

EMI TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : COLOR MONITOR

MODEL NO. : DC-995 FA, DC-995 LAT

FCC ID : H79DC-995

FILING TYPE : Original Grant

APPLICANT : DELTA ELECTRONICS, INC.
No. 3, Tung Yuan Road, Chungli Industrial Zone,
Taoyuan 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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EMI TEST REPORT

REPORT NO. : F8O0201

CERTIFICATE NO. : F8O0201

CERTIFICATE OF COMPLIANCE

for

FCC PART 15, SUBPART B CLASS B

EQUIPMENT : COLOR MONITOR

MODEL NO. : DC-995 FA, DC-995 LAT

F C C I D : H79DC-995

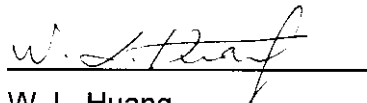
APPLICANT : **DELTA ELECTRONICS, INC.**

No. 3, Tung Yuan Road, Chungli Industrial Zone,
Taoyuan 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 **Oct. 02, 1998** at **SPORTON International Inc.**


W. L. Huang
General Manager

OCT 14, 1998

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

DELTA ELECTRONICS, INC.

No. 3, Tung Yuan Road, Chungli Industrial Zone,
Taoyuan Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : COLOR MONITOR

MODEL NO. : DC-995 FA, DC-995 LAT

FCC ID. : H79DC-995

TRADE NAME : DELTA

DATA CABLE : Shielded, 1.4m

(Remark: A ferrite cores was added on the video data cable at PC end.)

POWER SUPPLY TYPE : Switching

POWER CORD : Non-shielded

1.4. FEATURE OF EQUIPMENT UNDER TEST

- **Picture Tube** : SAMSUNG 19" Flat Square Tube (FST), 90 degree deflection, 0.26mm dot pitch, SMART-II, anti-glare, anti-static. P22 phosphor, medium short persistence.
- **Signal Input Interface** : Video \Rightarrow R.G.B. analog.
Sync \Rightarrow H.V. Separate Sync. H.V. Composite Sync. (TTL Compatuble).
- **Maximum Resolution (H x V)** : 1600 x 1200 @75
: 1280 x 1024 @85
- **Horizontal Sync.**: 31.5 to 94.0KHz.
Vertical Sync.: 60 to 85Hz.
(Non-interlaced/interlaced)
- **Video Bandwidth** : 150MHz (-3db) nominal.
- **Nominal Display Size** : 340mm x 255mm .
- **Power Source** : 90-264 Vac, 50/60Hz

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, HP printer, ACEEX modem, GENIUS PS/2 mouse, GAINWARD VGA card and EUT were connected to the FIC P.C.
- c. The following display resolution were investigated during the compliance test:
 - 1. Horizontal frequency (640 x 480 to 1600 x 1200, 31.5KHz to 94KHz)
 - 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 (Non-interlanced 94KHz), refresh rate 75Hz.
 - 2. 1280 x 1024 (Non-interlanced 91KHz), refresh rate 85Hz.
- e. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 2000MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- KEYBOARD (HONEYWELL)

FCC ID	: GJK101RX-6
Model No.	: PC7XL-AA
Serial No.	: SP1009
Data Cable	: Shielded, 360 degree via metal backshells, 3.0m

Support Device 2. -- 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, 1.75m

Support Device 3. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1017
Data Cable : Shielded, 360 degree via metal backshells, 2.0m
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded

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

FCC ID : FSUGMZFC
Model No. : NETMOUSE
Serial No. : SP1013
Data Cable : Shielded, 360 degree via metal backshells, 1.75m

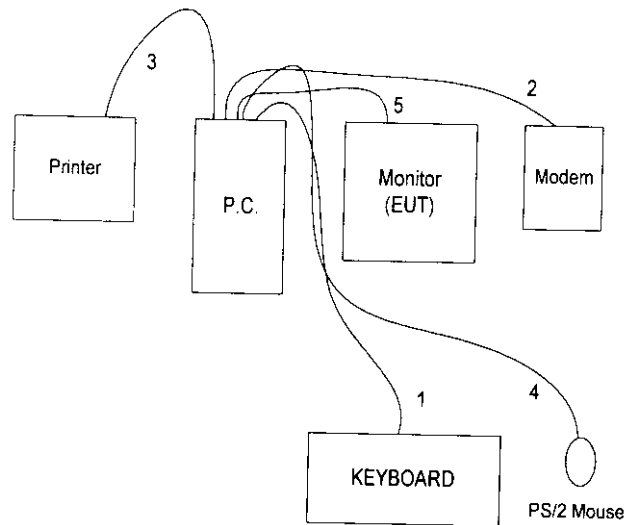
Support Device 5. – VGA CARD (GAINWARD)

FCC ID : ICUVGA-GW710
Model No. : S3 VIRGE/GX2
Serial No. : SP1035
Data Cable : Shielded, 360 degree via metal backshells, 1.7m

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

3. TEST SOFTWARE

An executive program, WINFCC.EXE under WIN 98, which generate a complete line of continuously repeating " H " pattern were used as the test software.

The programs were 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 (HP receiver 8546A) 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.

5.4. 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 : 27°C
- Relative Humidity : 53 % RH
- Test Mode : **1600 × 1200, 94K, 75Hz**
- Test Date : Oct. 02, 1998

The Conducted Emission test was passed at **Line 9.80 MHz / 43.20 dBuV**.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.75	Line	29.60	30.20	48.00	251.19	-18.40
9.80	Line	43.20	144.54	48.00	251.19	-4.80
22.78	Line	42.60	134.90	48.00	251.19	-5.40
0.47	Neutral	34.90	55.59	48.00	251.19	-13.10
9.80	Neutral	41.90	124.45	48.00	251.19	-6.10
22.78	Neutral	42.50	133.35	48.00	251.19	-5.50

Test Engineer :

Louis Lin

Louis Lin

EMI TEST REPORT

REPORT NO. : F800201

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 : 27°C
- Relative Humidity : 53 % RH
- Test Mode : **1280 × 1024, 91K, 85Hz**
- Test Date : Oct. 02, 1998

The Conducted Emission test was passed at Line 9.84 MHz / 42.50 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.46	Line	32.00	39.81	48.00	251.19	-16.00
9.84	Line	42.50	133.35	48.00	251.19	-5.50
22.88	Line	42.40	131.83	48.00	251.19	-5.60
0.46	Neutral	36.00	63.10	48.00	251.19	-12.00
9.89	Neutral	42.50	133.35	48.00	251.19	-5.50
23.33	Neutral	42.30	130.32	48.00	251.19	-5.70

Test Engineer :

Louis Lin
Louis Lin

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.

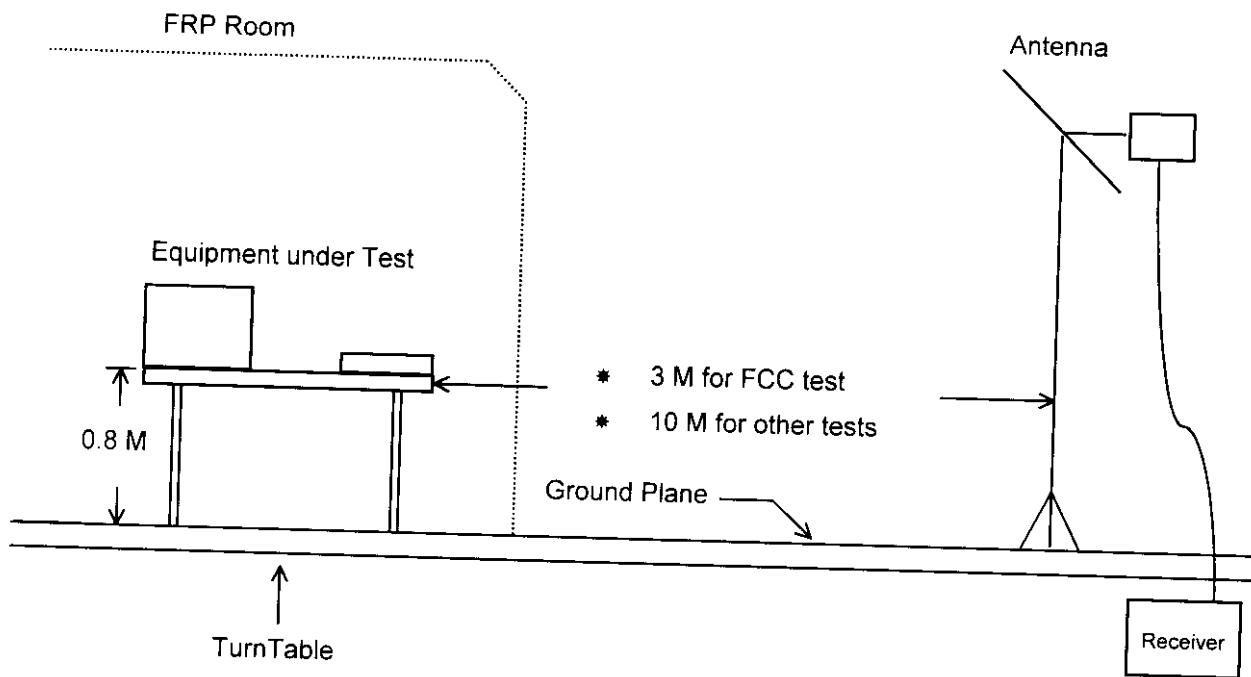
6.1. MAJOR MEASURING INSTRUMENTS

- Amplifier
Attenuation (HP 87405A)
0 dB
RF Gain 20 Db
Signal Input 10 MHz to 3 GHz
- Spectrum Analyzer
Attenuation (HP 8594A)
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
Resolution Bandwidth (HP 8594A)
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 : 30°C
- Relative Humidity : 63% RH
- Test Mode : **1600 × 1200, 94K, 75Hz**
- Test Date : Oct. 02, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 46.50 MHz
Corrected Reading = 1.63 + 1.00 + 33.54 = 36.17 (dBuV/m)

The Radiated Emission test was passed at

50.60 MHz / 36.70 dBuV (Vertical)

Antenna Height 1.0 Meter , Turntable Degree 185°.

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)	
37.00	V	-0.22	0.87	32.13	40.00	100	32.78	43.55	-7.22
46.50	V	1.63	1.00	33.54	40.00	100	36.17	64.34	-3.83
50.60	V	2.48	1.01	33.21	40.00	100	36.70	68.39	-3.30
70.80	V	5.67	1.22	24.95	40.00	100	31.84	39.08	-8.16
86.10	V	7.68	1.40	22.10	40.00	100	31.18	36.22	-8.82
181.00	V	13.07	2.30	17.87	43.50	150	33.24	45.92	-10.26

Test Engineer :

Louis Lin

Louis Lin

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 : 30°C
 - Relative Humidity : 63% RH
 - Test Mode : **1280 × 1024, 91K, 85Hz**
 - Test Date : Oct. 02, 1998
-
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
 - Sample Calculation at 77.60 MHz
Corrected Reading = 6.62 + 1.35 + 27.52 = 35.50 (dBuV/m)

The Radiated Emission test was passed at

77.60 MHz / 35.50 dBuV (Horizontal)

Antenna Height 4.0 Meter , Turntable Degree 216°.

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)	
77.60	H	6.62	1.35	27.52	40.00	100	35.50	59.57	-4.50
48.40	V	2.04	1.00	30.99	40.00	100	34.03	50.29	-5.97
72.50	V	5.85	1.25	25.31	40.00	100	32.41	41.73	-7.59
85.90	V	7.65	1.40	23.39	40.00	100	32.44	41.88	-7.56
118.40	V	10.36	1.68	21.48	43.50	150	33.53	47.48	-9.97
137.30	V	11.24	1.88	19.96	43.50	150	33.08	45.08	-10.42

Test Engineer :

Louis Lin

Louis Lin

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	4.1

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	April 13, 1998	Conduction
Test Receiver	R&S	ESVP	893610/003	20MHz - 1.3 GHz	April 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	April 13, 1998	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, 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

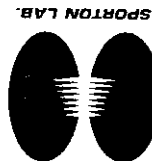
CERTIFICATE OF COMPLIANCE

Authorized under Declaration of Conformity
according to

47 CFR, Part 2 and Part 15 of the FCC Rules

Equipment Under Test : PERSONAL COMPUTER
Model No. : P2L97
Applicant : FIRST INTERNATIONAL COMPUTER INC.
6F, Formosa Plastics Rear Building 201,
Tung Hwa N. Rd., Taipei, Taiwan, R.O.C.

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 BOTH RADIATED AND
CONDUCTED EMISSIONS CLASS B LIMITS. THE TESTING WAS COMPLETED ON SEP. 02,
1997 AT SPORTON INTERNATIONAL INC. LAB IN NEI HWU.

GENERAL MANAGER

W. L. Huang

OCT 08, 97