

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : SCANNER

MODEL NO. : AM24S

F C C I D : ITEUECFSAM24S

FILING TYPE : ORIGINAL CERTIFICATION

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, Sec. 1, Hsin Tai Wu Rd., 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. : AM24S

F C C I D : ITEUECF SAM24S

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 **Mar. 12, 1999** at **SPORTON INTERNATIONAL INC. LAB.**



Lenore Chang
President

SPORTON INTERNATIONAL INC.

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

1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST

1.1. APPLICANT

ULTIMA ELECTRONICS CORP.

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

1.2. MANUFACTURER

Same as 1.1.

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : SCANNER

MODEL NO. : AM24S

TRADE NAME : **ULTIMA**

SCSI CABLE : Shielded, 1.8m

Remark : A ferrite core is added on the data cable at EUT end.

TRANSPARENCY CABLE : Shielded, 1m

POWER SUPPLY TYPE : Switching

INPUT POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- Scanning area : 210mm x 297mm (A4 size)
8.26" x 11.7"
- Optical resolution : 600 × 2400 dpi
- Maximum resolution : 19200 dpi (with S/W interpolation)
- Scanning mode : Line-Art, Gray, Color
- Scanning method : Single-pass with CCD
- Interface : PCI SCSI II
- Power source : 12VDC±5% / 1.5A
- Power consumption : 15W (Max.)

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, PS/2 DELL keyboard, GENIUS PS/2 mouse, HP printer, ACEEX modem, ADVANCE SCSI CD-ROM and EUT were connected to the F.I.C. P.C. for EMI test.
- c. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- 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.)

Support Device 2. --- MONITOR (SONY)

FCC ID : AK8GDM17SE2T
Model No. : GDM-17SE2T
Serial No. : SP1009
Data Cable : Shielded, 360 degree via metal backshells, 1.75m
Power Supply Type : Switching
Power Cord : Non-shielded

Support Device 3. --- PS/2 KEYBOARD (DELL)

FCC ID : GYUM90SK
Model No. : AT101 W
Serial No. : SP1022
Data Cable : Shielded, 360 degree via metal backshells, 2.0m

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

FCC ID : FSUGMZFC
Model No. : NETMOUSE
Serial No. : SP1033
Data Cable : Non-shielded, 1.75m

Support Device 5. --- PRINTER (HP)

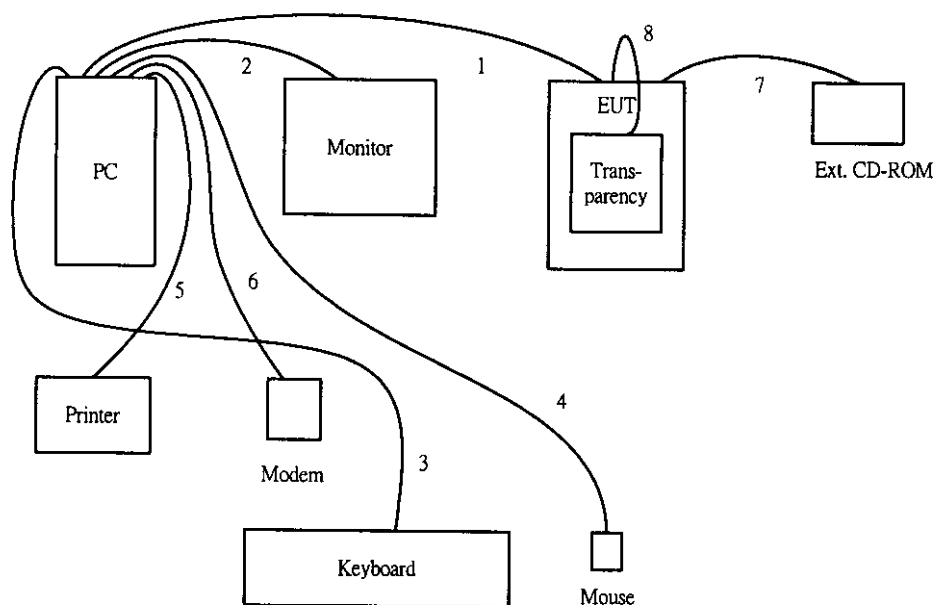
FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1041
Data Cable : Shielded, 360 degree via metal backshells, 1.2m
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded

Support Device 6. --- MODEM (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded
Serial No. : SP1045
Data Cable : Shielded, 360 degree via metal backshells, 1.2m

Support Device 7. --- CD-ROM (ADVANCE)

FCC ID : KDK93U1000HFS
Model No. : 93U1000HFS
Serial No. : SP1081
Data Cable : Shielded, 1.0m
Power Cord : Non-shielded

2.3. CONNECTION DIAGRAM OF TEST SYSTEM

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

3. TEST SOFTWARE

An executive program, EMITEST.EXE under WIN98, 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.

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.

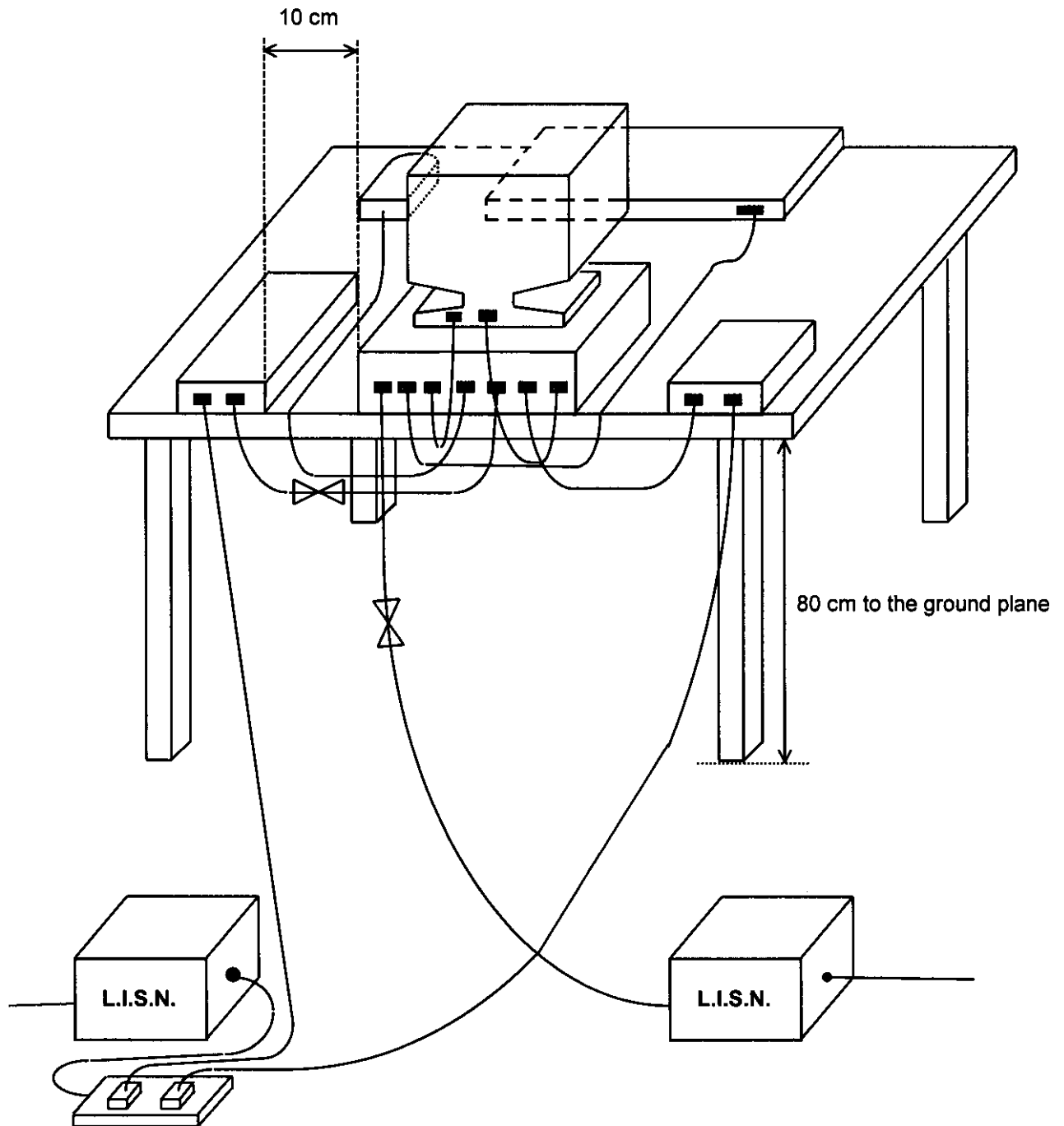
5.1. MAJOR MEASURING INSTRUMENTS

| | |
|-----------------|--------------|
| ● 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

- All emissions not reported here are more than 10 dB below the prescribed limit.
- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 23°C
- Relative Humidity : 48 % RH
- Test Date : Mar. 11, 1999

The Conducted Emission test was passed at Neutral 1.97 MHz/ 39.00 dBuV.

| Frequency (MHz) | Line / Neutral | Meter Reading | | Limits | | Margin |
|----------------------|----------------|---------------|--------|----------|--------|--------|
| | | (dBuV) | (uV) | (dBuV) | (uV) | (dB) |
| 0.59 | L | 34.00 | 50.12 | 48.00 | 251.19 | -14.00 |
| 1.95 | L | 37.50 | 74.99 | 48.00 | 251.19 | -10.50 |
| 20.70 | L | 33.00 | 44.67 | 48.00 | 251.19 | -15.00 |
| 0.56 | N | 33.00 | 44.67 | 48.00 | 251.19 | -15.00 |
| 1.97 | N | 39.00 | 89.13 | 48.00 | 251.19 | -9.00 |
| 5.87 | N | 31.50 | 37.58 | 48.00 | 251.19 | -16.50 |

Test Engineer : Roxy Chou
Roxy Chou

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

- Amplifier (HP 8447D)
 - Attenuation 0 dB
 - RF Gain 25 dB
 - Signal Input 20 Hz to 1.5 GHz

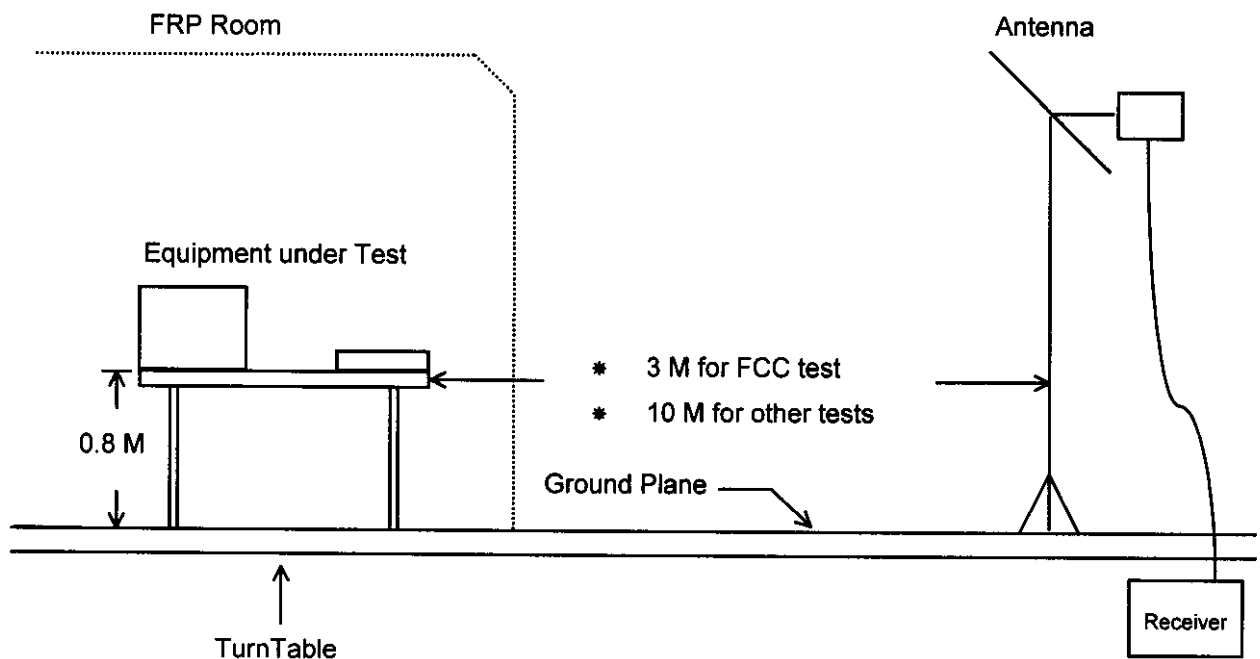
- Spectrum Analyzer (ADVANTEST R3261C)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 9 KHz to 2.6 GHz

- Spectrum Analyzer (ADVANTEST R3261C)
 - 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 : 25°C
 - Relative Humidity : 67 % RH
 - Test Date : Mar. 12, 1999
-
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
 - Sample Calculation at 145.09 MHz
Corrected Reading = 10.50 + 1.30 + 24.58 = 36.38 (dBuV/m)

The Radiated Emission test was passed at

Vertical 427.46 MHz / 43.15 dBuV

Antenna Height 1.0 Meter , Turntable Degree 200 °.

| Frequency (MHz) | Antenna Polarity | Cable Factor | Reading Loss | Limits | Emission | Level | Margin |
|----------------------|---------------------|-----------------|-----------------|----------|----------|--------|--------------------|
| | | (dB/m) | (dB) | (dBuV) | (dBuV/m) | (uV/m) | (dB) |
| 145.09 | H | 10.50 | 1.30 | 24.58 | 43.50 | 150 | 36.38 65.92 -7.12 |
| 83.87 | H | 7.50 | 1.20 | 25.17 | 40.00 | 100 | 33.87 49.37 -6.13 |
| 47.85 | V | 9.10 | 0.90 | 26.88 | 40.00 | 100 | 36.88 69.82 -3.12 |
| 144.07 | V | 10.50 | 1.30 | 25.02 | 43.50 | 150 | 36.82 69.34 -6.68 |
| 427.46 | V | 16.10 | 2.70 | 24.35 | 46.00 | 200 | 43.15 143.71 -2.85 |
| 437.90 | V | 16.40 | 2.70 | 22.97 | 46.00 | 200 | 42.07 126.91 -3.93 |

Test Engineer : Louis Lin

Louis Lin

7. ANTENNA FACTOR AND CABLE LOSS

| Frequency (MHz) | Antenna Factor (dB) | Cable Loss (dB) |
|-------------------|-----------------------|-------------------|
| 30 | 17.2 | 0.8 |
| 35 | 16.2 | 0.9 |
| 40 | 13.0 | 0.9 |
| 45 | 10.5 | 0.9 |
| 50 | 7.0 | 1.0 |
| 55 | 6.2 | 1.1 |
| 60 | 5.3 | 1.1 |
| 65 | 5.2 | 1.1 |
| 70 | 5.2 | 1.1 |
| 75 | 5.9 | 1.1 |
| 80 | 6.8 | 1.2 |
| 85 | 7.9 | 1.2 |
| 90 | 9.0 | 1.2 |
| 95 | 9.8 | 1.3 |
| 100 | 10.6 | 1.4 |
| 110 | 11.5 | 1.3 |
| 120 | 12.3 | 1.3 |
| 130 | 10.9 | 1.3 |
| 140 | 10.5 | 1.2 |
| 150 | 10.5 | 1.5 |
| 160 | 9.6 | 1.6 |
| 170 | 9.6 | 1.5 |
| 180 | 9.7 | 2.0 |
| 190 | 9.5 | 1.8 |
| 200 | 9.4 | 1.6 |
| 220 | 10.7 | 1.7 |
| 240 | 12.0 | 1.8 |
| 260 | 12.8 | 1.9 |
| 280 | 13.0 | 2.0 |
| 300 | 13.3 | 2.0 |
| 320 | 13.8 | 2.1 |
| 340 | 14.3 | 2.2 |
| 360 | 14.7 | 2.4 |
| 380 | 15.1 | 2.5 |
| 400 | 15.5 | 2.6 |
| 450 | 16.7 | 2.8 |
| 500 | 17.8 | 2.9 |
| 550 | 19.2 | 2.9 |
| 600 | 19.0 | 2.9 |
| 650 | 18.7 | 3.3 |
| 700 | 18.5 | 3.7 |
| 750 | 18.5 | 3.6 |
| 800 | 16.8 | 3.4 |
| 850 | 17.0 | 3.7 |
| 900 | 19.0 | 4.0 |
| 950 | 19.9 | 4.1 |
| 1000 | 20.4 | 4.2 |

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 - 30 MHz | Apr. 13, 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 |
| Spectrum Monitor | R&S | EZM | 894987/011 | N/A | Apr. 13, 1998 | Conduction |
| Amplifier (Site 1) | HP | 8447D | 2944A07523 | 20MHz -1.5GHz | Jan. 20, 1999 | Radiation |
| Spectrum Analyzer (site 1) | ADVANTEST | R3261C | 81720145 | 9KHz - 2.6GHz | Mar. 08, 1999 | Radiation |
| Bilog Antenna (site 1) | CHASE | CBL6112A | 2302 | 30MHz - 2GHz | Jan. 30, 1999 | Radiation |
| Half-wave dipole antenna (site 1) | EMCO | 3121C | 8912-496 | 20MHz - 1GHz | Aug. 08, 1998 | Radiation |
| Turn Table | EMCO | 1060-1.211 | 9507-1805 | 0 ~ 360 degree | N/A | Radiation |
| Antenna Mast | EMCO | 2075 | 9806-2160 | 1 m - 4 m | N/A | Radiation |

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