

FCC TEST REPORT

for

47 CFR, Part 2, Part 15 and CISPR PUB. 22 Class B

Equipment : SMART CARD READER
Model No. : GD-RR001
FCC ID : PCEGD-RR001
Filing Type : Original Grant
Applicant : **G-CARD TECHNOLOGY CO., LTD.**
6F-2, No.75, Hsin Taiwu Road, Sec.1 Hsichih,
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.
- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**

SPORTON International Inc.

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

Table of Contents

<u>CERTIFICATE OF COMPLIANCE</u>	3
<u>1. General Description of Equipment under Test</u>	4
1.1. <u>Applicant</u>	4
1.2. <u>Manufacturer</u>	4
1.3. <u>Basic Description of Equipment under Test</u>	4
1.4. <u>Feature of Equipment under Test</u>	4
<u>2. Test Configuration of Equipment under Test</u>	5
2.1. <u>Test Manner</u>	5
2.2. <u>Description of Test System</u>	5
2.3. <u>Connection Diagram of Test System</u>	7
<u>3. Test Software</u>	8
<u>4. General Information of Test</u>	9
4.1. <u>Test Facility</u>	9
4.2. <u>Standard for Methods of Measurement</u>	9
4.3. <u>Test in Compliance with</u>	9
4.4. <u>Frequency Range Investigated</u>	9
4.5. <u>Test Distance</u>	9
<u>5. Test of Conducted Powerline</u>	10
5.1. <u>Major Measuring Instruments</u>	10
5.2. <u>Test Procedures</u>	11
5.3. <u>Typical Test Setup Layout of Conducted Powerline</u>	12
5.4. <u>Test Result of AC Powerline Conducted Emission</u>	13
<u>6. Test of Radiated Emission</u>	14
6.1. <u>Major Measuring Instruments</u>	14
6.2. <u>Test Procedures</u>	15
6.3. <u>Typical Test Setup Layout of Radiated Emission</u>	16
6.4. <u>Test Result of Radiated Emission</u>	17
<u>7. Antenna Factor & Cable Loss</u>	18
<u>8. List of Measuring Equipment Used</u>	20
Appendix A. Photographs of EUT	A1 ~ A3

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 2, Part 15 and CISPR PUB. 22 Class B

Equipment : SMART CARD READER

Model No. : GD-RR001

FCC ID : XXXGD-RR001

Applicant : **G-CARD TECHNOLOGY CO., LTD.**
6F-2, No.75, Hsin Taiwu Road, Sec.1 Hsichih,
Taipei, Taiwan, R.O.C.

I **HEREBY** 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 CISPR PUB. 22** both radiated and conducted emission class B limits. Testing was carried out on Aug. 30, 2000 at **SPORTON International Inc.** LAB. in Lin Kou.

K. J. Lin
Manager

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

G-CARD TECHNOLOGY CO., LTD.
6F-2, No.75, Hsin Taiwu Road, Sec.1 Hsichih,
Taipei, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment : SMART CARD READER
Model No. : GD-RR001
FCC ID : XXXGD-RR001
Trade Name :  GARD
Data Cable : Shielded, 1.5m
Power Supply Type : From PC
Power Cord : N/A

1.4. Feature of Equipment under Test

- Compliance with Microsoft PC / SC spec, for the Window98 / 2000/ NT platform.
- Compliance with ISO 7816-3 standards to R/W all smart cards with existing COS.
- T=0& T=1 protocols.
- Capable of accessing memory cards.
- Capable to edit SIM card.
- Capable of multi-card accessing.
- I / O interface with PS / 2 more cost-effective.
- Short circuit protection.

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. The EUT has been associated with personal computer and peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The HITACHI Monitor, DELL PS/2 Keyboard, PRIMAX PS/2 Mouse, HP Printer and ACEEX Modem were connected to the EUT for EMI test.
- c. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 1000MHz.

2.2. Description of Test System

Support Unit 1. -- Monitor (HITACHI)

FCC ID	: N/A
Model No.	: CM814U
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0033
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 Unit 2. -- PS/2 Keyboard (DELL)

FCC ID	: GYUM92SK
Model No.	: AT101(DE8M)
Serial No.	: SP0054
Data Cable	: Shielded, 360 degree via metal backshells, 1.9m

Support Unit 3. -- PS/2 Mouse (PRIMAX)

FCC ID	: EMJMUSJQ
Model No.	: MUS9J
Serial No.	: SP0045
Data Cable	: Shielded, 360 degree via metal backshells, 1.7m

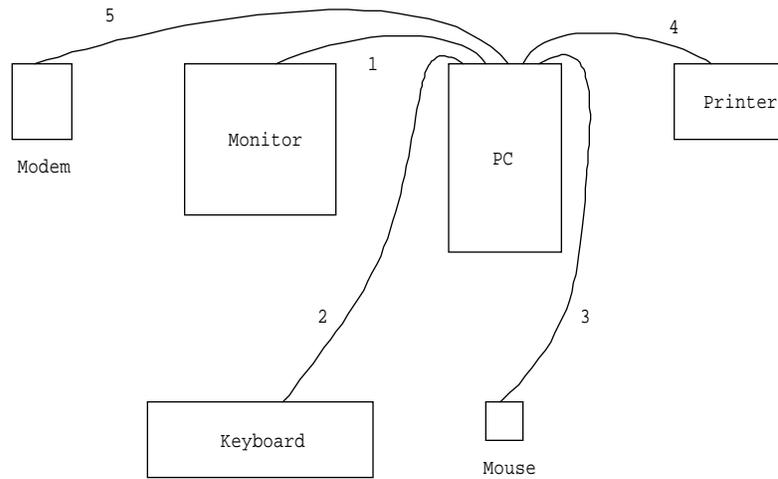
Support Unit 4. -- Printer (HP)

FCC ID : B94C2642X
Model No. : DeskJet 400
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0048
Data Cable : Braided-Shielded, 360 degree via metal backshells, 1.35m

Support Unit 5. -- Modem (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0015
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

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 PC to the support unit 2.
3. The I/O cable is connected from PC to the support unit 3.
4. The I/O cable is connected from PC to the support unit 4.
5. The I/O cable is connected from PC to the support unit 5.

3. Test Software

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

The program was executed as follows :

- a. Turn on the power of all equipment.
- b. The PC reads the test program from the floppy disk drive and runs it.
- c. The PC sends " H" messages to the monitor, and the monitor displays " H" patterns on the screen.
- d. The PC sends " H" messages to the printer, then the printer prints them on the paper.
- e. The PC sends " H" messages to the modem.
- f. The PC sends " H" messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
- g. Repeat the steps from b to f.

At the same time, "DEMO4.EXE" was executed to keep reading / writing data from the EUT.

4. General Information of Test

4.1. Test Facility

This test was carried out by SPORTON International Inc.

Test Site Location : No. 30-2, Lin 6, Diing-Fwu Tsuen, Lin-Kou-Hsiang,
Taipei Hsien, Taiwan, R.O.C.

TEL : 886-2-2601-1640

FAX : 886-2-2601-1695

4.2. Standard for Methods of Measurement

ANSI C63.4-1992

4.3. Test in Compliance with

CISPR PUB. 22 Class B

4.4. Frequency Range Investigated

- a. Conduction: from 150 kHz to 30 MHz
- b. Radiation : from 30 MHz to 1,000 MHz

4.5. Test Distance

The test distance of radiated emission from antenna to EUT is 10 M.

5. Test of Conducted Powerline

Conducted Emissions were measured from 150 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 section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

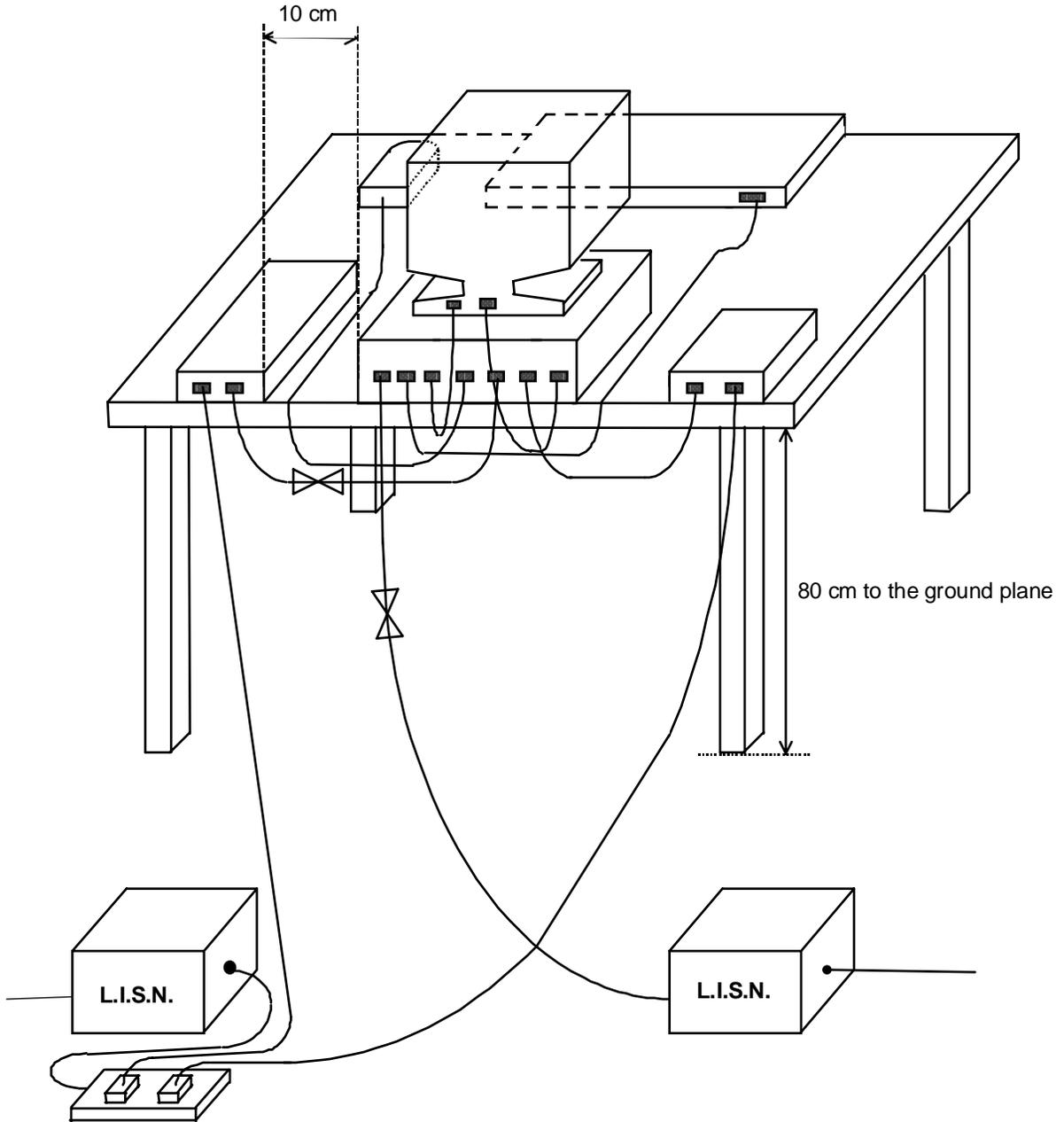
5.1. Major Measuring Instruments

Test Receiver	HP 8591EM
Attenuation	0 dB
Start Frequency	0.15 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 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 150 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 one 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 0.15 MHz to 30 MHz
- Temperature : 26°C
- Relative Humidity : 44 %
- Test Date : Aug. 30, 2000

The Conducted Emission test was passed at minimum margin

LINE 0.271 MHz / 47.50 dBuV.

Frequency (MHz)	Line or Neutral	Meter Reading				Limits				Margin	
		Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dB)	A.V. (dB)
0.271	L	48.50	47.50	266.07	237.14	61.09	51.09	1133.34	358.39	-12.59	-3.59
0.512	L	36.70	35.00	68.39	56.23	56.00	46.00	630.96	199.53	-19.30	-11.00
11.272	L	36.40	34.30	66.07	51.88	60.00	50.00	1000.00	316.23	-23.60	-15.70
0.272	N	48.30	47.10	260.02	226.46	61.06	51.06	1129.36	357.13	-12.76	-3.96
0.514	N	36.80	35.20	69.18	57.54	56.00	46.00	630.96	199.53	-19.20	-10.80
11.325	N	37.30	35.10	73.28	56.89	60.00	50.00	1000.00	316.23	-22.70	-14.90

Test Engineer : 
Aldrich Hong

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1,000 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 section 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 0.1 MHz to 1.3 GHz

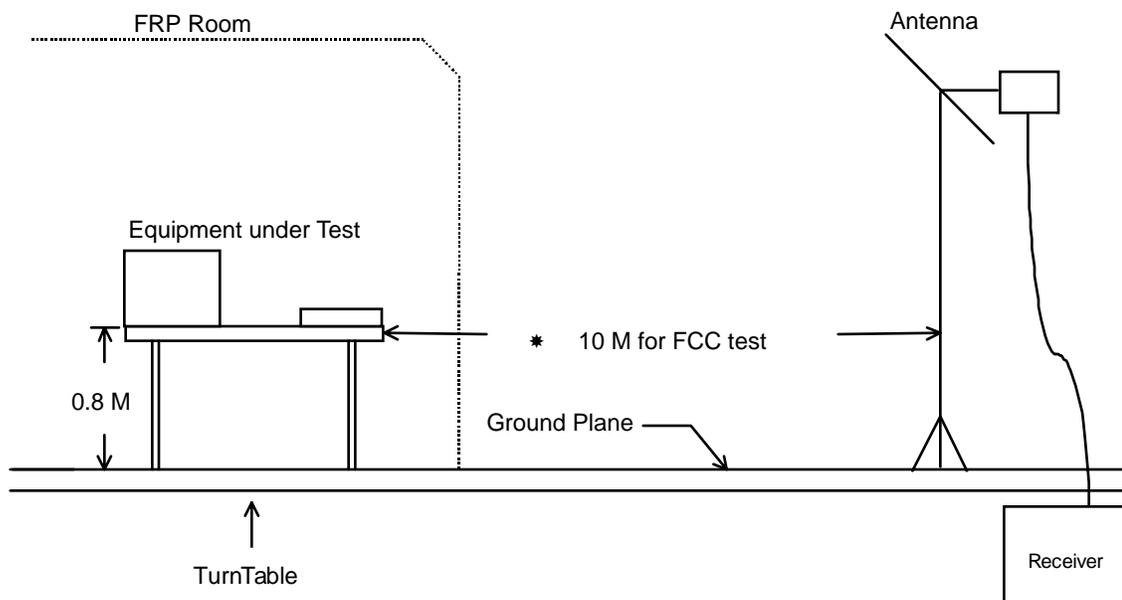
- Spectrum Analyzer (HP 8568B)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 100 Hz to 1.5 GHz

- 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 10 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



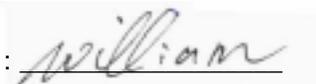
6.4. Test Result of Radiated Emission

- Frequency Range of Test : from 30 MHz to 1,000 MHz
- Test Distance : 10 M
- Temperature : 31°C
- Relative Humidity : 41 %
- Test Date : Aug. 29, 2000
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

222.400 MHz / 25.73 dBuV (VERTICAL) Antenna Height 1 Meter, Turntable Degree 129 °.

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits		Emission (dBuV/m)	Level (uV/m)	Margin (dB)
					(dBuV/m)	(uV/m)			
221.179	H	10.79	1.58	13.35	30.00	31.62	25.72	19.32	-4.28
584.800	H	19.38	3.01	6.81	37.00	70.79	29.20	28.84	-7.80
616.000	H	19.52	3.13	6.64	37.00	70.79	29.29	29.14	-7.71
735.200	H	19.14	3.75	6.91	37.00	70.79	29.80	30.90	-7.20
120.117	V	12.89	1.00	8.44	30.00	31.62	22.33	13.08	-7.67
222.400	V	10.89	1.59	13.25	30.00	31.62	25.73	19.34	-4.27

Test Engineer : 
 WILLIAM LEE

7. Modification

1. Added two ferrite cores on serial cable at two ends. (as shown on page 1 of EUT photo)

8. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	17.0	0.5
35	16.3	0.5
40	12.6	0.5
45	12.4	0.5
50	10.4	0.6
55	8.4	0.6
60	6.4	0.6
65	6.4	0.7
70	6.4	0.8
75	6.7	0.8
80	7.1	0.7
85	7.5	0.9
90	7.8	0.9
95	9.3	0.8
100	10.7	0.9
110	11.9	1.0
120	12.9	1.0
130	12.6	1.0
140	12.2	0.9
150	11.4	1.1
160	9.5	1.1
170	9.8	1.2
180	9.7	1.4
190	9.5	1.4
200	9.3	1.5
220	10.7	1.6
240	12.0	1.5
260	13.0	1.6
280	13.7	1.7
300	14.4	1.8
320	14.9	1.9
340	15.3	2.0
360	15.8	2.1
380	16.3	2.2
400	16.7	2.3
450	17.0	2.6
500	17.3	2.7
550	18.5	2.8
600	19.7	3.1
650	19.2	3.2
700	18.7	3.4
750	19.3	3.9
800	19.9	3.9
850	21.2	4.4
900	22.4	4.0
950	21.7	4.3
1000	20.9	4.5

LKOP3

9. List of Measuring Equipment Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver (site 2)	HP	8591EM	3710A01187	9 KHz - 18 GHz	Sep. 04, 1999	Conduction
LISN (Support Unit) (site 2)	Telemeter	NNB-2/16Z	98087	50 ohm / 50 uH	Dec. 07, 1999	Conduction
LISN (EUT) (site 2)	Telemeter	NNB-2/16Z	98009	50 ohm / 50 uH	Dec. 07. 1999	Conduction
Spectrum Analyzer (site 3)	HP	8568B	2732A04100	100Hz – 1.5GHz	Aug. 03. 2000	Radiation
Bilog Antenna (Site 3)	CHASE	CBL6112A	2322	30MHz -2GHz	Jan. 18. 2000	Radiation
Half-wave dipole antenna (Site 3)	EMCO	3121C	9705-1285	28M - 1GHz	May 17, 2000	Radiation
Turn Table (site 3)	EMCO	2080	9711-2022	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 3)	EMCO	2075	9710-2101	1 m- 4 m	N/A	Radiation

Calibration Interval of instruments listed above is one year.