

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : SCANNER

MODEL NO. : AM12S

F C C I D : ITEUECVSAM12S

FILING TYPE : Original Grant

APPLICANT : ULTIMA Electronics Corp.
9F, No. 18, Alley 1, Lane 768, Sec. 4, Pa Te 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.

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 : SCANNER

MODEL NO. : AM12S

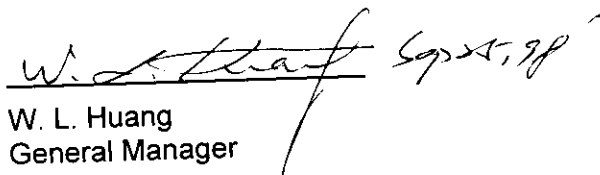
F C C I D : ITEUECVSAM12S

APPLICANT : **ULTIMA Electronics Corp.**
9F, No. 18, Alley 1, Lane 768, Sec. 4, Pa Te Rd.,
Taipei, 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 Aug. 27, 1998 at **SPORTON International Inc.**


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

ULTIMA Electronics Corp.

7F, No. 100, Li De Street, Chung Ho City,
Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER :

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : SCANNER

MODEL NO. : AM12S

TRADE NAME : ARTEC, ULTIMA

FCC ID. : ITEEUCVSAM12S

SCSI DATA CABLE : Shielded, 1.68m

1. A ferrite core was added on the SCSI cable at EUT end.
2. A ferrite core was added on the Adapter cable at EUT end.

25PIN TO 25PIN DATA CABLE : Shielded, 1.8m

POWER SUPPLY TYPE : Linear

POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- 36-bit true color-over 68 billion colors.
- Color enhancement technology.
- Easy to install, easy to use.
- High speed scanning.
- 3D object scanning.
- PCI SCSI interface.
- Friendly & Powerful user interface.
- Auto scan; Batch scan.
- 19200 DPI high resolution.
- Compatible with Windows 95, NT and Windows 98 environment.
- Professional color correction technology.

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 SONY monitor, SILITEK keyboard, GENIUS PS/2 mouse, HP printer, ACEEX modem and EUT were connected to the FIC P.C.
- c. During the test, the monitor AC power cord was plugged into the PC computer-mounted AC outlet and a floor-mounted AC outlet to search the maximum emission.
- d. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- MONITOR (SONY)

FCC ID : AK8GDM17SE2T
Model No. : GDM-17SE2T
Serial No. : SP1006
Data Cable : Shielded, 360 degree via metal backshells, 1.75m
Power Supply Type : Switching
Power Cord : Non-shielded

Support Device 2. --- KEYBOARD (SILITEK)

FCC ID : GYUM99SK
Model No. : SK9001AS2U
Serial No. : SP1008
Data Cable : Shielded, 360 degree via metal backshells, 2.5m

Support Device 3. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1015
Data Cable : Shielded, 360 degree via metal backshells, 2.0m
Power Supply Type : Linear, Adapter
Power Cord : Non-shielded

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

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

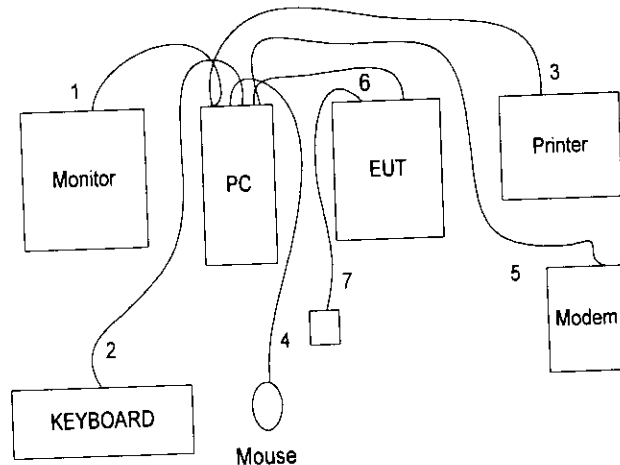
Support Device 5. -- MODEM (ACEEX)

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

FCC ID : N/A
Model No. : P55T2P4
Serial No. : SP1004
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 PC to the support device 1.
2. The I/O cable was connected from PC to the support device 2.
3. The I/O cable was connected from PC to the support device 3.
4. The I/O cable was connected from PC to the support device 4.
5. The I/O cable was connected from PC to the support device 5.
6. The I/O cable was connected from PC to the EUT.
7. The SCSI cable was floating.

3. TEST SOFTWARE

An executive program, EMITEST.EXE under WIN 3.1, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The EMITEST.EXE 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.

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 1000 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.

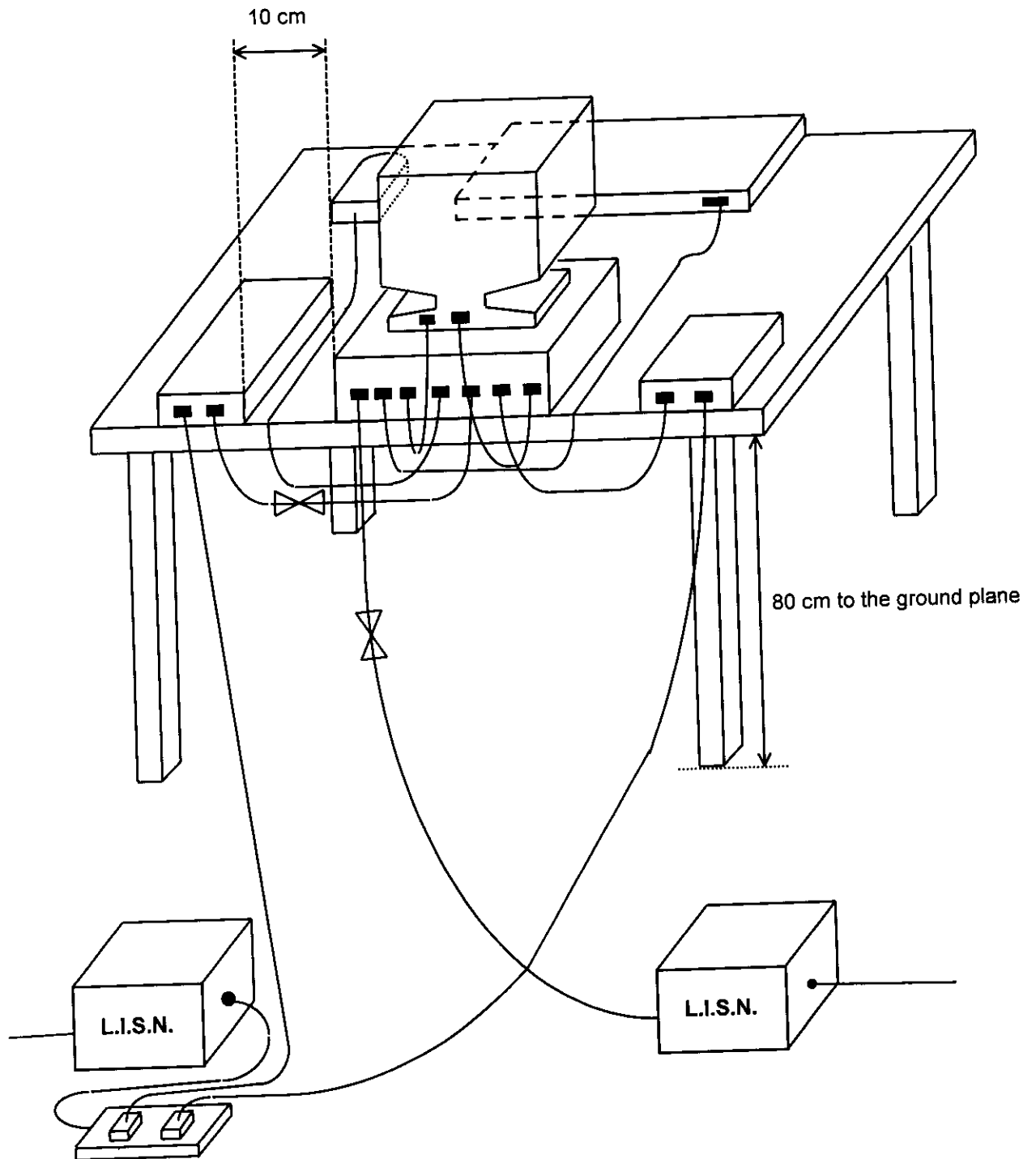
5.1. MAJOR MEASURING INSTRUMENTS

- 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 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



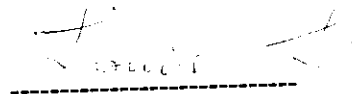
5.4. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION

- 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 : 29°C
- Relative Humidity : 57 % RH
- Test Date : Aug. 27, 1998

The Conducted Emission test was passed at **Neutral 2.56 MHz / 43.20 dBuV.**

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.61	Line	39.60	95.50	48.00	251.19	-8.40
0.92	Line	41.70	121.62	48.00	251.19	-6.30
2.45	Line	42.60	134.90	48.00	251.19	-5.40
0.59	Neutral	41.70	121.62	48.00	251.19	-6.30
1.10	Neutral	40.20	102.33	48.00	251.19	-7.80
2.56	Neutral	43.20	144.54	48.00	251.19	-4.80

Test Engineer :



Louis Lin

6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 1000 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

- RF Preselector (HP 85685A)
 - Attenuation 0 dB
 - RF Gain 25 db
 - Signal Input 20 Hz to 1.5 GHz

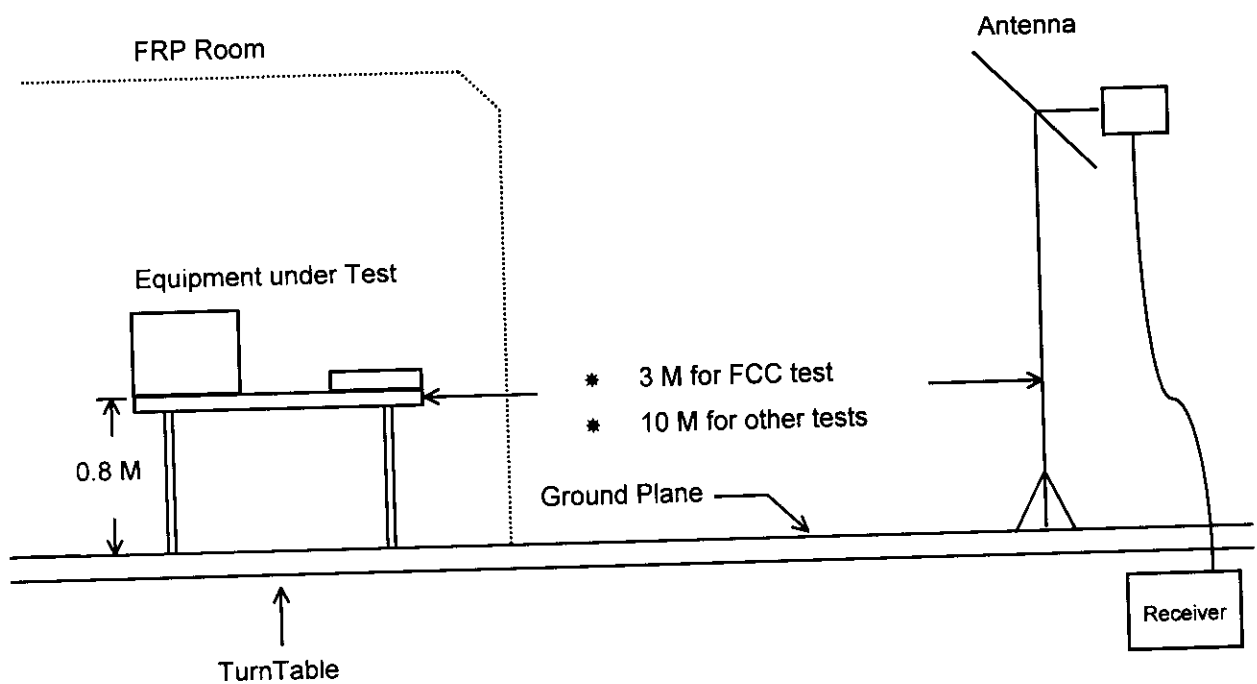
- Spectrum Analyzer (HP 8568B)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 100 Hz to 1.5 GHz

- Quasi-Peak Adapter (HP 85650A)
 - 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 1000 MHz
- Test Distance : 3 M
- Temperature : 32°C
- Relative Humidity : 66% RH
- Test Date : Aug. 27, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 240.00 MHz
Corrected Reading = 15.11 + 2.50 + 25.23 = 42.84 (dBuV/m)

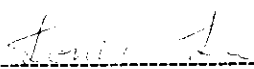
The Radiated Emission test was passed at minimum margin

Vertical 320.00 MHz / 42.87 dBuV

Antenna Height 1.0 Meter , Turntable Degree 98°.

Frequency (MHz)	Polarity	Antenna Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV) (uV)	Emission (dBuV)	Level (uV)	Margin (dB)
240.00	H	15.11	2.50	25.23	46.00 200	42.84	138.68	-3.16
320.00	H	18.10	3.10	21.17	46.00 200	42.37	131.37	-3.63
159.90	V	12.25	2.01	22.44	43.50 150	36.70	68.39	-6.80
219.20	V	14.30	2.40	19.85	46.00 200	36.55	67.22	-9.45
320.00	V	18.10	3.10	21.67	46.00 200	42.87	139.16	-3.13
400.40	V	22.29	3.60	16.96	46.00 200	42.85	138.84	-3.15

Test Engineer :


Louis Lin

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

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
RF Preselector (Site 1)	HP	85685A	2926A00951	20Hz -1.5GHz	July 18, 1998	Radiation
Spectrum Analyzer (site 1)	HP	8568B	2928A04713	100Hz - 1.5GHz	July 18, 1998	Radiation
Quasi-peak Adapter (site 1)	HP	85650A	2811A01285	9KHz -1 GHz	July 18, 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

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I HEREBY CERTIFY THAT :

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Testing was carried out on ***Dec. 24, 1998*** at **SPORTON International Inc.**

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.

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1.1. APPLICANT

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Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER :

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : SCANNER

MODEL NO. : AM12S

TRADE NAME : ARTEC, ULTIMA

FCC ID. : ITEEUCVSAM12S

SCSI DATA CABLE : Shielded

1. A ferrite core was added on the SCSI cable at EUT end.
2. A ferrite core was added on the Adapter cable at EUT end.

POWER SUPPLY TYPE : Linear

POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- 36-bit true color-over 68 billion colors.
- Color enhancement technology.
- Easy to install, easy to use.
- High speed scanning.
- 3D object scanning.
- PCI SCSI interface.
- Friendly & Powerful user interface.
- Auto scan; Batch scan.
- 19200 DPI high resolution.
- Compatible with Windows 95, NT and Windows 98 environment.
- Professional color correction technology.

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 SONY monitor, SILITEK keyboard, GENIUS PS/2 mouse, HP printer, ACEEX modem, SCSI CD-ROM and EUT were connected to the FIC P.C.
- c. During the test, the monitor AC power cord was plugged into the PC computer-mounted AC outlet and a floor-mounted AC outlet to search the maximum emission.
- d. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

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Model No. : GDM-17SE2T
Serial No. : SP1006
Data Cable : Shielded, 360 degree via metal backshells, 1.75m
Power Supply Type : Switching
Power Cord : Non-shielded

Support Device 2. --- KEYBOARD (SILITEK)

FCC ID : GYUM99SK
Model No. : SK9001AS2U
Serial No. : SP1008
Data Cable : Shielded, 360 degree via metal backshells, 2.5m

Support Device 3. -- PS/2 MOUSE (GENIUS)

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

Support Device 4. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1015
Data Cable : Shielded, 360 degree via metal backshells, 2.0m
Power Supply Type : Linear, Adapter
Power Cord : Non-shielded

Support Device 5. -- 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

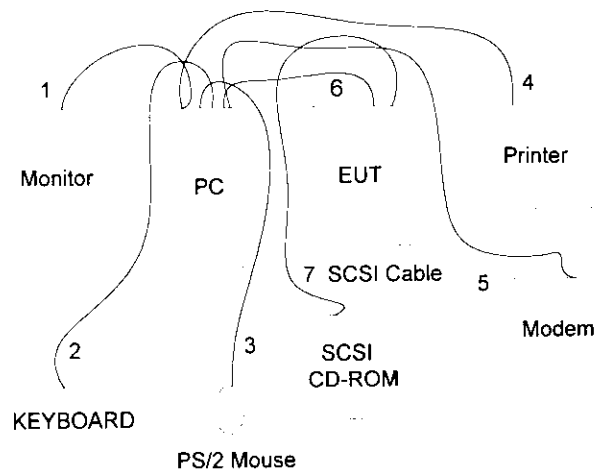
Support Device 6. -- SCSI CD-ROM (Advance Storage Device)

FCC ID : KDK93U1000HFS
Model No. : 93U1000HFS
Serial No. : SP1070
Data Cable : Shielded, 0.6m

Support Device 7. --- P.C. (FIC)

FCC ID : N/A
Model No. : P55T2P4
Serial No. : SP1004
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 PC to the support device 1.
2. The I/O cable was connected from PC to the support device 2.
3. The I/O cable was connected from PC to the support device 3.
4. The I/O cable was connected from PC to the support device 4.
5. The I/O cable was connected from PC to the support device 5.
6. The I/O cable was connected from PC to the EUT.
7. The SCSI cable was connected from EUT to the support device 6.

3. TEST SOFTWARE

An executive program, EMITEST.EXE under WIN 3.1, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The EMITEST.EXE 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.

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 1000 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.

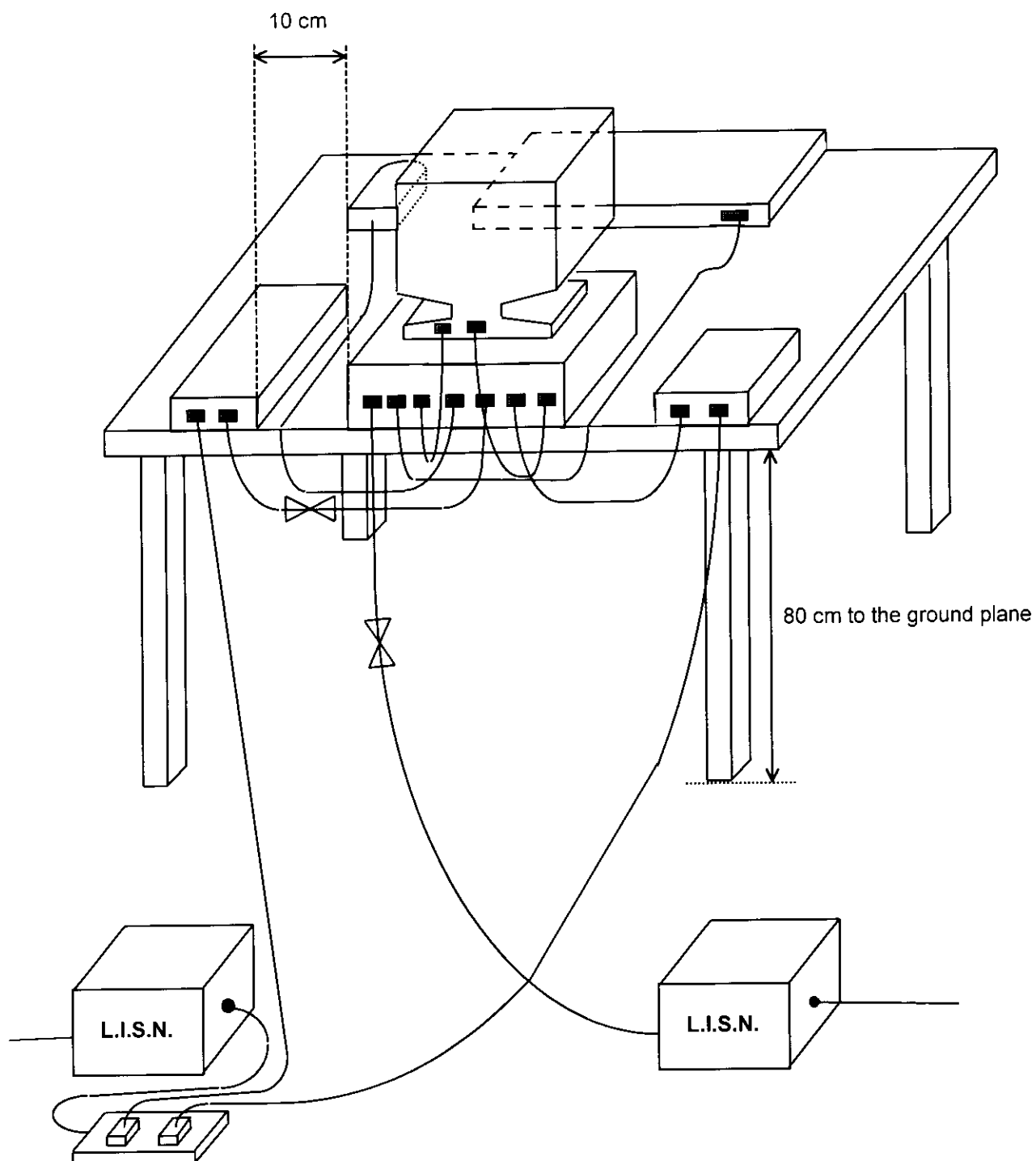
5.1. MAJOR MEASURING INSTRUMENTS

- 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 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 : 23
- Relative Humidity : 69 % RH
- Test Date : Dec. 24, 1998

The Conducted Emission test was passed at Neutral 0.59 MHz / 42.50 dBuV.

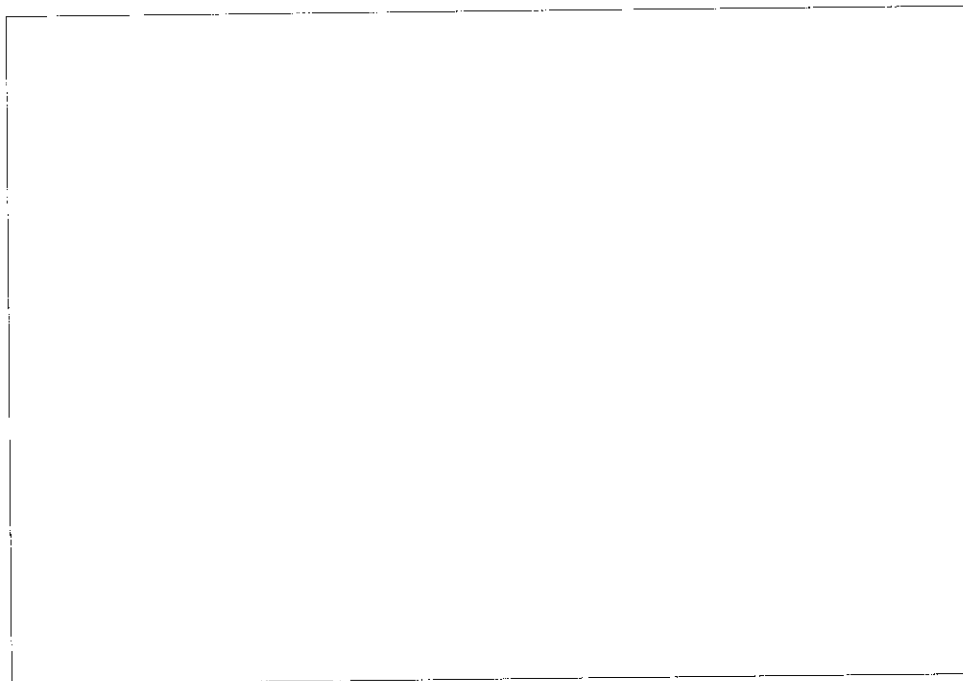
Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.59	Line	41.30	116.14	48.00	251.19	-6.70
0.70	Line	40.60	107.15	48.00	251.19	-7.40
1.09	Line	38.50	84.14	48.00	251.19	-9.50
0.59	Neutral	42.50	133.35	48.00	251.19	-5.50
0.70	Neutral	41.60	120.23	48.00	251.19	-6.40
1.09	Neutral	39.70	96.61	48.00	251.19	-8.30

Test Engineer :

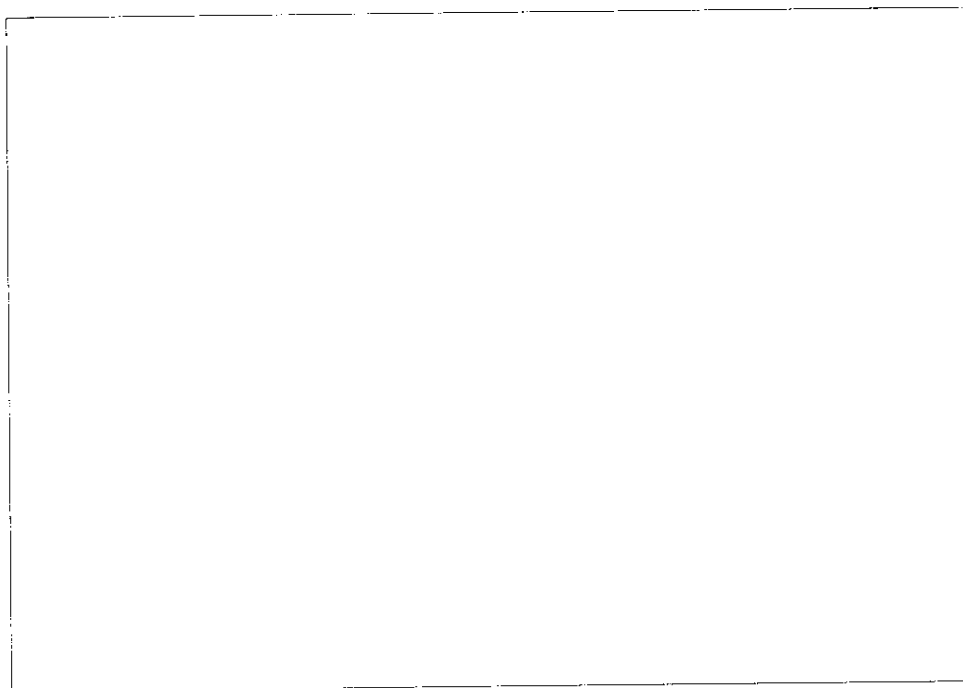
Louis Lin

5.5. PHOTOGRAPHS OF CONDUCTED POWERLINE TEST CONFIGURATION

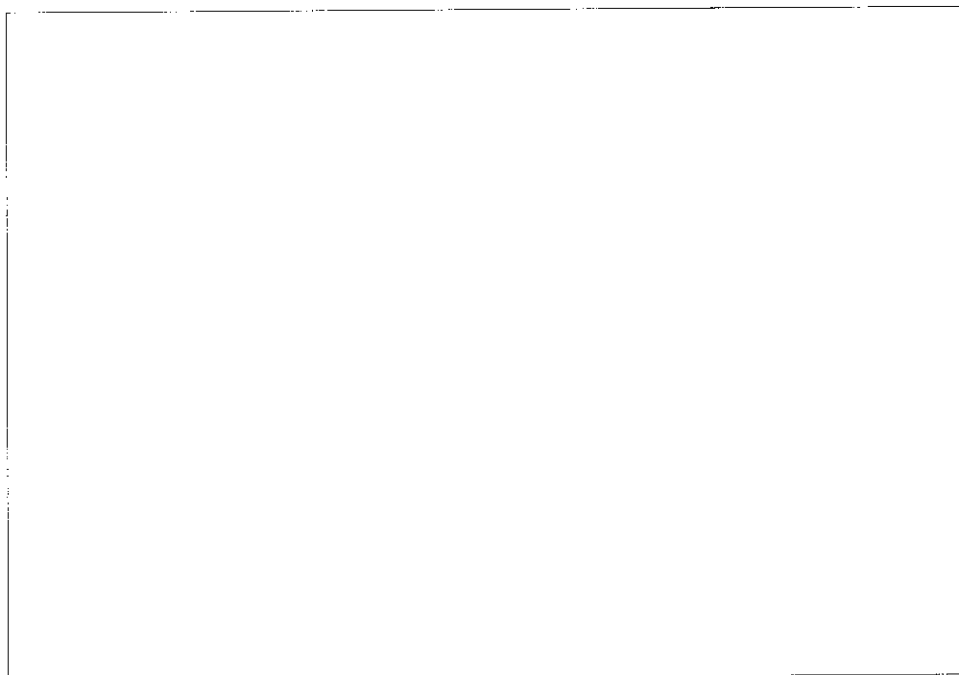
FRONT VIEW



REAR VIEW



SIDE VIEW



6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 1000 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

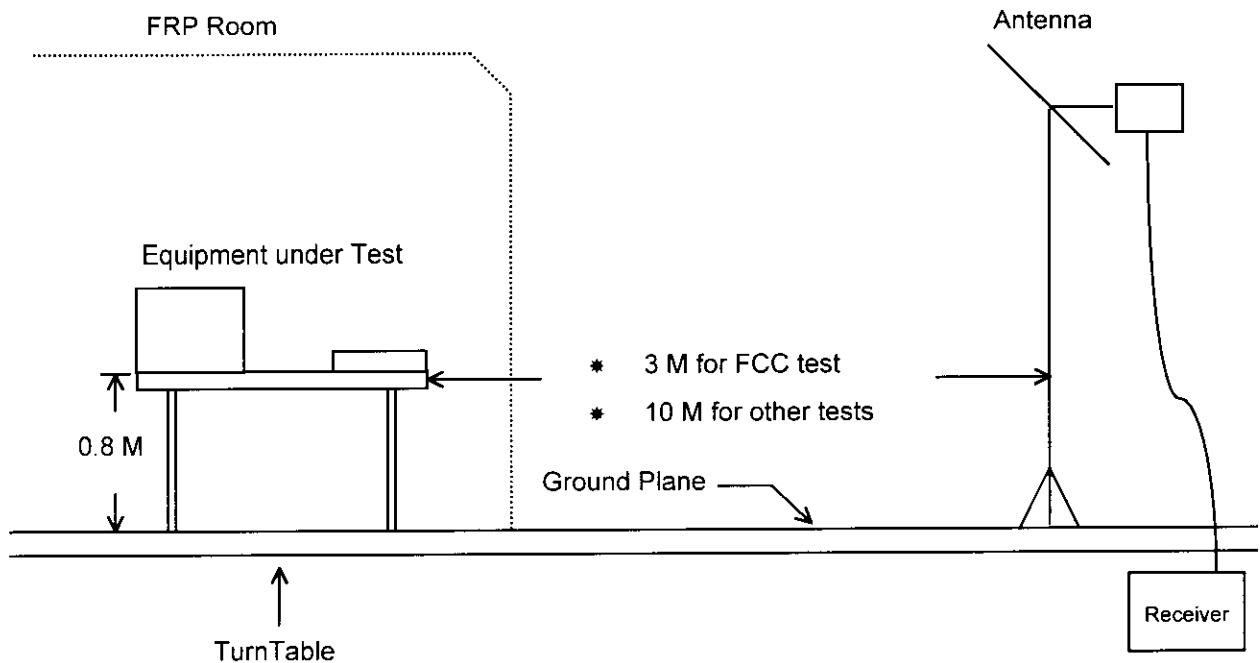
- RF Preselector (HP 85685A)
 - Attenuation 0 dB
 - RF Gain 25 db
 - Signal Input 20 Hz to 1.5 GHz

- Spectrum Analyzer (HP 8568B)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 100 Hz to 1.5 GHz

- Quasi-Peak Adapter (HP 85650A)
 - 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 1000 MHz
- Test Distance : 3 M
- Temperature : 22 .
- Relative Humidity : 78% RH
- Test Date : Dec. 24, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 121.50 MHz
Corrected Reading = 10.46 + 1.72 + 24.46 = 36.63 (dBuV/m)

The Radiated Emission test was passed at minimum margin

Vertical 80.80 MHz / 36.00 dBuV

Antenna Height 1.0 Meter , Turntable Degree 168°.

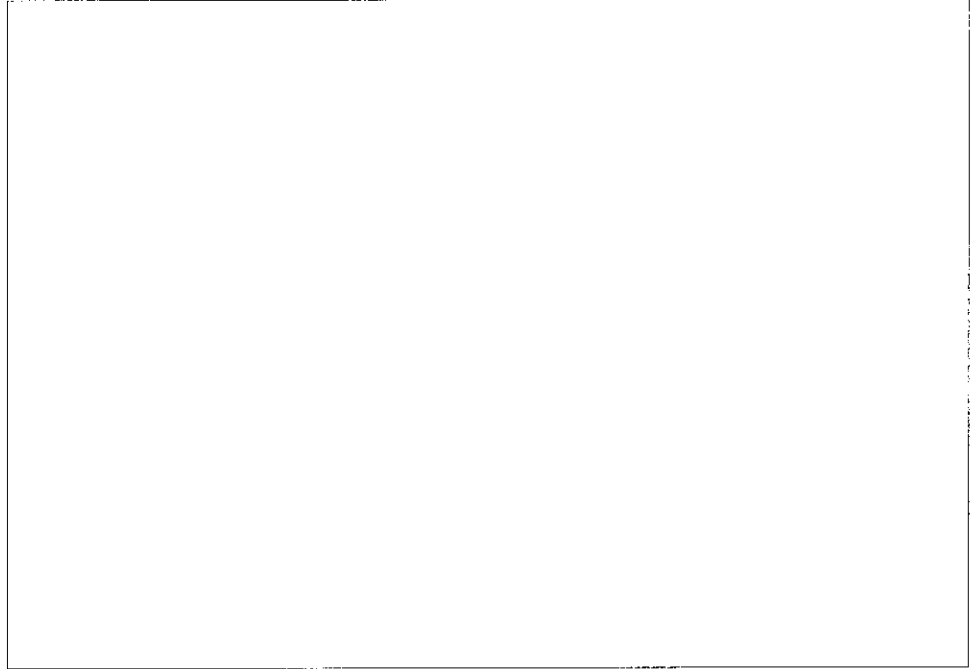
Frequency (MHz)	Polarity	Antenna Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV) (uV)	Emission (dBuV)	Level (uV)	Margin (dB)
121.50	H	10.46	1.72	24.46	43.50 150	36.63	67.84	-6.87
153.40	H	12.03	2.01	22.32	43.50 150	36.36	65.77	-7.14
191.80	H	13.60	2.32	20.14	43.50 150	36.06	63.53	-7.44
80.80	V	7.17	1.40	27.43	40.00 100	36.00	63.10	-4.00
151.90	V	11.97	2.01	22.52	43.50 150	36.50	66.83	-7.00
216.00	V	14.26	2.40	19.34	43.50 150	36.00	63.10	-7.50

Test Engineer :

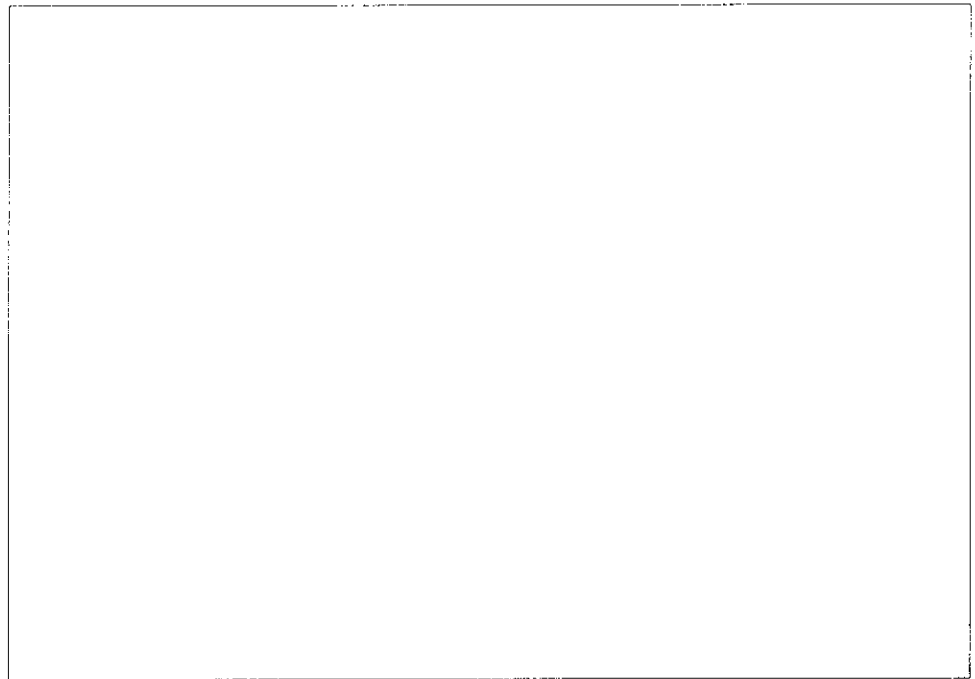
Louis Lin

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	1.70
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

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, 1998	Conduction
LISN	KYORITSU	KNW-407	8-1010-15	50 ohm / 50 μ H	Nov. 10, 1998	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
RF Preselector (Site	HP	85685A	2926A00951	20Hz -1.5GHz	July 18, 1998	Radiation
Spectrum Analyzer (site 1)	HP	8568B	2928A04713	100Hz - 1.5GHz	July 18, 1998	Radiation
Quasi-peak Adapter (site 1)	HP	85650A	2811A01285	9KHz -1 GHz	July 18, 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

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : SCANNER

MODEL NO. : AM12S

F C C I D : ITEUECVSAM12S

FILING TYPE : Original Grant

APPLICANT : ULTIMA Electronics Corp.

9F, No. 18, Alley 1, Lane 768, Sec. 4, Pa Te 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.

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 : SCANNER

MODEL NO. : AM12S

F C C I D : ITEUECVSAM12S

APPLICANT : ULTIMA Electronics Corp.
9F, No. 18, Alley 1, Lane 768, Sec. 4, Pa Te Rd.,
Taipei , 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 **Dec. 24, 1998** at **SPORTON International Inc.**

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

ULTIMA Electronics Corp.

7F, No. 100, Li De Street, Chung Ho City,
Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER :

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : SCANNER

MODEL NO. : AM12S

TRADE NAME : ARTEC, ULTIMA

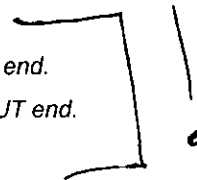
FCC ID. : ITEEUCVSAM12S

SCSI DATA CABLE : Shielded

1. A ferrite core was added on the SCSI cable at EUT end.
2. A ferrite core was added on the Adapter cable at EUT end.

POWER SUPPLY TYPE : Linear

POWER CORD : N/A



1.4. FEATURE OF EQUIPMENT UNDER TEST

- 36-bit true color-over 68 billion colors.
- Color enhancement technology.
- Easy to install, easy to use.
- High speed scanning.
- 3D object scanning.
- PCI SCSI interface.
- Friendly & Powerful user interface.
- Auto scan; Batch scan.
- 19200 DPI high resolution.
- Compatible with Windows 95, NT and Windows 98 environment.
- Professional color correction technology.

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 SONY monitor, SILITEK keyboard, GENIUS PS/2 mouse, HP printer, ACEEX modem, SCSI CD-ROM and EUT were connected to the FIC P.C.
- c. During the test, the monitor AC power cord was plugged into the PC computer-mounted AC outlet and a floor-mounted AC outlet to search the maximum emission.
- d. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- MONITOR (SONY)

FCC ID : AK8GDM17SE2T
Model No. : GDM-17SE2T
Serial No. : SP1006
Data Cable : Shielded, 360 degree via metal backshells, 1.75m
Power Supply Type : Switching
Power Cord : Non-shielded

Support Device 2. --- KEYBOARD (SILITEK)

FCC ID : GYUM99SK
Model No. : SK9001AS2U
Serial No. : SP1008
Data Cable : Shielded, 360 degree via metal backshells, 2.5m

Support Device 3. -- PS/2 MOUSE (GENIUS)

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

Support Device 4. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1015
Data Cable : Shielded, 360 degree via metal backshells, 2.0m
Power Supply Type : Linear, Adapter
Power Cord : Non-shielded

Support Device 5. -- 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

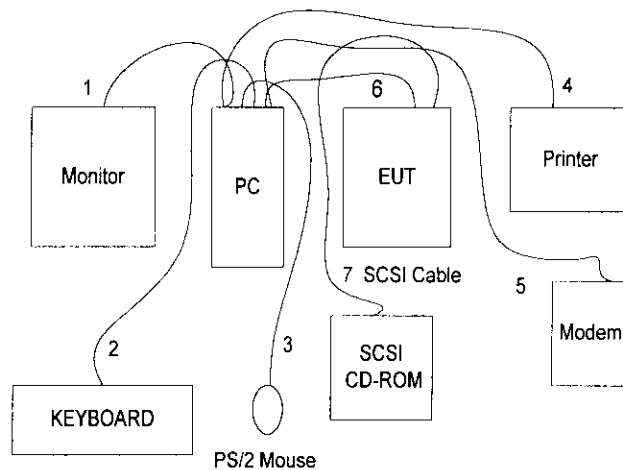
Support Device 6. – SCSI CD-ROM (Advance Storage Device)

FCC ID : KDK93U1000HFS
Model No. : 93U1000HFS
Serial No. : SP1070
Data Cable : Shielded, 0.6m

Support Device 7. --- P.C. (FIC)

FCC ID : N/A
Model No. : P55T2P4
Serial No. : SP1004
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 PC to the support device 1.
2. The I/O cable was connected from PC to the support device 2.
3. The I/O cable was connected from PC to the support device 3.
4. The I/O cable was connected from PC to the support device 4.
5. The I/O cable was connected from PC to the support device 5.
6. The I/O cable was connected from PC to the EUT.
7. The SCSI cable was connected from EUT to the support device 6.

3. TEST SOFTWARE

An executive program, EMITEST.EXE under WIN 3.1, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The EMITEST.EXE 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.

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 1000 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 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

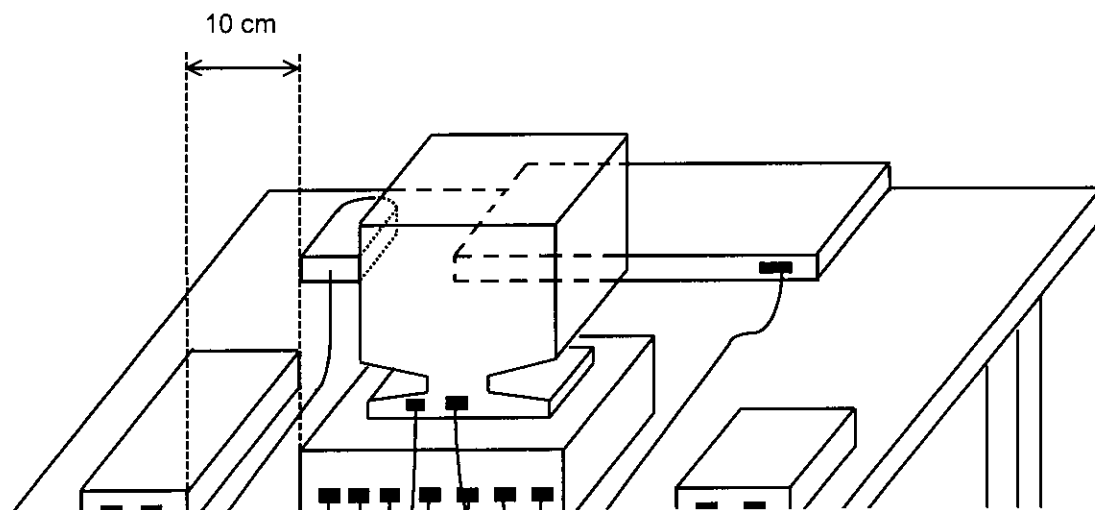


Exhibit #6
FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : SCANNER

MODEL NO. : AM12S

F C C I D : ITEUECVSAM12S

FILING TYPE : Original Grant

APPLICANT : ULTIMA Electronics Corp.
9F, No. 18, Alley 1, Lane 768, Sec. 4, Pa Te Rd.,
Taipei, Taiwan, R.O.C.

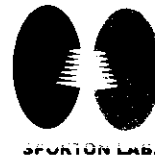
- The test result refers exclusively to the test presented test model / sample.
- Without the written authorization of the test lab., the Test Report may not be copied.

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 : SCANNER

MODEL NO. : AM12S

F C C I D : ITEUECVSAM12S

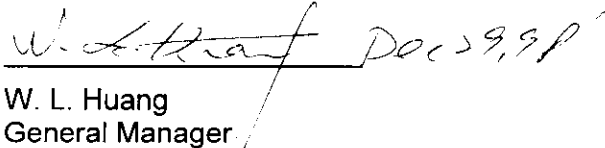
APPLICANT : ULTIMA Electronics Corp.

9F, No. 18, Alley 1, Lane 768, Sec. 4, Pa Te Rd.,
Taipei , 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 **Dec. 24, 1998** at **SPORTON International Inc.**


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

ULTIMA Electronics Corp.

7F, No. 100, Li De Street, Chung Ho City,
Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER :

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : SCANNER

MODEL NO. : AM12S

TRADE NAME : ARTEC, ULTIMA

FCC ID. : ITEEUCVSAM12S

SCSI DATA CABLE : Shielded

1. A ferrite core was added on the SCSI cable at EUT end.
2. A ferrite core was added on the Adapter cable at EUT end.

POWER SUPPLY TYPE : Linear

POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- 36-bit true color-over 68 billion colors.
- Color enhancement technology.
- Easy to install, easy to use.
- High speed scanning.
- 3D object scanning.
- PCI SCSI interface.
- Friendly & Powerful user interface.
- Auto scan; Batch scan.
- 19200 DPI high resolution.
- Compatible with Windows 95, NT and Windows 98 environment.
- Professional color correction technology.

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 SONY monitor, SILITEK keyboard, GENIUS PS/2 mouse, HP printer, ACEEX modem, SCSI CD-ROM and EUT were connected to the FIC P.C.
- c. During the test, the monitor AC power cord was plugged into the PC computer-mounted AC outlet and a floor-mounted AC outlet to search the maximum emission.
- d. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- MONITOR (SONY)

FCC ID : AK8GDM17SE2T
Model No. : GDM-17SE2T
Serial No. : SP1006
Data Cable : Shielded, 360 degree via metal backshells, 1.75m
Power Supply Type : Switching
Power Cord : Non-shielded

Support Device 2. --- KEYBOARD (SILITEK)

FCC ID : GYUM99SK
Model No. : SK9001AS2U
Serial No. : SP1008
Data Cable : Shielded, 360 degree via metal backshells, 2.5m

Support Device 3. -- PS/2 MOUSE (GENIUS)

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

Support Device 4. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1015
Data Cable : Shielded, 360 degree via metal backshells, 2.0m
Power Supply Type : Linear, Adapter
Power Cord : Non-shielded

Support Device 5. -- 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

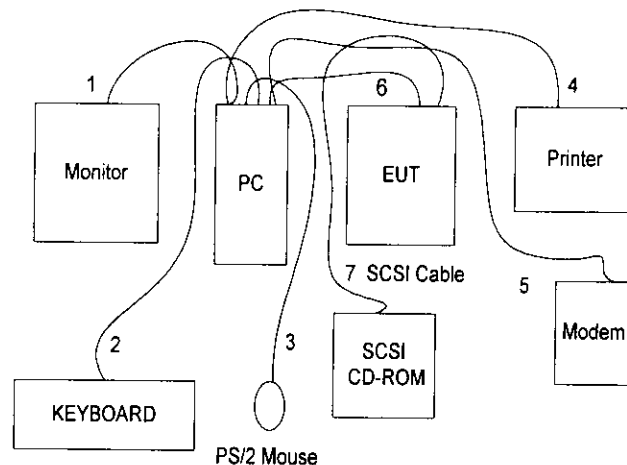
Support Device 6. – SCSI CD-ROM (Advance Storage Device)

FCC ID : KDK93U1000HFS
Model No. : 93U1000HFS
Serial No. : SP1070
Data Cable : Shielded, 0.6m

Support Device 7. --- P.C. (FIC)

FCC ID : N/A
Model No. : P55T2P4
Serial No. : SP1004
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 PC to the support device 1.
2. The I/O cable was connected from PC to the support device 2.
3. The I/O cable was connected from PC to the support device 3.
4. The I/O cable was connected from PC to the support device 4.
5. The I/O cable was connected from PC to the support device 5.
6. The I/O cable was connected from PC to the EUT.
7. The SCSI cable was connected from EUT to the support device 6.

3. TEST SOFTWARE

An executive program, EMITEST.EXE under WIN 3.1, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The EMITEST.EXE 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.

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 1000 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.

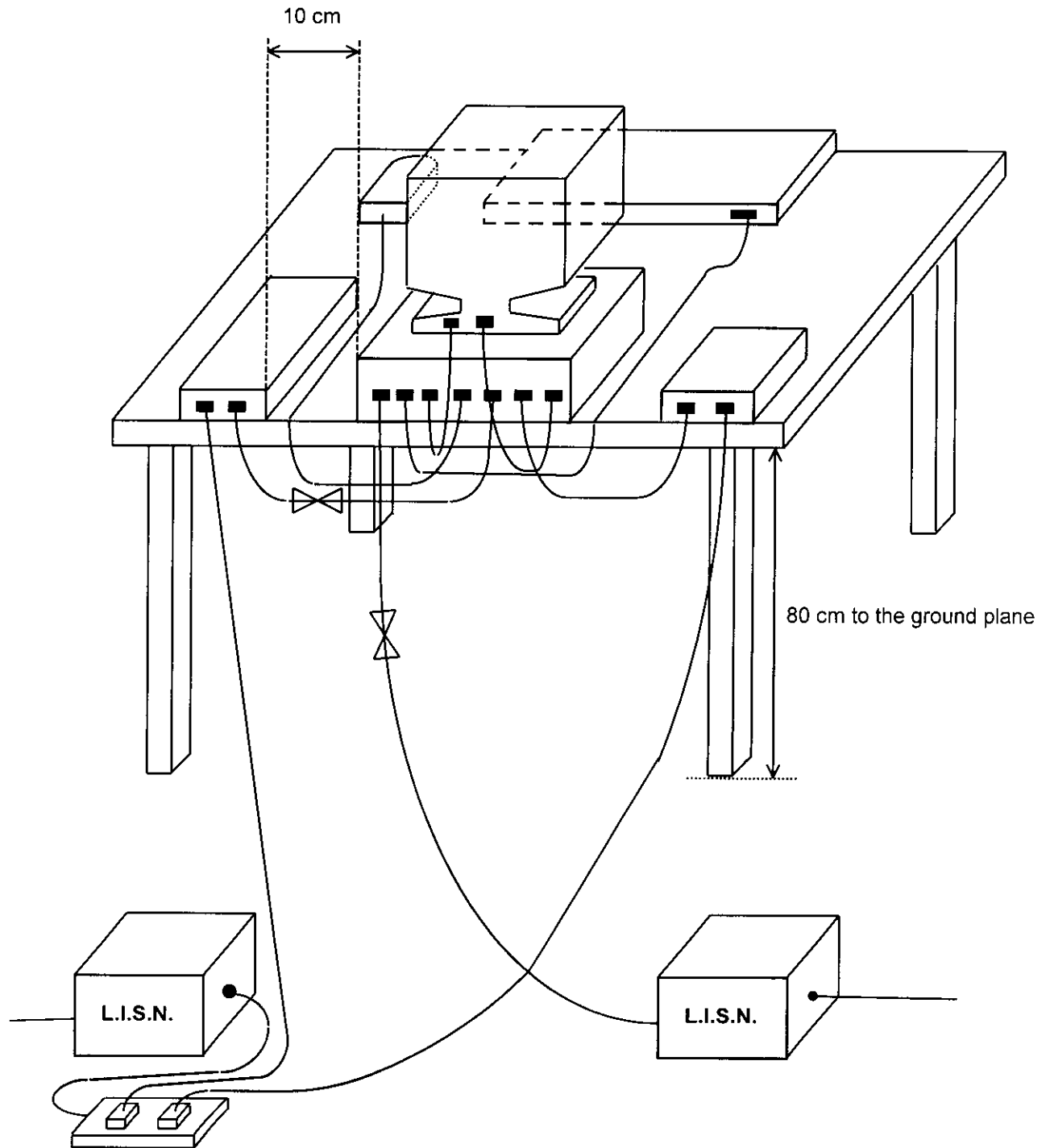
5.1. MAJOR MEASURING INSTRUMENTS

- 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 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 : 23°C
- Relative Humidity : 69 % RH
- Test Date : Dec. 24, 1998

The Conducted Emission test was passed at Neutral 0.59 MHz / 42.50 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.59	Line	41.30	116.14	48.00	251.19	-6.70
0.70	Line	40.60	107.15	48.00	251.19	-7.40
1.09	Line	38.50	84.14	48.00	251.19	-9.50
0.59	Neutral	42.50	133.35	48.00	251.19	-5.50
0.70	Neutral	41.60	120.23	48.00	251.19	-6.40
1.09	Neutral	39.70	96.61	48.00	251.19	-8.30

Test Engineer :



Louis Lin

6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 1000 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

- RF Preselector (HP 85685A)
 - Attenuation 0 dB
 - RF Gain 25 db
 - Signal Input 20 Hz to 1.5 GHz

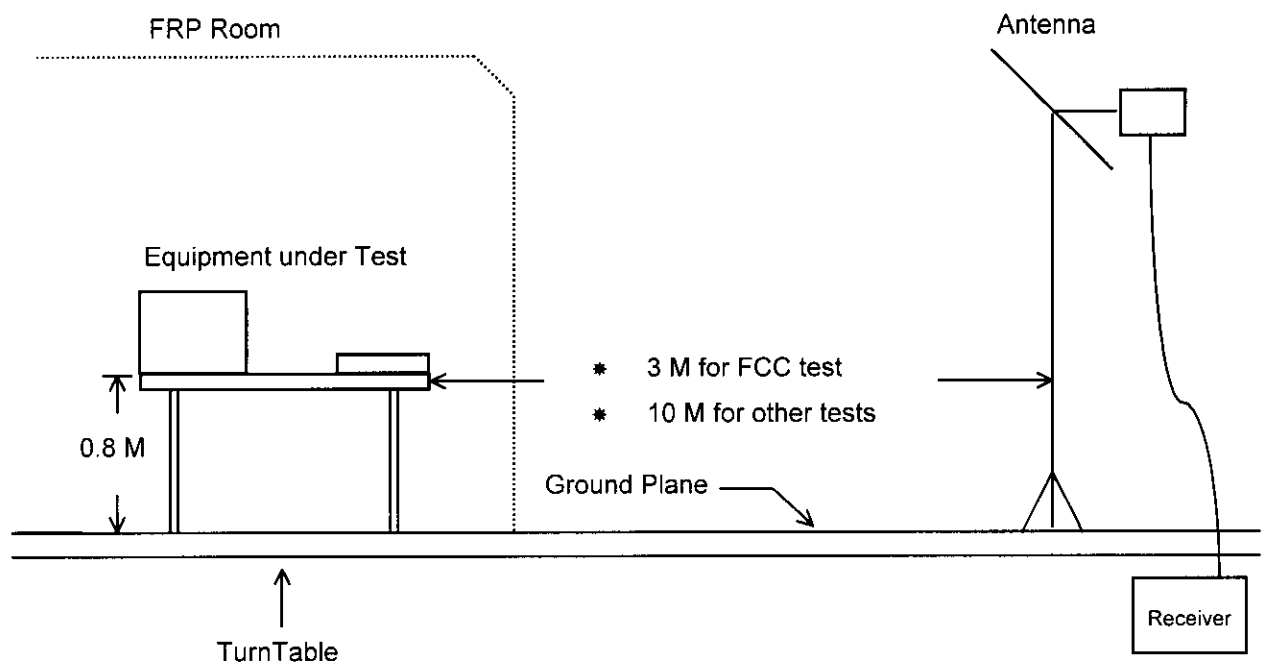
- Spectrum Analyzer (HP 8568B)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 100 Hz to 1.5 GHz

- Quasi-Peak Adapter (HP 85650A)
 - 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 1000 MHz
- Test Distance : 3 M
- Temperature : 22°C
- Relative Humidity : 78% RH
- Test Date : Dec. 24, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 121.50 MHz
Corrected Reading = 10.46 + 1.72 + 24.46 = 36.63 (dBuV/m)

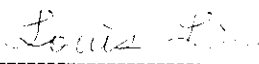
The Radiated Emission test was passed at minimum margin

Vertical 80.80 MHz / 36.00 dBuV

Antenna Height 1.0 Meter , Turntable Degree 168°.

Frequency (MHz)	Polarity	Antenna Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV)	(uV)	Emission (dBuV)	Level (uV)	Margin (dB)
121.50	H	10.46	1.72	24.46	43.50	150	36.63	67.84	-6.87
153.40	H	12.03	2.01	22.32	43.50	150	36.36	65.77	-7.14
191.80	H	13.60	2.32	20.14	43.50	150	36.06	63.53	-7.44
80.80	V	7.17	1.40	27.43	40.00	100	36.00	63.10	-4.00
151.90	V	11.97	2.01	22.52	43.50	150	36.50	66.83	-7.00
216.00	V	14.26	2.40	19.34	43.50	150	36.00	63.10	-7.50

Test Engineer :



Louis Lin

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

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, 1998	Conduction
LISN	KYORITSU	KNW-407	8-1010-15	50 ohm / 50 μ H	Nov. 10, 1998	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
RF Preselector (Site 1)	HP	85685A	2926A00951	20Hz -1.5GHz	July 18, 1998	Radiation
Spectrum Analyzer (site 1)	HP	8568B	2928A04713	100Hz - 1.5GHz	July 18, 1998	Radiation
Quasi-peak Adapter (site 1)	HP	85650A	2811A01285	9KHz -1 GHz	July 18, 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