SPORTON International Inc.
TEL : 886-2-2696-2468
FAX : 886-2-2696-2255

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EX

Equipment : 17" COLOR MONITOR

MODEL NO. : C709/C709U

F C C I D : IQX97C1795

Filing Type : Original Grant

APPLICANT : **SHAMROCK TECHNOLOGY CO., LTD.**
No. 3, Chung-Shan Rd., Tu-Cheng Industrial District,
Tu-Cheng 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.

TABLE OF CONTENT

SECTION TITLE — PAGE

SPORTON International Inc.
TEL : 886-2-2696-2468
FAX : 886-2-2696-2255

FCC TEST REPORT

REPORT NO. : F7N2805

CERTIFICATE NO. : F7N2805

CERTIFICATE OF COMPLIANCE

for

FCC PART 15, SUBPART B CLASS B

Equipment : 17" COLOR MONITOR

MODEL NO. : C709/C709U

F C C I D : IQX97C1795

APPLICANT : **SHAMROCK TECHNOLOGY CO., LTD.**
No. 3, Chung-Shan Rd., Tu-Cheng Industrial District,
Tu-Cheng 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 FEB. 25, 1998 at **SPORTON International Inc.** in NEI HWU.

Lenore Chang Mar. 02, 1998

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

SHAMROCK TECHNOLOGY CO., LTD.
No. 3, Chung-Shan Rd., Tu-Cheng Industrial District,
Tu-Cheng City, Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : 17" COLOR MONITOR
MODEL NO. : C709/C709U
FCC ID:IQX97C1795
TRADE NAME : SHAMROCK
DATA CABLE : Shielded
USB MOUSE DATA CABLE : Shielded
Remark: A ferrite core is added on the video cable at PC end.
POWER SUPPLY TYPE : Switching
POWER CORD : Non-shielded

1.4. FEATURE OF EQUIPMENT UNDER TEST

- CRT: 17",0.26mm dot pitch, dark tint, F.S.T.
- Resolution: 1600x1200 (NI)
- Horizontal Sync.: 31.47 to 93.8KHz
- Vertical Sync.:60 to 85Hz
- Reponse video: 150Mhz nominal
- Signal cable: 15-pin D-type connector
- USB HUB: 1 up stream & 4 down streams (option)
- Power input voltage frequency: 100 to 240VAC, 50/60Hz, 2.5A

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 HONEYWELL keyboard, SHAMROCK monitor, HP printer, KYE mouse, LOGITECH mouse and DATATRONICS modem were connected to the LEO PC.

c. The following display resolution were investigated during the compliance test:
   1. Horizontal frequency (640x480 to 1600x1200, 31.5Khz to 93.8KHz)
   2. Vertical frequency (60Hz to 85Hz)

d. According to the above tests, we listed the following display modes as the worst cases:
   1. 1600x1200 (non-interlaced 93.8KHz), refresh rate 75Hz.
   2. 1280x1024 (non-interlaced 90KHz), refresh rate 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. --- PERSONAL COMPUTER (LEO)

FCC ID	:N/A
Model No.	:P2L97
Serial No.	:SP1039
Data Cable	:Shielded, 360 degree via metal backshells.
Power Supply Type	:Switching
Power Cord	:Shielded

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

Support Device 2. --- MODEM (DATATRONICS)

FCC ID	:E2O5OV1200CK
Model No.	:1200CK
Serial No.	:SP0016
Data Cable	:Shielded, 360 degree via metal backshells
Power Supply Type	:Linear

Support Device 3. --- PRINTER (HP)

FCC ID	:DSI6XU2225
Model No.	:2225C
Serial No.	:SP0003
Data Cable	:Shielded, 360 degree via metal backshells
Power Supply Type	:Linear

Support Device 4. --- VGA CARD (BRITEK)

FCC ID	:N/A
Model No.	:B3D-3L3
Serial No.	:SP1046
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 Device 5. --- KEYBOARD (HONEYWELL)

FCC ID	:GJK101RX-6
Model No.	:PC7XL-AA
Serial No.	:SP1008
Data Cable	:Shielded, 360 degree via metal backshells

Support Device 6. --- MOUSE (KYE)

FCC ID	:FSUGMZFG
Model No.	:USB MOUSE
Serial No.	:SP1036
Data Cable	:Shielded, 360 degree via metal backshells

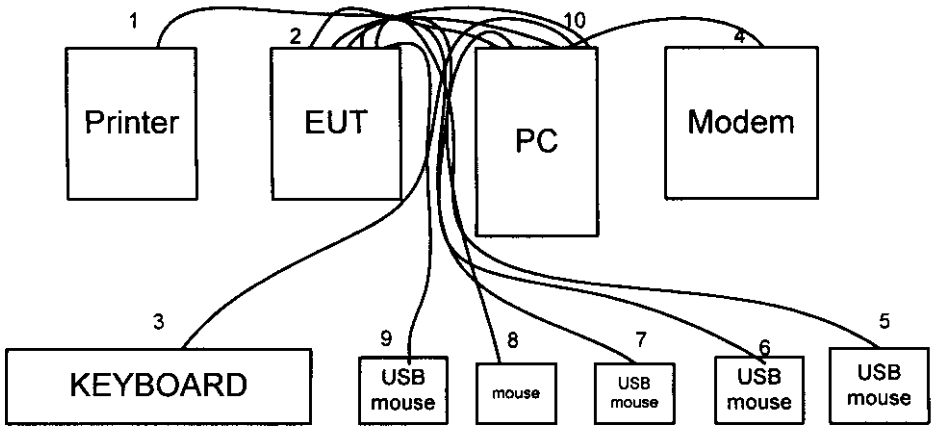
Support Device 7. --- MOUSE (LOGITECH)

FCC ID	:DZL211087
Model No.	:M-UA34
Serial No.	:SP1037
Data Cable	:Shielded, 360 degree via metal backshells

Support Device 8. --- MOUSE (LOGITECH)

FCC ID	:DZLM04
Model No.	:M-CQ38
Serial No.	:SP1038
Data Cable	:Shielded, 360 degree via metal backshells

2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The I/O cable is connected to the support device 3.
2. The I/O cable is connected to the EUT.
3. The I/O cable is connected to the support device 5.
4. The I/O cable is connected to the support device 2.
5. The I/O cable is connected from EUT to the support device 7.
6. The I/O cable is connected from EUT to the support device 6.
7. The I/O cable is connected from EUT to the support device 6.
8. The I/O cable is connected to the support device 8.
9. The I/O cable is connected from EUT to the support device 6.
10. The I/O cable is connected from EUT to the support device 1.

3. TEST SOFTWARE

An executive program, FCC.EXE, 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 EUT, and the EUT 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, then 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 : 886-2-631-4739

FAX : 886-2-631-9740

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

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.

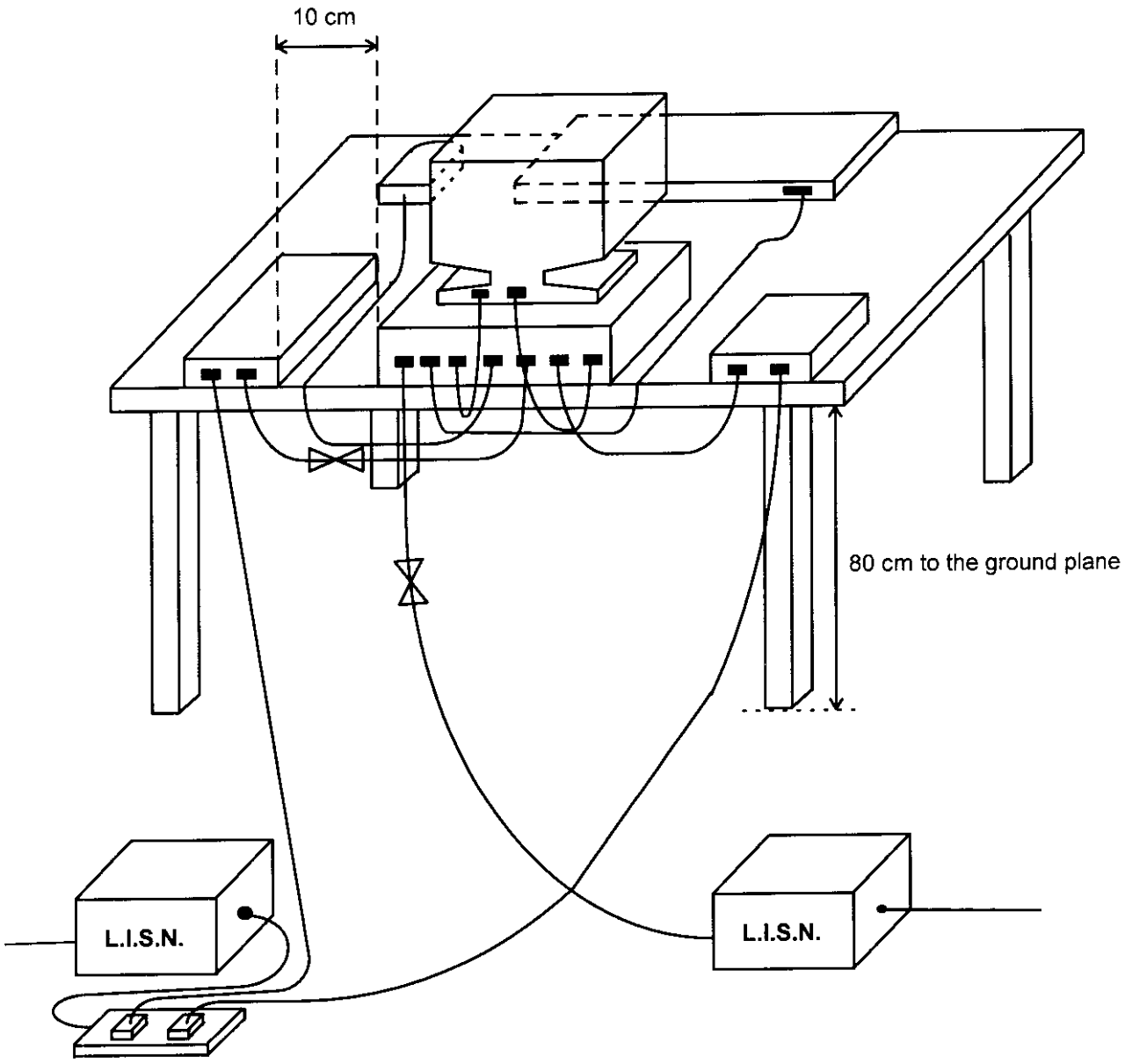
f. Both sides of AC line were checked for maximum conducted interference.

g. The frequency range from 450 KHz to 30 MHz was searched.

h. Set the test-receiver system (R/S receiver 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
- Temperature : 26 ℃
- Relative Humidity :54% RH
- Measuring mode: 1600x1200 (non-interlaced 93.8KHz), 75Hz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test Date : FEB. 25, 1998

The Conducted Emission test was passed at minimum margin

NEUTRAL 0.48MHz / 41.20dBuV.

Frequency	Line / Neutral	Meter Reading		Limits		
(MHz)		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.57	L	40.80	109.65	48.00	251.19	-7.20
0.80	L	41.00	112.20	48.00	251.19	-7.00
0.95	L	40.70	108.39	48.00	251.19	-7.30
0.48	N	41.20	114.82	48.00	251.19	-6.80
0.57	N	40.70	108.39	48.00	251.19	-7.30
0.71	N	39.70	96.61	48.00	251.19	-8.30

Test Engineer : Benson

5.4.1 TEST RESULT OF AC POWERLINE CONDUCTED EMISSION

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 26 ℃
- Relative Humidity :54% RH
- Measuring mode: 1280x1024 (non-interlaced 90Khz), 85Hz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test Date : FEB. 25, 1998

The Conducted Emission test was passed at minimum margin

LINE 0.69MHz / 41.50dBuV.

Frequency	Line / Neutral	Meter Reading		Limits		
(MHz)		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.46	L	41.00	112.20	48.00	251.19	-7.00
0.56	L	40.80	109.65	48.00	251.19	-7.20
0.69	L	41.50	118.85	48.00	251.19	-6.50
0.46	N	40.20	102.33	48.00	251.19	-7.80
0.60	N	40.20	102.33	48.00	251.19	-7.80
0.73	N	39.80	97.72	48.00	251.19	-8.20

Test Engineer : Benzen

6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 2000MHz 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

- RF Preselector

Attenuation	0 dB
RF Gain	20 dB
Signal Input	Input 2 (for 20 MHz to 2 GHz)

- Spectrum Analyzer 8568B/8594A

Attenuation	0 dB
Start Frequency	30 MHz
Stop Frequency	2000MHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	Input 1 (for 9KHz to 2.9 GHz)

- Quasi-Peak Adapter

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.

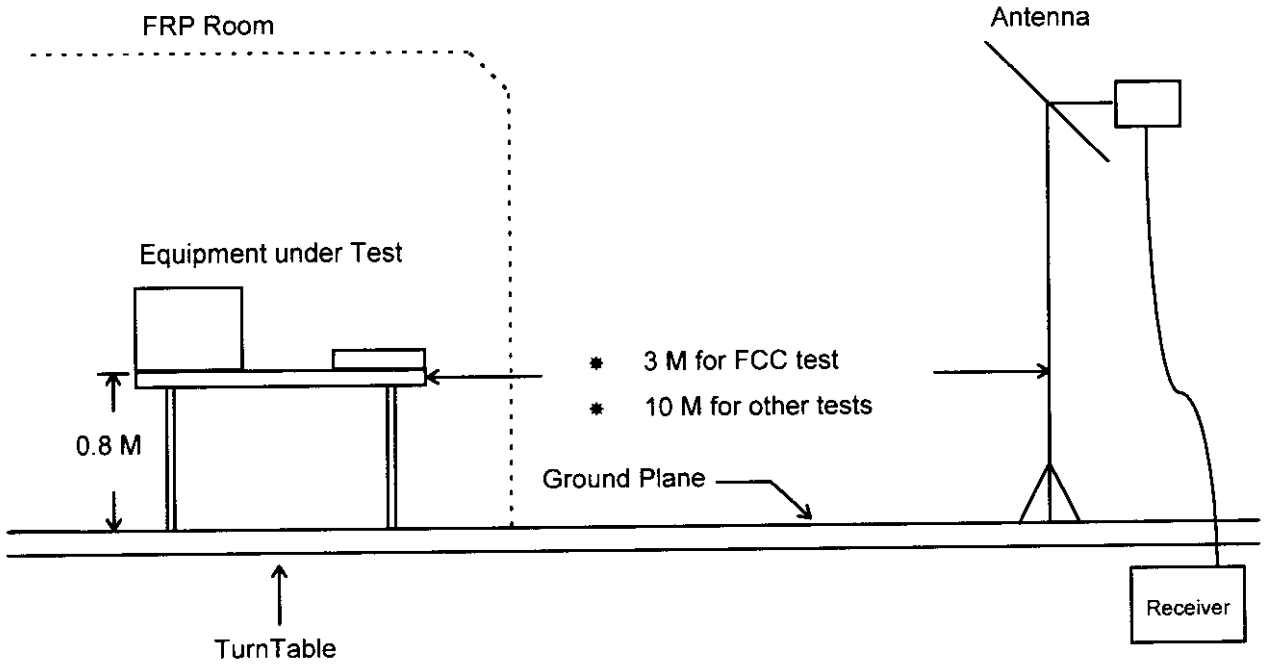
d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

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 (HP 8568B/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 : 29 °C
- Relative Humidity :68% RH
- Measuring mode: 1600x1200 (non-interlaced 93.8KHz), 75Hz
- Test Date :FEB. 21, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 254.40MHz
  Corrected Reading = 17.31+ 2.68+ 23.24= 43.23(dBuV/m)

The Radiated Emission test was passed at minimum margin

Vertical 254.40 MHz / 43.23dBuV

Antenna Height 1.5Meter , Turntable Degree 217°.

Frequency		Antenna	Cable	Reading	Limits		Emission	Level	Margin
(MHz)	Polarity	Factor (dB/m)	Loss (dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
166.70	H	12.56	2.18	22.32	43.50	150	37.06	71.29	-6.44
147.82	H	11.80	1.99	23.22	43.50	150	37.01	70.88	-6.49
172.00	H	12.78	2.23	21.84	43.50	150	36.85	69.58	-6.65
66.70	V	5.09	1.39	30.08	40.00	100	36.56	67.30	-3.44
172.00	V	12.78	2.23	21.34	43.50	150	36.35	65.69	-7.15
254.40	V	17.31	2.68	23.24	46.00	200	43.23	145.04	-2.77

Test Engineer :

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 : 29 ℃
- Relative Humidity :68% RH
- Measuring mode: 1280x1024 (non-interlaced 90KHz),85Hz
- Test Date FEB. 21, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 606.62MHz
  Corrected Reading = 24.16+ 4.53+ 14.80= 43.48(dBuV/m)

The Radiated Emission test was passed at minimum margin

Vertical 606.62 MHz / 44.48dBuV

Antenna Height 1Meter , Turntable Degree 244°.

Frequency		Antenna	Cable	Reading	Limits		Emission	Level	Margin
(MHz)	Polarity	Factor (dB/m)	Loss (dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
114.70	H	10.20	1.79	24.26	43.50	150	36.25	64.94	-7.25
147.83	H	11.80	1.99	23.42	43.50	150	37.21	72.53	-6.29
202.13	H	14.16	2.41	21.46	43.50	150	38.03	79.71	-5.47
208.17	H	14.48	2.44	19.56	43.50	150	36.48	66.68	-7.02
606.40	H	24.15	4.53	12.80	46.00	200	41.48	118.58	-4.52
606.62	V	24.16	4.53	14.80	46.00	200	43.48	149.28	-2.52

Test Engineer : Peter Wang

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	1.70
120	10.41	1.90
130	10.84	1.90
140	11.42	1.91
150	11.91	2.01
160	12.25	2.11
170	12.72	2.21
180	13.02	2.30
190	13.50	2.30
200	14.05	2.40
220	15.11	2.50
240	16.81	2.60
260	17.51	2.71
280	17.70	2.90
300	17.89	2.91
320	18.00	3.10
340	18.33	3.20
360	19.44	3.30
380	20.31	3.40
400	21.19	3.50
450	21.10	3.70
500	22.21	4.10
550	23.42	4.30
600	24.01	4.50
650	25.11	4.70
700	26.00	4.90
750	26.41	5.11
800	27.10	5.50
850	27.51	5.60
900	27.90	5.80
950	28.01	5.90
1000	29.00	6.20

※ Remark: For frequency above 1000 MHz, we used low cable loss BNC cable to test.

8. LIST OF MEASURING INSTRUMENTS USED

INSTRUMENT	Manufacturer	Model No	Serial No	Characteristic	Calibration Date	Calibration Interval	Remark
Spectrum Analyzer	HP	8568B	2928A04713	100Hz - 1500MHz	Jul. 19, 1997	1 Year	R
Quasi-Peak Adapter	HP	85650A	2811A01285	9KHz - 1000MHz	Jul. 19, 1997	1 Year	R
RF. Preselector	HP	85685A	2926A00951	20MHz- 1500MHz	Jul. 19, 1997	1 Year	R
Test Receiver	R&S	ESH3	893495/013	9KHz-30MHz	Mar. 21, 1997	1 Year	C
Test Receiver	R&S	ESVP	893610/003	20MHz-1300MHz	Mar. 20, 1997	1 Year	C
Spectrum monitor	R&S	EZM	894987/011	N/A	Mar. 20, 1997	1 Year	C
LISN	KYORITSU	KNW407	8-1010-15	50 ohm / 50μH	Nov. 11, 1997	1 Year	C
LISN	EMCO	3825/2	9510-2484	50 ohm / 50μH	Nov. 29 ,1997	1 Year	C
Signal Generator	R&S	SMX-B1	837900/023	100KHz - 1000MHz	Nov. 08, 1997	1 Year	N/A
Antenna Mast	EMCO	1051-1.2	N/A	N/A	N/A	N/A	R
Turntable	EMCO	1060-7.21	N/A	N /A	N/A	N/A	R
Wooden Table	SPORTON	N/A	N/A	N/A	N/A	N/A	C
Bilog Antenna	CHASE	CBL6112A	2296	30MHz-2GHz	Jul. 24, 1997	1 Year	R
Shielding Room	SPORTON	N/A	N/A	8m ×4.8m ×4.8m	N/A	N/A	N/A
Spectrum	HP	8594A	2741A0311	9 KHz - 2.9GHz	Mar. 24, 1997	1 Year	R

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