

FCC TEST REPORT

for

Part 15, Subpart B Class B

Equipment : CARDEXpert 128ZX
Model No. : 9807-00
FCC ID : ICUVGA-GW807
Filing Type : Certification
Applicant : GAINWARD CO., LTD.
12F., No. 96, Hsin Tai Wu Rd., Sec. 1,
Hsin-Chih, Taipei Hsien, Taiwan, R.O.C.

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

SPORTON International Inc.

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

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CERTIFICATE OF COMPLIANCE

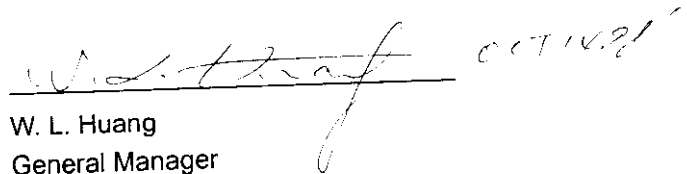
for

FCC Part 15, Subpart B Class B

Equipment : CARDEXpert 128ZX
Model No. : 9807-00
FCC ID : ICUVGA-GW807
Prepared for : GAINWARD CO., LTD.
12F., No. 96, Hsin Tai Wu Rd., Sec. 1,
Hsin-Chih, Taipei Hsien, 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** both radiated and conducted emission class B limits. Testing was carried out on Oct. 8, 1998 at **SPORTON International Inc. LAB** in Nei Hwu.


W. L. Huang
General Manager

SPORTON International Inc.

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

FCC TEST REPORT**1. General Description of Equipment under Test****1.1. Applicant**

GAINWARD CO., LTD.
12F., No. 96, Hsin Tai Wu Rd., Sec. 1,
Hsin-Chih, Taipei Hsien, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment	: CARDEXpert 128ZX
Model No.	: 9807-00
FCC ID	: ICUVGA-GW807
Trade Name	: CARDEXpert
Data Cable	: Shielded
Power Supply Type	: N/A
Power Cord	: N/A

1.4. Feature of Equipment under Test

- Using the unparalleled 128 bit NVIDIA RIVA 128ZX, 3D Graphics Accelerator
- Bus mastering DMA 66MHz AGP 1.0 Interface
- Display Memory 4/8MB SGRAM for Riva128ZX
- Provides 2X(Riva128ZX)AGP support
- Maximum Resolution 1600x1200
- Support VESA DDC and DPMS
- Support flash Rom for easy to update your BIOS
- Full support for Direct3D,OpenGL

FCC TEST REPORT**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 GENIUS PS/2 Mouse, HP Printer, ACEEX Modem and EUT were connected to the FIC PC for EMI test.
- c. The following display resolution were investigated during the compliance test:
 1. Horizontal frequency (640x480 to 1,600x1,200, 31.47 KHz to 107 KHz)
 2. Vertical frequency (60 Hz to 85 Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
 1. 1,600 x1,200 (non-interlaced 107 KHz), refresh rate 85 Hz.
 2. 1,280x1,024 (non-interlaced 91 KHz), refresh rate 85 Hz.
- e. Frequency range investigated: conduction 450 KHz to 30 MHz, radiation 30 MHz to 2,000 MHz.

2.2. Description of Test System

Support Unit 1. -- Personal Computer (FIC)

FCC ID	: N/A
Model No.	: P2L97
Data Cable	: Shielded, 360 degree via metal backshells
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0006
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- PS/2 Mouse (Genius)

FCC ID	: FSUGMZFC
Model No.	: Netmouse
Power Supply Type	: N/A
Serial No.	: SP0022
Data Cable	: Non-Shielded

Support Unit 3. -- Printer (HP)

FCC ID : DSI6XU225
Model No. : 2225C
Power Supply Type : Linear
Serial No. : SP0014
Data Cable : Shielded, 360 degree via metal backshells

Support Unit 4. -- Modem (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear
Power Cord : N/A
Serial No. : SP0025
Data Cable : Shielded, 360 degree via metal backshells

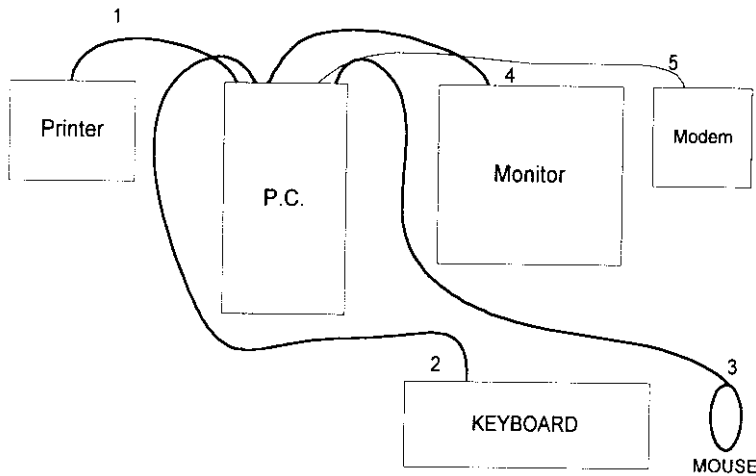
Support Device 5. --- MONITOR (HITACHI)

FCC ID : M9U9705C97BMD
Model No. : CM-803ET
Serial No. : SP1012
Data Cable : Shielded, 360 degree via metal backshells
Power Supply Type : Switching
Power Card : Non-shielded

Support Device 6. --- KEYBOARD (DELL)

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

2.3. Connection Diagram of Test System



1. The I/O cable is connected to the support device 3.
2. The I/O cable is connected to the support device 6.
3. The I/O cable is connected to the support device 2.
4. The I/O cable is connected to the support device 5.
5. The I/O cable is connected to the support device 4.

3. Test Software

An executive program, WINFCC.EXE under WIN98, which generates a complete line of continuously repeating "H" pattern is used as the test software.

The program was executed as follows :

- a. Turn on the power of all equipment.
- B. The PC reads the test program from the floppy disk drive and runs it.
- C. The PC sends "H" messages to the 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 : 886-2-2631-9739
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 2,000 MHz

4.5. Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

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

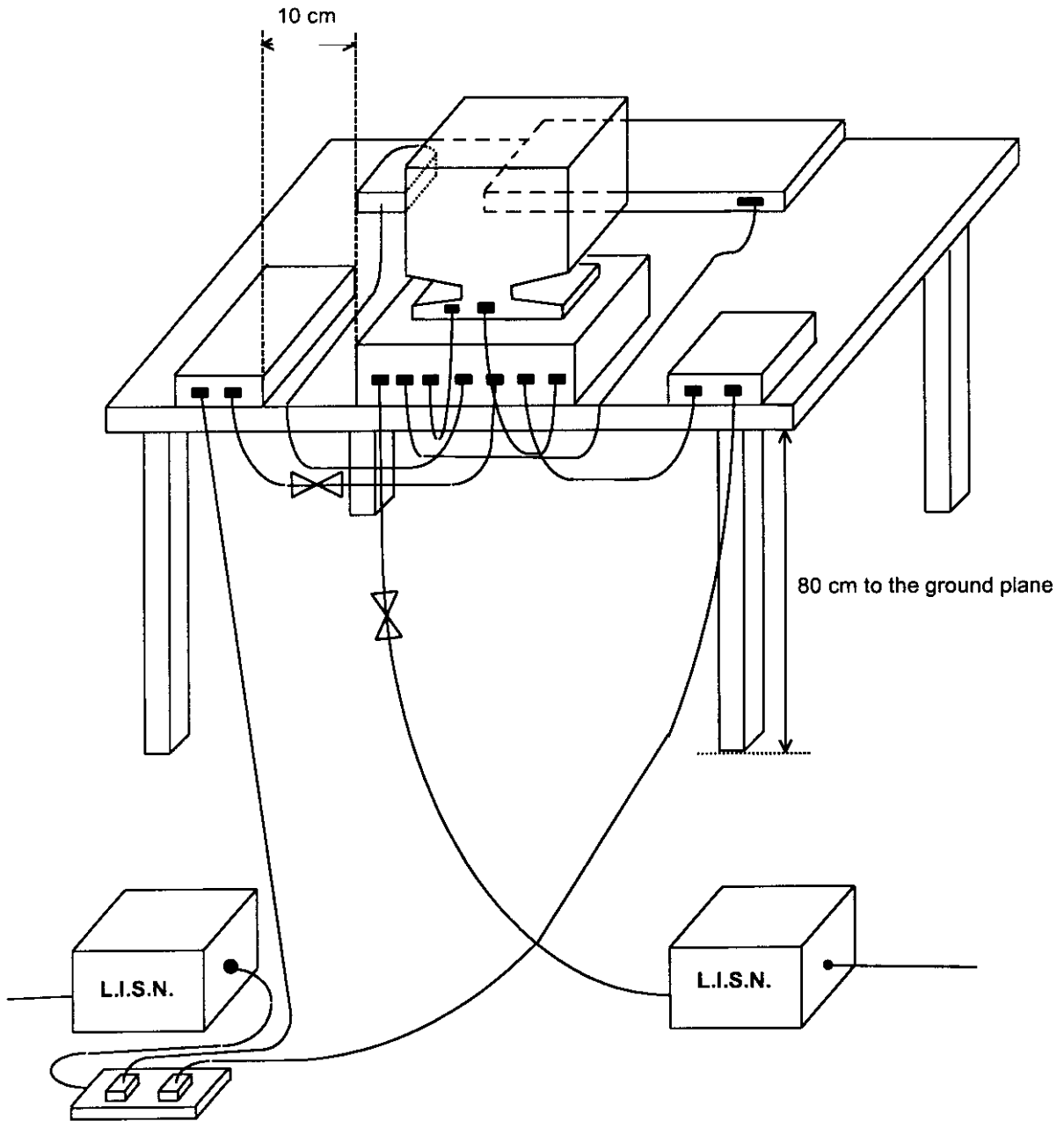
5.1. Major Measuring Instruments

- Test Receiver (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 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 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

5.4.1 Test mode : 1280x1024 91K/85Hz

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 26°C
- Relative Humidity : 54 %
- Test Date : Oct. 8, 1998
- All emissions not reported here are more than 10 dB below the prescribed limit.

The Conducted Emission test was passed at minimum margin

NEUTRAL 0.478 MHz / 38.90 dBuV.

Freq. (MHz)	Line/ Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.466	L	38.50	84.00	48.00	251.19	-9.50
5.257	L	36.70	68.00	48.00	251.19	-11.30
19.266	L	35.50	60.00	48.00	251.19	-12.50
0.478	N	38.90	88.00	48.00	251.19	-9.10
5.183	N	37.20	72.00	48.00	251.19	-10.80
19.586	N	33.70	48.00	48.00	251.19	-14.30

Test Engineer : Benson Tsai
 BENSON TSAI

5.4.2 Test mode : 1600x1200 107K/85Hz

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 26°C
- Relative Humidity : 54 %
- Test Date : Oct. 8, 1998
- All emissions not reported here are more than 10 dB below the prescribed limit.

The Conducted Emission test was passed at minimum margin

LINE 0.480 MHz / 39.80 dBuV.

Freq. (MHz)	Line/ Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.480	L	39.80	98.00	48.00	251.19	-8.20
4.857	L	37.60	76.00	48.00	251.19	-10.40
18.254	L	35.80	62.00	48.00	251.19	-12.20
0.489	N	39.20	91.00	48.00	251.19	-8.80
4.623	N	36.50	67.00	48.00	251.19	-11.50
19.243	N	34.80	55.00	48.00	251.19	-13.20

Test Engineer : Benson Tsai
 BENSON TSAI

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 2,000 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

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

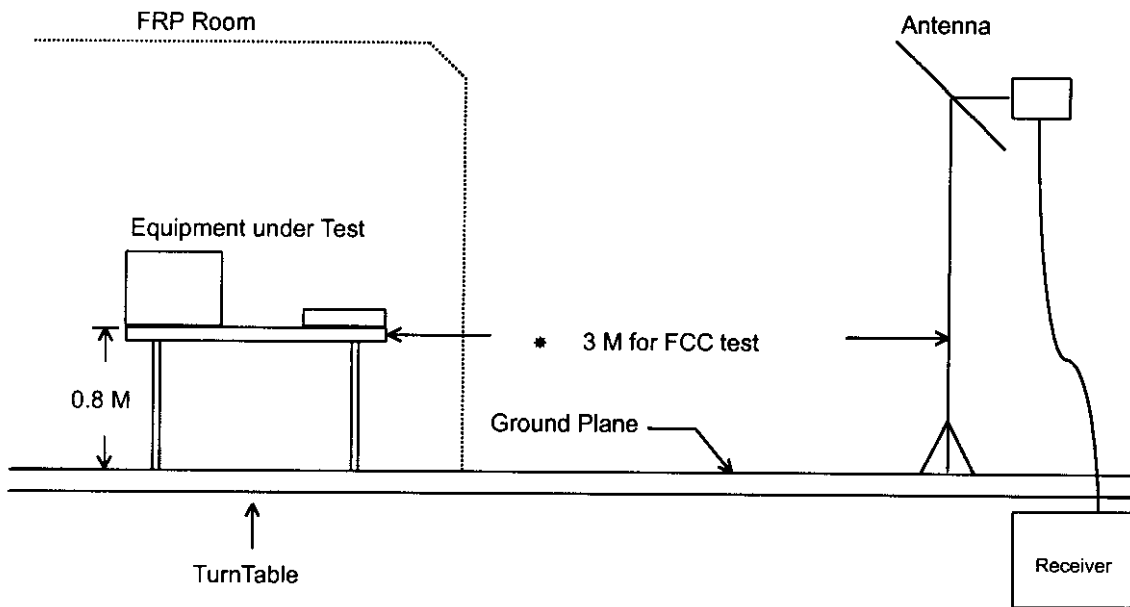
- Spectrum Analyzer (HP 8568B)
Attenuation 0 dB
Start Frequency 30 MHz
Stop Frequency 2000 MHz
Resolution Bandwidth 1 MHz
Video Bandwidth 1 MHz
Signal Input 100 Hz to 1.5 GHz

- 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

6.4.1 Test mode : 1280x1024 91K/85Hz

- Test Distance : 3 M
- Temperature : 29°C
- Relative Humidity : 58 %
- Test Date : Oct. 8, 1998
- 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

333.510 MHz / 41.72 dBuV (HORIZONTAL) Antenna Height 1 Meter, Turntable Degree 180 °.

Frequency (MHz)	Polarity	Antenna Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Limits		Emission (dBuV)	Level (uV)	Margin (dB)
					(dBuV)	(uV)			
333.510	H	14.00	3.00	25.00	46.00	199.53	41.72	122.00	-4.28
433.080	H	17.00	4.00	18.00	46.00	199.53	38.99	89.00	-7.01
120.130	V	12.00	2.00	22.00	43.50	149.62	35.78	62.00	-7.72
201.440	V	9.00	2.00	22.00	43.50	149.62	33.25	46.00	-10.25
250.800	V	12.00	3.00	27.00	46.00	199.53	41.59	120.00	-4.41
535.060	V	19.00	4.00	16.00	46.00	199.53	38.95	89.00	-7.05

Test Engineer : Benson Tsai
 BENSON TSAI

6.4.2 Test mode : 1600x1200 107K/85Hz

- Test Distance : 3 M
- Temperature : 29°C
- Relative Humidity : 58 %
- Test Date : Oct. 8, 1998
- 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

66.330 MHz / 34.76 dBuV (HORIZONTAL) Antenna Height 4 Meter, Turntable Degree 180 °.

Frequency (MHz)	Polarity	Antenna Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Limits		Emission (dBuV)	Level (uV)	Margin (dB)
					(dBuV)	(uV)			
66.330	H	6.00	1.00	28.00	40.00	100.00	34.76	55.00	-5.24
292.557	H	13.00	3.00	21.00	46.00	199.53	37.25	73.00	-8.75
291.754	V	13.00	3.00	22.00	46.00	199.53	38.46	84.00	-7.54
408.189	V	16.00	3.00	22.00	46.00	199.53	40.51	106.00	-5.49
522.215	V	18.00	4.00	16.00	46.00	199.53	38.41	83.00	-7.59
535.063	H	19.00	4.00	14.00	46.00	199.53	36.75	69.00	-9.25

Test Engineer : Benson Tsai
 BENSON TSAI

7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	17.7	0.9
35	15.6	1.1
40	13.0	1.0
45	10.1	1.2
50	8.0	1.2
55	6.4	1.2
60	6.1	1.2
65	5.9	1.4
70	6.4	1.3
75	6.3	1.5
80	7.2	1.5
85	7.5	1.6
90	8.5	1.6
100	10.1	1.7
110	10.4	1.9
120	11.8	1.8
130	11.2	2.3
140	11.7	2.0
150	11.9	2.2
160	10.5	2.1
180	9.0	2.0
200	9.1	2.3
225	9.5	2.5
250	11.8	2.6
300	13.6	2.9
350	14.8	3.1
400	16.3	3.4
450	17.3	3.7
500	17.7	3.7
550	19.5	3.9
600	20.0	4.1
650	20.4	4.3
700	21.0	4.6
750	21.4	4.9
800	22.1	4.8
850	22.9	5.0
900	22.7	5.1
950	24.1	5.3
1000	24.9	5.5
2000	25.1	5.6

8. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Test Receiver	R&S	ESH3	893495/013	9 KHz - 30MHz	Apr. 13, 1998	Conduction
Test Receiver	R&S	ESVP	893610/003	20MHz - 1.3 GHz	Apr. 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	Apr. 13, 1998	Conduction
RF Preselector (Site 1)	HP	85685A	2926A00951	20Hz -1.5GHz	Jul. 18, 1998	Radiation
Spectrum Analyzer (site 1)	HP	8568B	2928A04713	100Hz - 1.5GHz	Jul. 18, 1998	Radiation
Quasi-peak Adapter (site 1)	HP	85650A	2811A01285	9KHz -1GHz	Jul. 18, 1998	Radiation
Bilog Antenna (site 1)	CHASE	CBL6112A	2302	30MHz - 2GHz	Jan. 27, 1998	Radiation
Half-wave dipole antenna (site 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