

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : CARDEXpert ST2X

MODEL NO. : 9817-20

F C C I D : ICUVGA-GW817G

FILING TYPE : Original Grant

APPLICANT : **GAINWARD CO., LTD.**
12F,#96,Hsin Tai Wu Rd. Sec.1,His-chih,
Taipei Hsien, Taiwan

- 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 : CARDEXpert ST2X

MODEL NO. : 9817-20

F C C I D : ICUVGA-GW817G

APPLICANT : **GAINWARD CO., LTD.**
12F,#96,Hsin Tai Wu Rd. Sec.1,His-chih,
Taipei Hsien, Taiwan

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 **MAR. 02, 1999** at **SPORTON International Inc.**

Lenore Chang
President

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

GAINWARD CO., LTD.

12F,#96,Hsin Tai Wu Rd. Sec.1,His-chih,
Taipei Hsien, Taiwan

1.2. MANUFACTURER :

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : CARDEXpert ST2X

MODEL NO. : 9817-20

FCC ID : ICUVGA-GW817G

TRADE NAME : CARDEXpert

DATA CABLE : Shielded

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- Enhanced 64-bit graphics engine
- Integrated 230MHz RAMDAC.
- 133MHz Baseline AGP bus (Trio3D-2X AGP).
- Resolution support of up to 1600x1200x64k.
- BIOS support for VESA Display Power Management Signaling (DPMS) monitor
Power savings modes, DDC monitor communications support

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 keyboard, GENIUS mouse, HP printer, ACEEX modem were connected to the FIC P.C. for EMI test.
- c. The following display resolution were investigated during the compliance test:
 1. Horizontal frequency (640 x 480 to 1600 x 1200, 31.5KHz to 106KHz)
 2. Vertical frequency (60Hz to 85Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
 1. 1600 x 1200, 106KHz, 85Hz
 2. 1280 x 1024, 91KHz, 85Hz
- 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. --- MONITOR (HITACHI)

FCC ID : M9U9705C97BMD
Model No. : CM803ET
Serial No. : SP1019
Data Cable : Shielded, 360 degree via metal backshells, 1.7m
Power Supply Type : Switching
Power Cord : Non-shielded

Support Device 2. --- KEYBOARD (DELL)

FCC ID : GYUM92SK
Model No. : AT101 (DE8M)
Serial No. : SP1009
Data Cable : Shielded, 360 degree via metal backshells, 1.9m

Support Device 3. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP0037
Data Cable : Shielded, 360 degree via metal backshells, 1.35m
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded

Support Device 4. -- MODEM (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded
Serial No. : SP1019
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

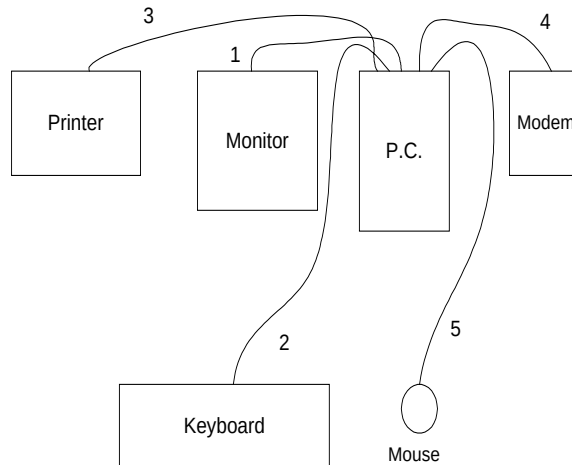
Support Device 5. – PS/2 MOUSE (GENIUS)

FCC ID : FSUGMZFC
Model No. : NETMOUSE
Serial No. : SP1017
Data Cable : Non-shielded, 1.75m

Support Device 6. --- P.C. (FIC)

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

(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 was connected from EUT to the support device 1.
2. The I/O cable was connected from the PC to the support device 2.
3. The I/O cable was connected from the PC to the support device 3.
4. The I/O cable was connected from the PC to the support device 4.
5. The I/O cable was connected from the PC to the support device 5.

3. TEST SOFTWARE

An executive program, WINFCC.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. 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.

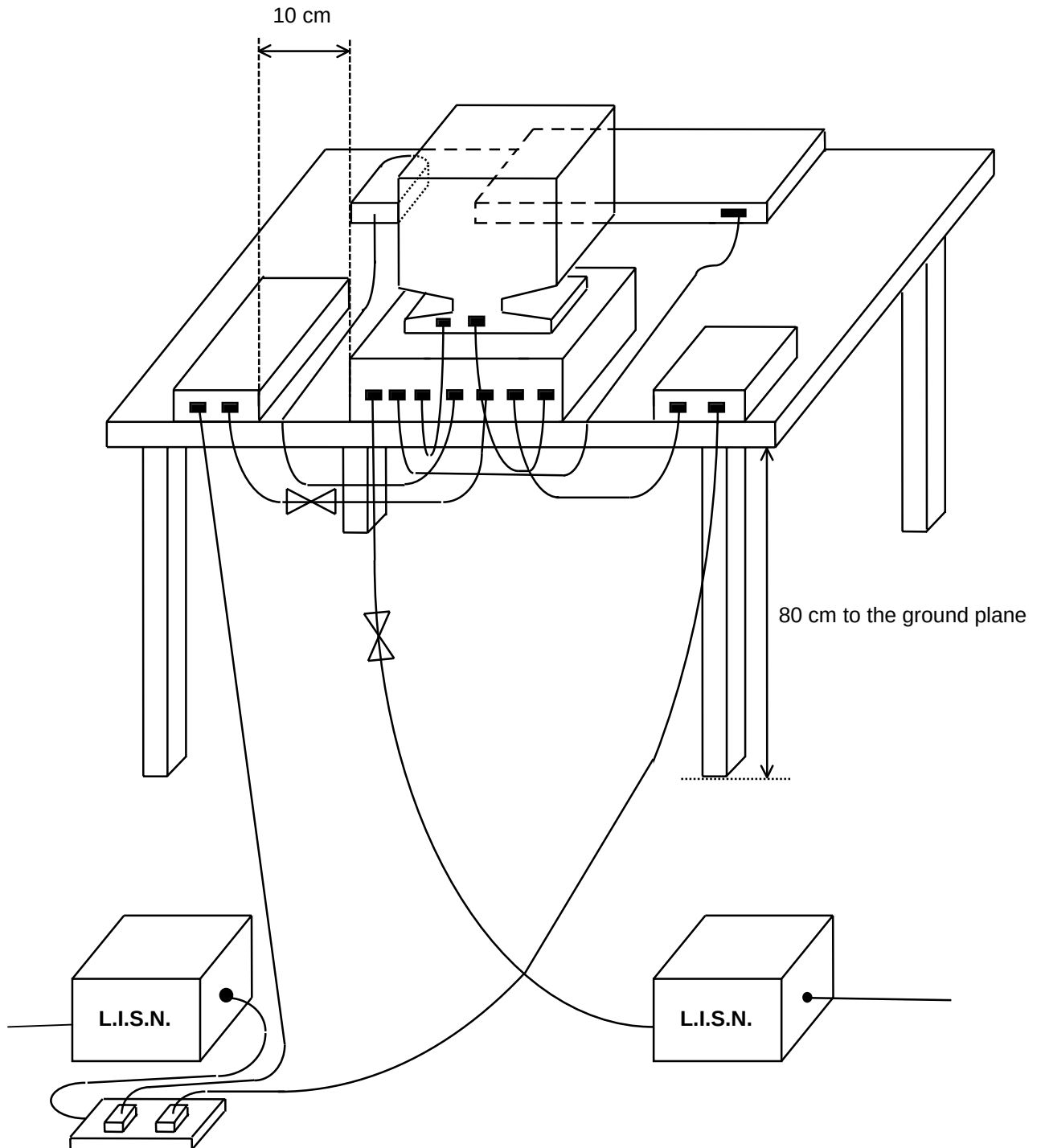
5.1. MAJOR MEASURING INSTRUMENTS

- Test Receiver (8591EM)
 - 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 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 : 28
- Relative Humidity : 51% RH
- Test Mode : **1600x1200 106K/85Hz**
- Test Date : Mar. 02, 1999

The Conducted Emission test was passed at Line 7.32 MHz / 32.80 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
7.30	L	31.60	38.02	48.00	251.19	-16.40
11.89	L	32.50	42.17	48.00	251.19	-15.50
15.71	L	30.80	34.67	48.00	251.19	-17.20
7.32	N	32.80	43.65	48.00	251.19	-15.20
11.85	N	31.70	38.46	48.00	251.19	-16.30
15.83	N	31.40	37.15	48.00	251.19	-16.60

Test Engineer :

Roxy Chou

- 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 : 28
- Relative Humidity : 51% RH
- Test Mode : **1280x1024 91K/85Hz**
- Test Date : Mar. 02, 1999

The Conducted Emission test was passed at Line 11.94 MHz / 34.10 dBuV.

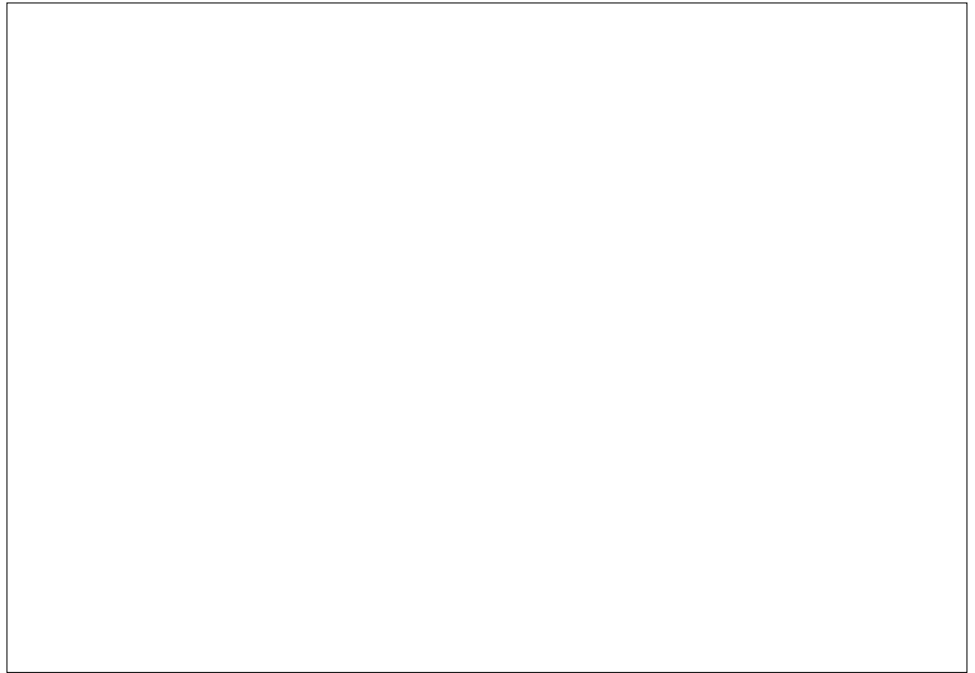
Frequency Line / Neutral		Meter Reading		Limits		Margin
(MHz)		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
7.32	L	30.23	32.47	48.00	251.19	-17.77
11.94	L	34.10	50.70	48.00	251.19	-13.90
15.74	L	31.00	35.48	48.00	251.19	-17.00
7.31	N	31.20	36.31	48.00	251.19	-16.80
11.90	N	33.60	47.86	48.00	251.19	-14.40
15.72	N	30.50	33.50	48.00	251.19	-17.50

Test Engineer :

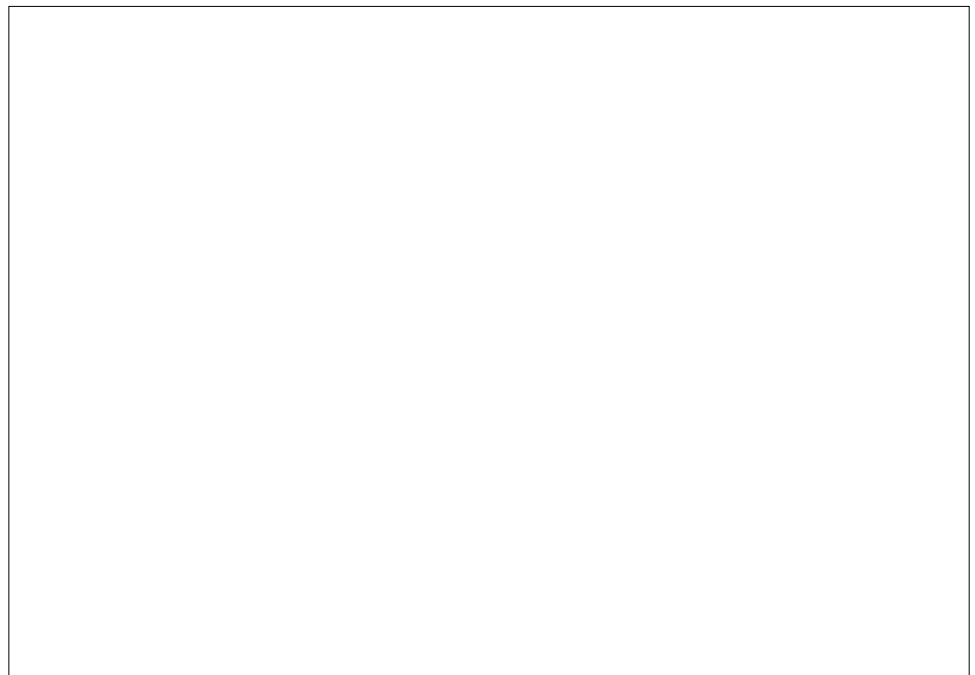
Roxy Chou

5.5. PHOTOGRAPHS OF CONDUCTED POWERLINE TEST CONFIGURATION

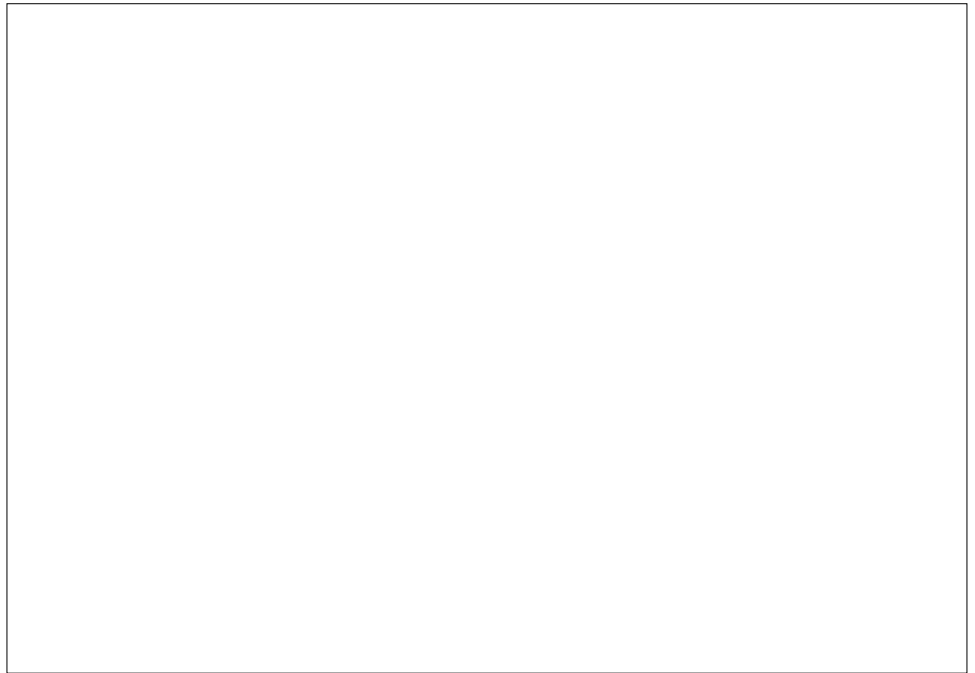
FRONT VIEW



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 (HP 87405A)
 - Attenuation 0 dB
 - RF Gain 25 dB
 - Signal Input 10 MHz to 3 GHz

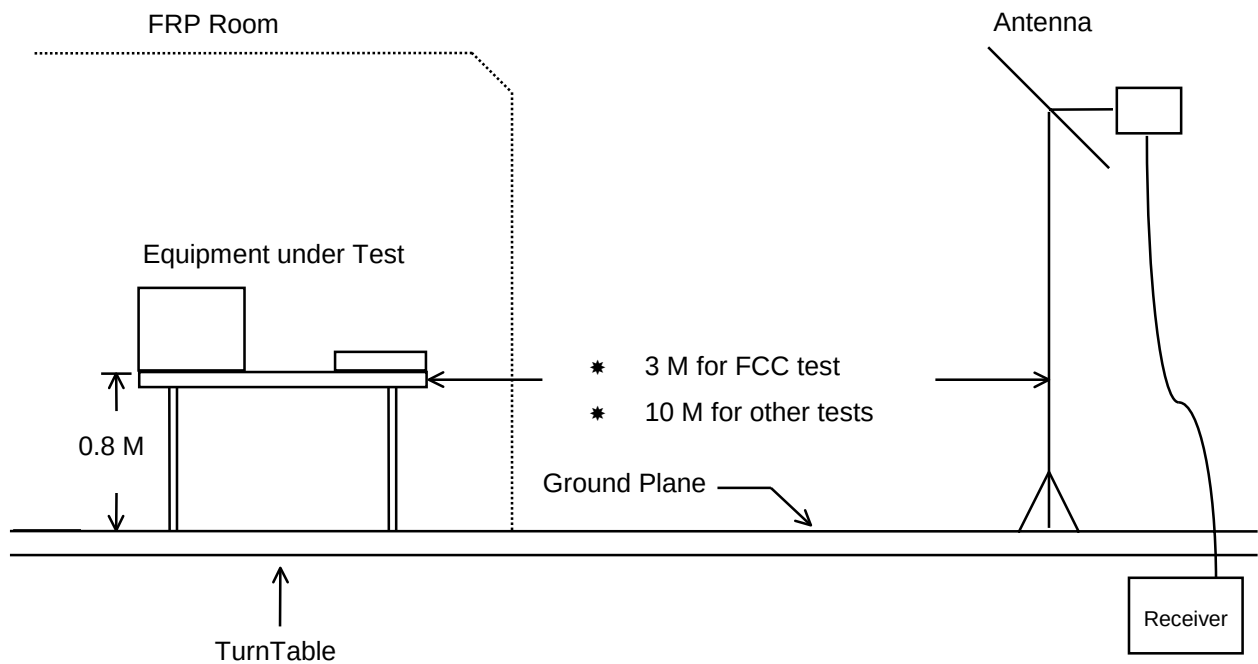
- Spectrum Analyzer (HP 8594A)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 2000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 9 KHz to 2.9 GHz

- Spectrum Analyzer (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 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 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 : 28
- Relative Humidity : 53 % RH
- Test Mode : 1600 $\times$ 1200, 106K/85Hz
- Test Date : Mar. 02, 1999
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 57.50 MHz
Corrected Reading = 3.97 + 1.20 + 27.74 = 32.91 (dBuV/m)

The Radiated Emission test was passed at minimum margin

Vertical 57.37 MHz / 34.91 dBuV

Antenna Height 1.0 Meter , Turntable Degree 65°.

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)
57.50	V	3.97	1.20	27.74	40.00	100	32.91	44.21	-7.09
204.00	V	14.26	2.42	16.36	43.50	150	33.04	44.87	-10.46
57.37	H	3.95	1.20	29.76	40.00	100	34.91	55.65	-5.09
64.34	H	4.78	1.39	28.38	40.00	100	34.55	53.39	-5.45
119.70	H	10.40	1.89	19.69	43.50	150	31.98	39.72	-11.52
137.95	H	11.30	1.91	19.96	43.50	150	33.17	45.55	-10.33

Test Engineer :

Roxy Chou

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 : 28
- Relative Humidity : 53 % RH
- Test Mode : 1280x1024, 91K/ 85Hz
- Test Date : Mar. 02, 1999
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 137.95 MHz
Corrected Reading = 11.30+ 1.91 +21.36 = 34.57 (dBuV/m)

The Radiated Emission test was passed at minimum margin

Vertical 196.77 MHz / 35.20 dBuV

Antenna Height 1.0 Meter , Turntable Degree 73⁰.

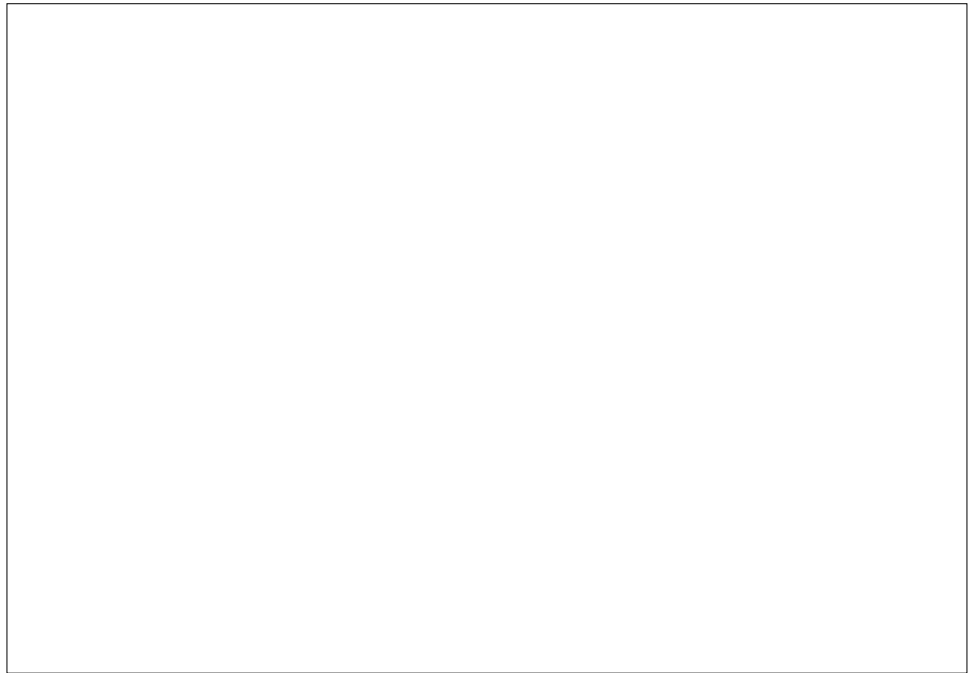
Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin		
Polarity	Factor	Loss							
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	
137.95	H	11.30	1.91	21.36	43.50	150	34.57	53.52	-8.93
196.90	H	13.88	2.37	16.55	43.50	150	32.80	43.65	-10.70
202.40	H	14.18	2.41	15.89	43.50	150	32.48	42.07	-11.02
64.17	V	4.77	1.38	25.50	40.00	100	31.65	38.24	-8.35
137.95	V	11.30	1.91	18.16	43.50	150	31.37	37.03	-12.13
196.77	V	13.87	2.37	18.96	43.50	150	35.20	57.54	-8.30

Test Engineer :

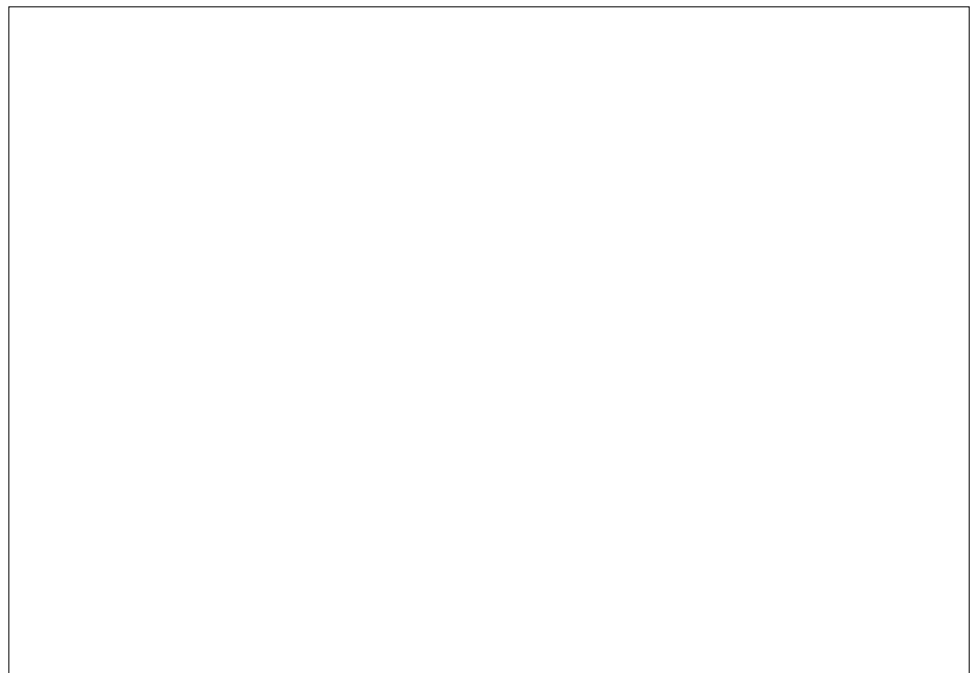
Roxy Chou

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	17.7	0.9
35	15.1	0.8
40	12.3	0.8
45	9.0	0.8
50	7.4	0.8
55	5.9	0.9
60	5.0	1.0
65	4.8	1.1
70	5.1	1.2
75	5.7	1.3
80	6.6	1.4
85	7.6	1.5
90	8.5	1.5
95	9.3	1.6
100	10.1	1.8
110	10.7	1.7
120	11.2	1.5
130	10.8	1.2
140	10.4	1.2
150	9.9	1.6
160	9.4	1.7
170	9.0	1.8
180	8.6	2.3
190	8.5	1.8
200	9.2	1.7
220	9.9	2.1
240	11.2	1.9
260	12.2	2.0
280	12.5	2.3
300	12.9	2.5
320	13.5	2.4
340	14.0	2.5
360	14.6	2.7
380	15.1	3.1
400	15.6	3.2
450	16.3	3.0
500	17.0	3.1
550	18.5	3.4
600	18.5	3.1
650	18.9	3.0
700	18.9	2.9
750	19.6	3.5
800	19.9	3.7
850	20.2	4.1
900	20.6	4.0
950	20.8	3.3
1000	21.4	3.9
2000	22.0	4.0

8. LIST OF MEASURING EQUIPMENT USED

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Test Receiver	HP	8591EM	3801A01325	9 KHz - 30MHz	Aug. 27, 1998	Conduction
LISN (for EUT)	KYORITSU	KNW-407	8-1010-15	50 ohm / 50 μ H	Nov. 17, 1998	Conduction
LISN (for support device)	EMCO	3810/2	9703-1838	50 ohm / 50 μ H	Aug. 27, 1998	Conduction
EMI Filter	CORCOM	MRI-2030	N/A	480VAC / 30A	N/A	Conduction
Amplifier (Site 1)	HP	87405A	3207A01437	10MHz -3.0GHz	June 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, 1999	Radiation
Half-wave dipole antenna (1)	EMCO	3121C	8912-496	20MHz - 1GHz	Aug. 8, 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