL01A

FILING TYPE : Original Grant

APPLICANT : **BIOSTAR GROUP**
2F, No. 108-2, Min Chuan Rd.,
Hsin Tien City, Taipei Hsien, 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.

SPORTON INTERNATIONAL INC.

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

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CERTIFICATE OF COMPLIANCE

for

FCC PART 15, SUBPART B CLASS B

EQUIPMENT : VGA Card

MODEL NO. : VL01

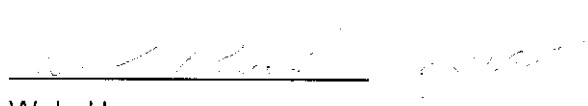
F C C I D : I27MM-VL01A

APPLICANT : **BIOSTAR GROUP**

2F, No. 108-2, Min Chuan Rd.,
Hsin Tien City, Taipei Hsien, Taiwan, R.O.C.

I HEREBY CERTIFY THAT :

The measurement shown in this report were made in accordance with the procedures given in **ANSI C63.4 -1992** and the energy emitted by this equipment was ***passed*** both radiated and conducted emissions **Class B** limits. Testing was carried out on **Sep. 01, 1998** at **SPORTON International Inc. LAB.**


W. L. Huang

General Manager

SPORTON INTERNATIONAL INC.

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

1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST

1.1. APPLICANT

BIOSTAR GROUP

2F. No. 108-2, Min Chuan 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

FCC ID: I27MM-VL01A

MODEL NO. : VL01

TRADE NAME : VEGA 6326 AGP

DATA CABLE : Shielded

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- AGP 100Mhz 3D/2D 64-bit VGA card with DVD/MPEG-2 and TV out designed on SiS 6326 chip set.
- Windows 95 DirectDraw and Direct3D acceleration
- Extended display resolution up to 1600x1200 64k colors
- On board 4MB 32-bit high speed EDORAM
- Maximum 135Mhz palette-DAC

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, HONEYWELL keyboard, GENIUS mouse, HP printer, ACEEX modem and EUT were connected to the F.I.C. P.C. for EMI test.
- c. The following display resolution were investigated during the compliance test :
 1. Horizontal frequency (640×480 to 1600×1200, 31.5KHz to 94KHz)
 2. Vertical frequency (60Hz to 85Hz)
- d. According to the above tests, we listed the flowing display modes as the worst cases :
 1. 1280×1024 (91KHz), refresh rate 85Hz.
 2. 1600×1200 (94KHz), refresh rate 75Hz.
- e. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 2000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- P.C. (F.I.C.)

FCC ID : N/A
odel No. : P2L97
Serial No. : SP1005
Data Cable : Shielded
Power Cord : Non-hielded
Power Supply Type : Switching

(Remark : This support device was tested to comply with FCC standards and
authorized under a declaration of conformity.)

Support Device 2. --- MONITOR (HITACHI)

FCC ID : M9U9705C97BMD
Model No. : CM-803ET
Serial No. : SP1012
Data Cable : Shielded, 360 degree via metal backshells, 1.7m
Power Supply Type : Switching
Power Cord : Non-shielded

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Support Device 3. --- KEYBOARD (HONEYWELL)

FCC ID : GJK101RX-6
Model No. : PC7XL-AA
Serial No. : SP1038
Data Cable : Shielded, 132 cm Length, Metallic connector, 3.0m

Support Device 4. -- PS/2 MOUSE (GENIUS)

FCC ID : FSUGMZFC
Model No. : NETMOUSE
Serial No. : SP1034
Data Cable : Non-shielded, 1.75m

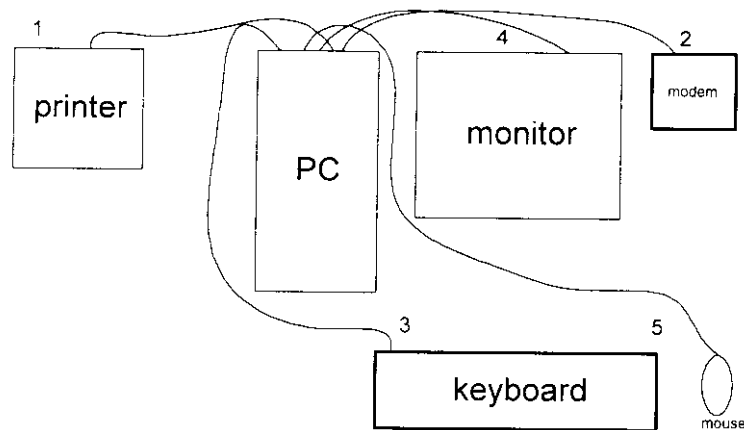
Support Device 5. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1015
Data Cable : Shielded, 360 degree via metal backshells, 135m
Power Supply Type : Linear

Support Device 6. -- MODEM (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded
Serial No. : SP1019
Data Cable : Shielded, 1.75m

2.3. CONNECTION DIAGRAM OF TEST SYSTEM



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

3. TEST SOFTWARE

An executive program, WINFCC.EXE under WIN 98, which generate 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. 3, Lane 238, Kang Lo Street, Nei Hwu District,
Taipei 11424, Taiwan, R.O.C.

TEL : 886-2-2631-4739

FAX : 886-2-2631-9740

4.2. STANDARD FOR METHODS OF MEASUREMENT

ANSI C63.4-1992

4.3 .TEST IN COMPLIANCE WITH

FCC PART 15, SUBPART B CLASS B

4.4. FREQUENCY RANGE INVESTIGATED

- a. Conduction : from 450 KHz to 30 MHz
- b. Radiation : from 30 MHz to 2000 MHz.

4.5. TEST DISTANCE

The test distance of radiated emission from antenna to EUT is 3M.

5. TEST OF CONDUCTED POWERLINE

Conducted Emissions were measured from 450 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 Figure 5-3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

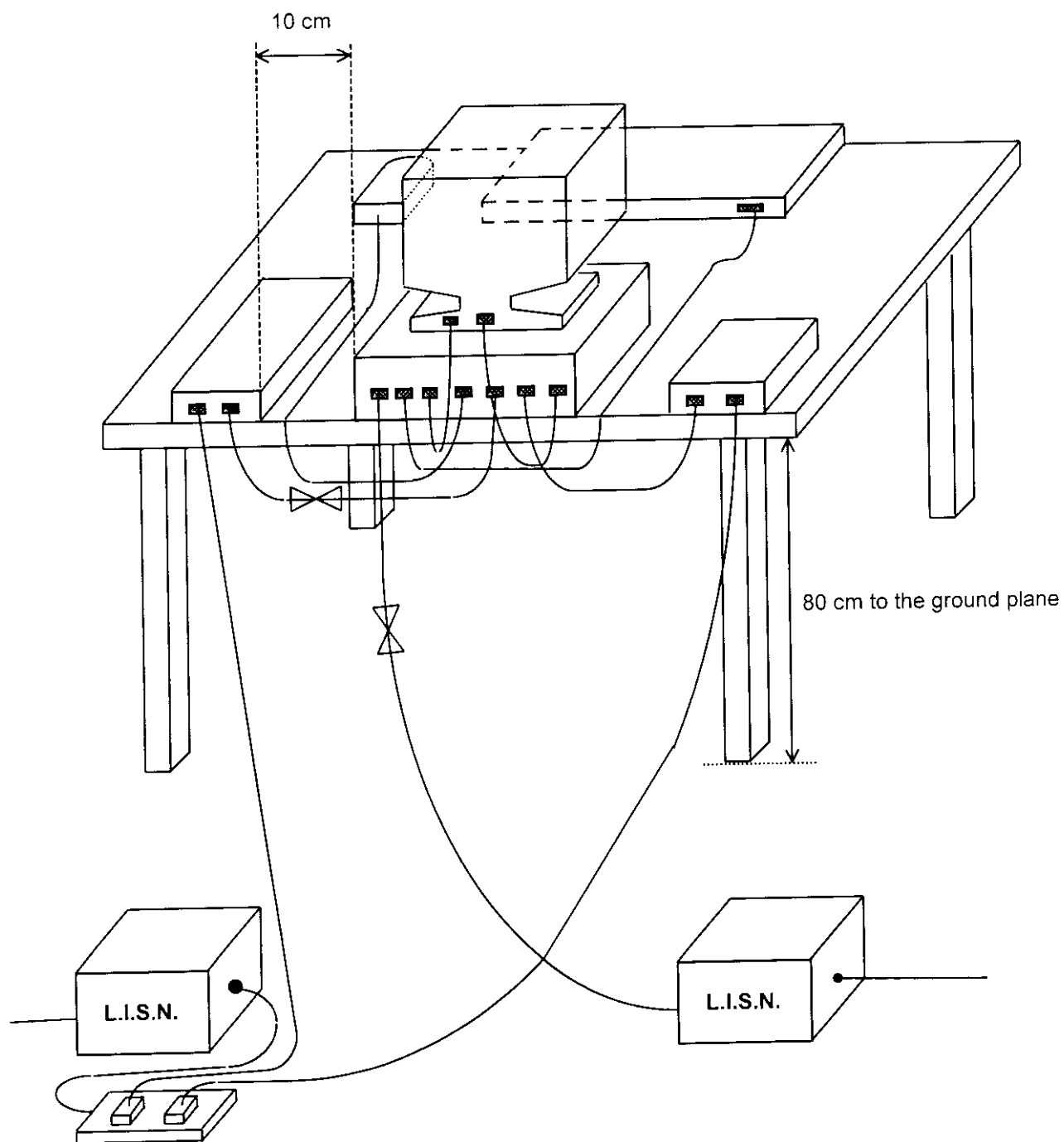
5.1. MAJOR MEASURING INSTRUMENTS

- Test Receiver (R&S ESH3)
 - Attenuation 0 dB
 - Start Frequency 0.45 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 and 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 450 KHz to 30 MHz was searched.
- h. Set the test-receiver system (R&S ESH3) 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 on 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 0.45 MHz to 30 MHz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Temperature : 26°C
- Relative Humidity : 54 % RH
- Test Mode : 1280x1024 91K / 85Hz
- Test Date : Sep 01, 1998

The Conducted Emission test was passed at Neutral 0.45 MHz/ 34.30 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.46	L	34.20	51.29	48.00	251.19	-13.80
1.10	L	30.20	32.36	48.00	251.19	-17.80
14.55	L	28.50	26.61	48.00	251.19	-19.50
0.45	N	34.30	51.88	48.00	251.19	-13.70
1.10	N	30.40	33.11	48.00	251.19	-17.60
14.54	N	29.10	28.51	48.00	251.19	-18.90

Test Engineer : Benson Tsai

BENSON TSAI

5.4.1. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Temperature : 26°C
- Relative Humidity : 54 % RH
- Test Mode : 1600×1200 94K / 75Hz
- Test Date : Sep 01, 1998

The Conducted Emission test was passed at **Neutral 0.45 MHz/ 34.60 dBuV**.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.45	L	34.50	53.09	48.00	251.19	-13.50
1.10	L	30.80	34.67	48.00	251.19	-17.20
14.54	L	28.60	26.92	48.00	251.19	-19.40
0.45	N	34.60	53.70	48.00	251.19	-13.40
1.10	N	29.90	31.26	48.00	251.19	-18.10
14.54	N	29.40	29.51	48.00	251.19	-18.60

Test Engineer : Benson Tsai
BENSON TSAI

5.5. PHOTOGRAPHS OF CONDUCTED POWERLINE TEST CONFIGURATION

FRONT VIEW



REAR VIEW





SIDE VIEW

6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 2000 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 Figure 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

Attenuation

RF Gain

Signal Input

(HP 87405A)

0 dB

20 dB

10 MHz to 3 GHz
- Spectrum Analyzer

Start Frequency

Stop Frequency

Resolution Bandwidth

Video Bandwidth

Signal Input

(HP 8594A)

0 dB

30 MHz

2000 MHZ

1 MHz

1 MHz

9 KHz to 2.9 GHz
- Spectrum Analyzer

Resolution Bandwidth

Frequency Band

Quasi-Peak Detector

(HP 8594A)

120 KHz

30 MHz to 1 GHz

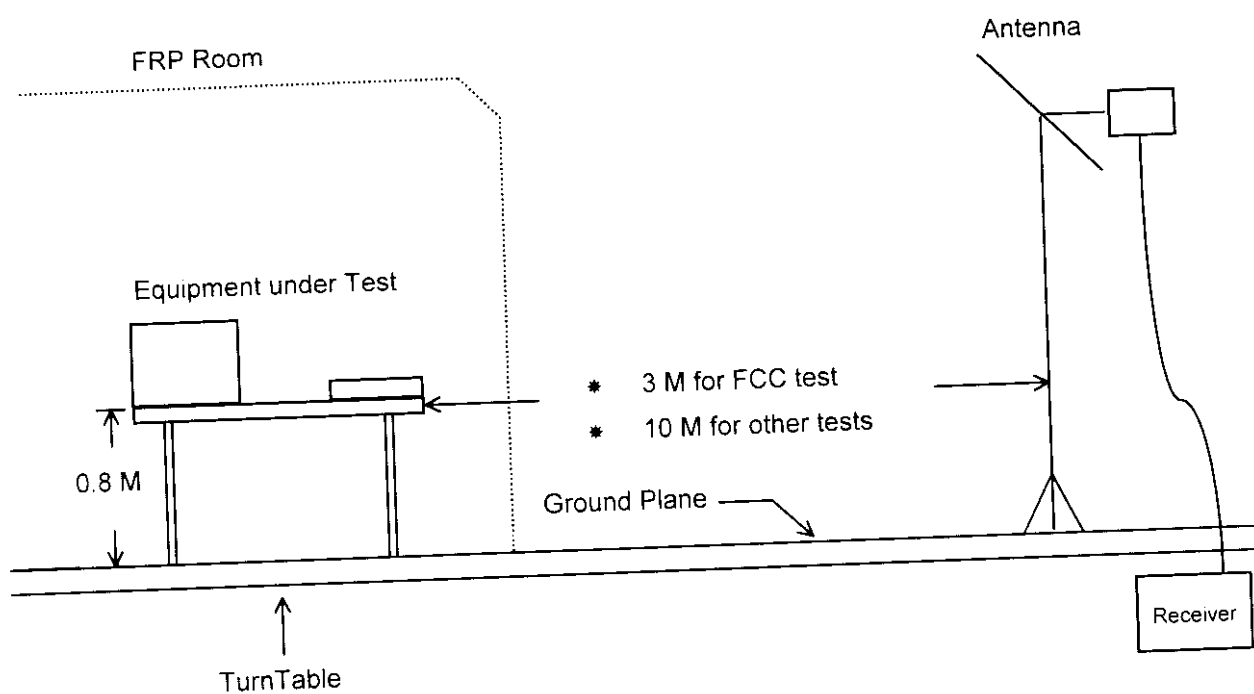
ON for Quasi-Peak Mode

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 3 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 (HP 8594A) 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

- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 33°C
- Relative Humidity : 57 % RH
- Test Mode : 1280x1024 91K / 85Hz
- Test Date : Sep 01, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 66.85 MHz
Corrected Reading = 5.12 + 1.39 + 24.40 = 30.91 (dBuV/m)

The Radiated Emission test was passed at

Horizontal 601.39 MHz / 42.24 dBuV

Antenna Height 2.0 Meter , Turntable Degree 180°.

Antenna Height 2.0 Meter , Turntable 20°									
Frequency	Antenna	Cable	Reading	Limits		Emission	Level	Margin	
	Polarity	Factor	Loss						
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
66.85	H	5.12	1.39	24.40	40.00	100	30.91	35.12	-9.09
466.01	H	21.46	3.83	12.72	46.00	200	38.00	79.43	-8.00
601.39	H	24.04	4.51	13.69	46.00	200	42.24	129.42	-3.76
66.85	V	5.12	1.39	23.00	40.00	100	29.51	29.89	-10.49
120.13	V	10.42	1.90	19.26	43.50	150	31.58	37.93	-11.92
600.11	V	24.01	4.50	11.54	46.00	200	40.05	100.58	-5.95

Test Engineer : Benson Tsai

BENSON TSAI

6.4.1. TEST RESULT OF RADIATED EMISSION

- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 33 °C
- Relative Humidity : 57 % RH
- Test Mode : 1600×1200 94K 75Hz
- Test Date : Sep 01, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 66.85 MHz
Corrected Reading = 5.12 + 1.39 + 24.20 = 30.71 (dBuV/m)

The Radiated Emission test was passed at

Vertical 600.11MHz / 41.85 dBuV

Antenna Height 1.0 Meter , Turntable Degree 180 °.

Frequency	Antenna	Cable	Reading		Limits	Emission	Level	Margin	
Polarity	Factor	Loss							
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	
66.85	H	5.12	1.39	24.20	40.00	100	30.71	34.32	-9.29
466.01	H	21.46	3.83	12.42	46.00	200	37.70	76.74	-8.30
600.11	H	24.01	4.50	13.14	46.00	200	41.65	120.92	-4.35
133.11	V	11.02	1.90	18.97	43.50	150	31.89	39.31	-11.61
226.71	V	15.68	2.53	12.39	46.00	200	30.60	33.88	-15.40
600.11	V	24.01	4.50	13.34	46.00	200	41.85	123.74	-4.15

Test Engineer : Benson Tsai

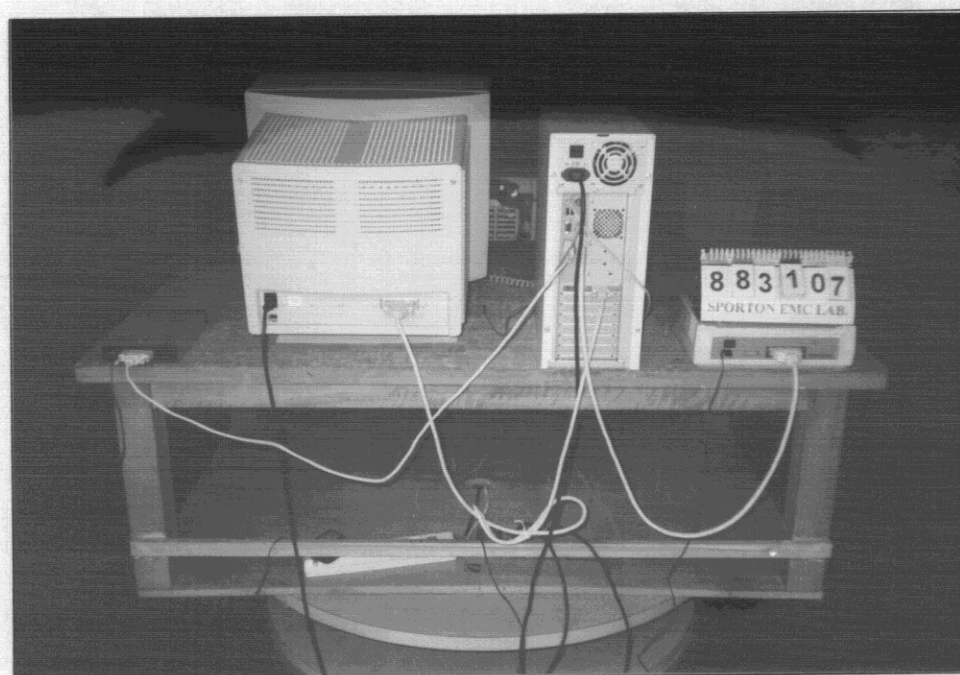
BENSON TSAI

6.5. PHOTOGRAPHS OF RADIATED EMISSION TEST CONFIGURATION

FRONT VIEW



REAR VIEW



7. ANTENNA FACTOR AND CABLE LOSS

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	-1.91	0.90
35	-0.50	0.92
40	0.61	1.04
45	1.40	1.28
50	2.39	1.10
55	3.54	1.11
60	4.40	1.30
65	4.84	1.40
70	5.59	1.37
75	6.21	1.24
80	7.60	1.51
85	7.73	1.60
90	8.22	1.60
95	8.90	1.70
100	9.36	1.70
110	10.01	1.90
120	10.41	1.90
130	10.84	1.91
140	11.42	2.01
150	11.91	2.11
160	12.25	2.21
170	12.72	2.30
180	13.02	2.30
190	13.50	2.40
200	14.05	2.50
220	15.11	2.60
240	16.81	2.71
260	17.51	2.90
280	17.70	2.91
300	17.89	3.10
320	18.00	3.20
340	18.33	3.30
360	19.44	3.40
380	20.31	3.50
400	21.19	3.70
450	21.10	4.10
500	22.21	4.30
550	23.42	4.50
600	24.01	4.70
650	25.11	4.90
700	26.00	5.11
750	26.41	5.50
800	27.10	5.60
850	27.51	5.80
900	27.90	5.90
950	28.01	

8 LIST OF MEASURING EQUIPMENT USED

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Test Receiver	R&S	ESH3	893495/013	9 KHz - 30MHz	Apr. 13, 1998	Conduction
Test Receiver	R&S	ESVP	893610/003	20MHz - 1.3 GHz	Apr. 13, 1998	Conduction
LISN	EMCO	3825/2	9510-2484	50 ohm / 50 μ H	Nov. 29, 1997	Conduction
LISN	KYORITSU	KNW-407	8-1010-15	50 ohm / 50 μ H	Nov. 10, 1997	Conduction
EMI Filter	CORCOM	MRI-2030	N/A	480VAC / 30A	N/A	Conduction
Spectrum Monitor	R & S	EZM	894987/011	N/A	Apr. 13, 1998	Conduction
Amplifier (Site 1)	HP	87405A	3207A01437	10MHz - 3.0GHz	Jun. 26, 1998	Radiation
Spectrum Analyzer (site 1)	HP	8594A	3051A00172	9KHz - 2.9GHz	Apr. 17, 1998	Radiation
Bilog Antenna (1)	CHASE	CBL6112A	2302	30MHz - 2GHz	Jan. 27, 1998	Radiation
Half-wave dipole antenna (1)	EMCO	3121C	8912-496	20MHz - 1GHz	Aug. 12, 1998	Radiation
Turn Table	EMCO	1060-1.211	9507-1805	0 - 360 degree	N/A	Radiation
Antenna Mast	EMCO	1051-1.2	9502-1868	1 m - 4 m	N/A	Radiation

※ The column of Remark indicates that the instruments used for conduction ("C") or radiation ("R") test.