FCC TEST REPORT

for

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

Equipment : VGA CARD

Model No. : SP7200T285V128DV; SP7200T285V128TV; SP7200T285V128T1; SP7200T285V128PU; SP7200T285X064DV; SP7200T285X064TV; SP7200T285X064T1; SP7200T285X064PU

FCC ID : M697200T2

Filing Type : Certification

Applicant : **SPARKLE COMPUTER CO., LTD**
13F, No. 2, Sec. 1, Fu Hsing S. Rd., Taipei, 104, Taiwan, R.O.C.

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SPORTON International Inc.

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

Table of Contents

History of this test report ii
CERTIFICATE OF COMPLIANCE 1
1. General Description of Equipment under Test 2
1.1 Applicant 2
1.2 Manufacturer 2
1.3 Basic Description of Equipment under Test 2
1.4 Feature of Equipment under Test 3
2. Test Configuration of Equipment under Test 4
2.1 Test Manner 4
2.2 Description of Test System 4
2.3 Connection Diagram of Test System 7
3. Test Software 8
4. General Information of Test 9
4.1 Test Facility 9
4.2 Standard for Methods of Measurement 9
4.3 Test in Compliance with 9
4.4 Frequency Range Investigated 9
4.5 Test Distance 9
5. Test of Conducted Powerline 10
5.1 Major Measuring Instruments 10
5.2 Test Procedures 11
5.3 Typical Test Setup Layout of Conducted Powerline 12
5.4 Test Result of AC Powerline Conducted Emission 13
6. Test of Radiated Emission 16
6.1 Major Measuring Instruments 16
6.2 Test Procedures 17
6.3 Typical Test Setup Layout of Radiated Emission 18
6.4 Test Result of Radiated Emission 19
7. Antenna Factor & Cable Loss 22
8. EMI Suppression Component List 23
9. List of Measuring Equipment Used 24
10. Uncertainty of Test Site 25
Appendix A. Photographs of EUT ..... A1 ~ A2

History of this test report

Original Report Issue Date: Oct. 5, 2002

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F273109

CERTIFICATE OF COMPLIANCE

for

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

Equipment : VGA CARD

Model No. : SP7200T285V128DV; SP7200T285V128TV;
SP7200T285V128T1; SP7200T285V128PU;
SP7200T285X064DV; SP7200T285X064TV;
SP7200T285X064T1; SP7200T285X064PU

FCC ID : M697200T2

Applicant : **SPARKLE COMPUTER CO., LTD**
13F, No. 2, Sec. 1, Fu Hsing S. Rd., Taipei, 104, 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 limits. Testing was carried out on **Sep. 27, 2002** at **SPORTON International Inc.** LAB.

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

SPARKLE COMPUTER CO., LTD
13F, No. 2, Sec. 1, Fu Hsing S. Rd., Taipei, 104, Taiwan, R.O.C.

1.2 Manufacturer

Same as 1.1.

1.3 Basic Description of Equipment under Test

Equipment	: VGA CARD
Model No.	: SP7200T285V128DV; SP7200T285V128TV; SP7200T285V128T1; SP7200T285V128PU; SP7200T285X064DV; SP7200T285X064TV; SP7200T285X064T1; SP7200T285X064PU
FCC ID	: M697200T2
Trade Name	: SPARKLE
S-Video Cable	: Shielded, 0.6m
VGA Cable	: Shielded, 1.7m
DVI Cable	: Shielded, 1.7m
Power Supply Type	: From PC
AC Power Input	: N/A

1.4 Feature of Equipment under Test

GeForce4 Ti 4200 AGP bus, with 64/128MB DDR SDRAM on Board
Graphics core 256-BIT
Fill rate (AA samples/sec.) 4.0 BILLION
Operations/sec 1.03 Trillion
Memory bandwidth 8.0 GB/SEC

nView Display Technology
-nView delivers the maximum flexibility and control in display options
-nView allows for one card to driver multiple displays of any type(Analog, Digital, TV)
-Allows for multiple configurations of CRTs and digital flat panels
-Multi-desktop integration
-Advanced window management
-Individual application control

Lightspeed Memory Architecture (LMA) II engine for unmatched performance
-For independent memory controllers
-Lossless Z-compression
-Z-occlusion culling
-Fast Z-clear
-Auto-precharge

Ti Memory Crossbar
Dual memory controllers allow more efficient utilization of memory bandwidth

Accuview-high-resolution antialiasing
-Accuview technology delivers highest performance and no-penalty Quincunx AA quality
-Advanced technology ensures rock-solid compatibility with all applications
-New sub pixel sample locations provide improved AA quality.
-High quality 4XS mode for incredible image quality

Other function
High performance 2D rendering engine
High-quality HDTV/DVD playback
High-definition video processor(HDVP)for full-screen, full-screen, full-frame video playback of HDTV and DVD content
Hardware accelerated real-time shadows
True, reflective bump mapping

Operating systems support

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 complete test included HP PC, Genuine PS/2 Keyboard, LOGITECH PS/2 Mouse, HP Printer, ACEEX Modem, JVC TV, HITACHI Monitor, REALsync LCD Monitor and EUT for EMI test.

c. The following test modes were performed:
   Mode 1. 1920 × 1440 75Hz/112K, CRT Only
   Mode 2. 1280 x 1024 60Hz/64K, CRT + LCD
   Mode 3. 640 × 480 60Hz/31K, CRT + TV

d. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 2000MHz.

2.2 Description of Test System

Support Unit 1. -- Personal Computer (HP)

FCC ID	: N/A
Model No.	: VECTRA VL420 DT
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0040
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 (Genuine)

FCC ID	: N/A
Model No.	: K288
Serial No.	: SP0054
Data Cable	: Shielded, 360 degree via metal backshells, 1.3m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

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

FCC ID	: DZL211029
Model No.	: M-S34
Serial No.	: SP0108
Data Cable	: Shielded, 1.7m

Support Unit 4. -- Printer (HP)

FCC ID	: B94C2642X
Model No.	: DJ 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

Support Unit 6. -- TV (JVC)

FCC ID	: N/A
Model No.	: TM-1700PN
Serial No.	: SP0014
Data Cable	: Shielded, 1.7m

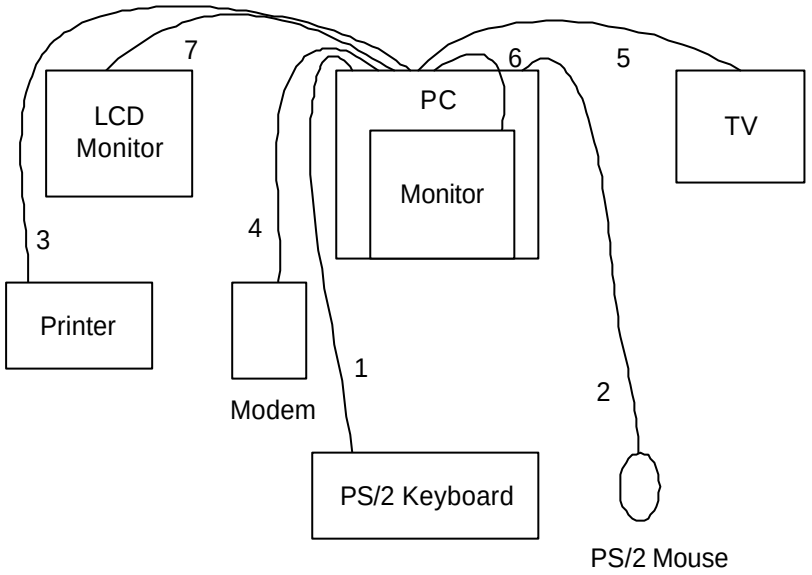
Support Unit 7. -- Monitor (HITACHI)

FCC ID	: N/A
Model No.	: CM823F
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0013
Data Cable	: Shielded, 360 degree via metal backshells, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 8. – LCD Monitor (REALsync)

FCC ID	: N/A
Model No.	: LS690udvi
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0076
Data Cable	: Shielded, 360 degree via metal backshells, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

2.3 Connection Diagram of Test System



1. The I/O cable is connected from PC to the support unit 2.
2. The I/O cable is connected from PC to the support unit 3.
3. The I/O cable is connected from PC to the support unit 4.
4. The I/O cable is connected from PC to the support unit 5.
5. The S-Video cable is connected from EUT to the support unit 6.
6. The VGA cable is connected from EUT to the support unit 7.
7. The DVI cable is connected from EUT to the support unit 8.

3. Test Software

An executive program, EMCTEST.EXE under WIN 2000, 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 hard 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 c to f.

4. General Information of Test

4.1 Test Facility

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

Test Site No. : CL01, OL01

4.2 Standard for Methods of Measurement

ANSI C63.4-1992

4.3 Test in Compliance with

CISPR PUB. 22 and FCC Part 15, Subpart B Class B

4.4 Frequency Range Investigated

a. Conduction: from 150 kHz to 30 MHz
b. Radiation : from 30 MHz to 2000 MHz

4.5 Test Distance

a. The test distance of radiated emission from antenna to EUT is 10 M (from 30MHz~1000MHz).
b. The test distance of radiated emission from antenna to EUT is 3 M (from 1GHz~2GHz).

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

• Spectrum	(HP 8591EM)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9KHz

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.

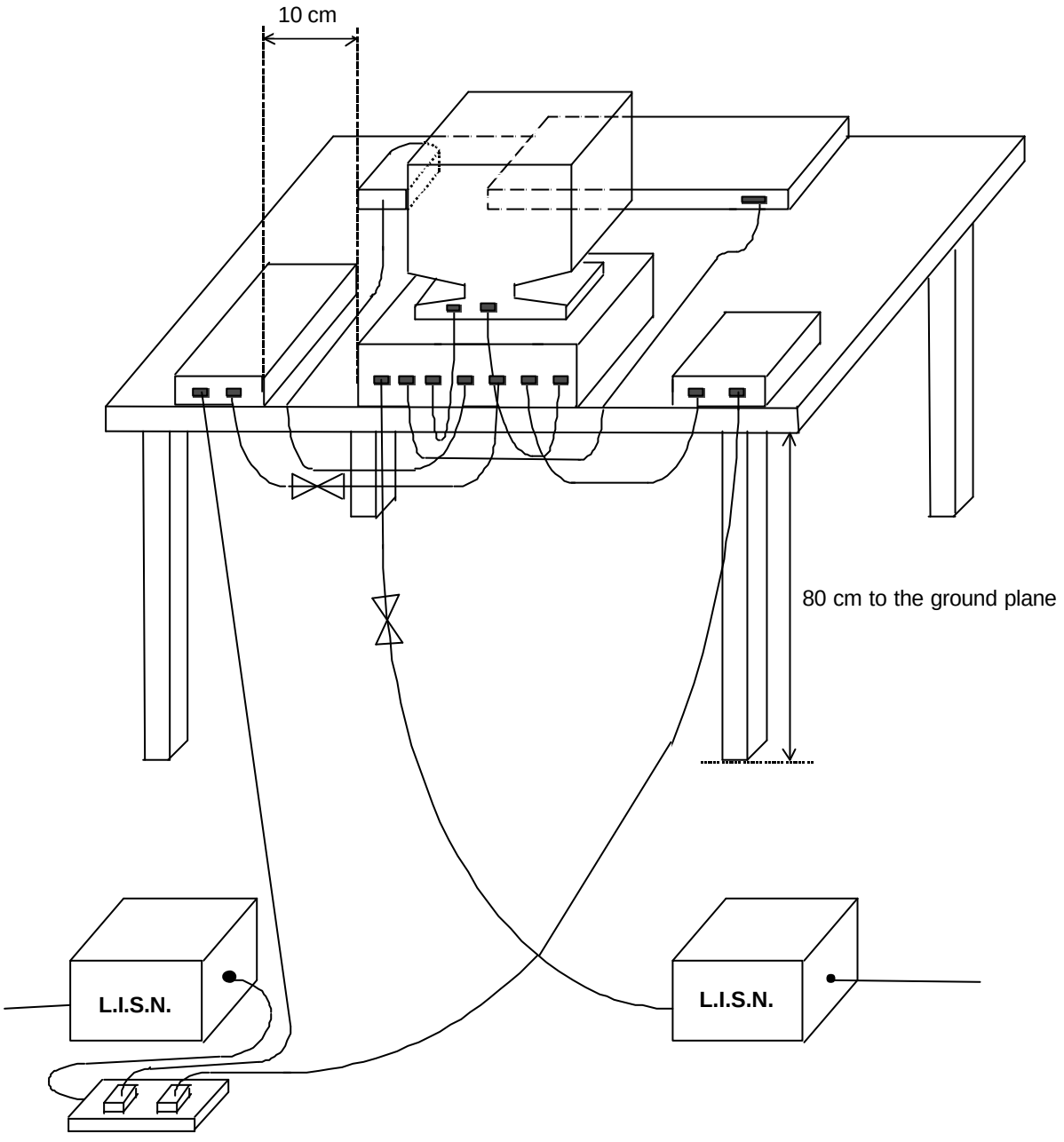
e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.

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.

5.3 Typical Test Setup Layout of Conducted Powerline



5.4 Test Result of AC Powerline Conducted Emission

5.4.1 Test Mode: Mode 1

- Frequency Range of Test : from 0.15 MHz to 30 MHz
- Temperature : 25°C
- Relative Humidity : 56 %
- Test Date : Sep. 27, 2002
- All emissions not reported here are more than 10 dB below the prescribed limit.

The Conducted Emission test was passed at minimum margin NEUTRAL 1.948 MHz / 39.70 dBuV.

Freq.	Line	Meter Reading				Limits				Margin	
	or	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.
(MHz)	Neutral	(dBuV)	(dBuV)	(uV)	(uV)	(dBuV)	(dBuV)	(uV)	(uV)	(dB)	(dB)
0.241	L	44.90	31.40	175.79	37.15	62.06	52.06	1267.90	400.94	-17.2	-20.7
0.486	L	39.00	37.90	89.13	78.52	56.24	46.24	648.33	205.02	-17.2	-8.3
1.948	L	40.80	39.60	109.65	95.50	56.00	46.00	630.96	199.53	-15.2	-6.4
2.048	L	42.70	38.70	136.46	86.10	56.00	46.00	630.96	199.53	-13.3	-7.3
2.533	L	41.20	37.50	114.82	74.99	56.00	46.00	630.96	199.53	-14.8	-8.5
13.281	L	33.90	30.10	49.55	31.99	60.00	50.00	1000.00	316.23	-26.1	-19.9
0.242	N	44.10	35.90	160.32	62.37	62.03	52.03	1262.89	399.36	-17.9	-16.1
0.486	N	38.90	38.00	88.10	79.43	56.24	46.24	648.33	205.02	-17.3	-8.2
1.948	N	41.90	39.70	124.45	96.61	56.00	46.00	630.96	199.53	-14.1	-6.3
2.048	N	43.30	39.10	146.22	90.16	56.00	46.00	630.96	199.53	-12.7	-6.9
2.533	N	41.70	37.60	121.62	75.86	56.00	46.00	630.96	199.53	-14.3	-8.4
13.281	N	34.70	30.80	54.33	34.67	60.00	50.00	1000.00	316.23	-25.3	-19.2

Test Engineer : Jason

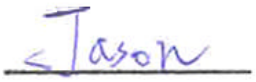
Jason Chang

5.4.2 Test Mode: Mode 2

- Frequency Range of Test : from 0.15 MHz to 30 MHz
- Temperature : 25°C
- Relative Humidity : 56 %
- Test Date : Sep. 27, 2002
- All emissions not reported here are more than 10 dB below the prescribed limit.

The Conducted Emission test was passed at minimum margin NEUTRAL 2.051 MHz / 42.70 dBuV.

Freq.	Line	Meter Reading				Limits				Margin	
	or	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.
(MHz)	Neutral	(dBuV)	(dBuV)	(uV)	(uV)	(dBuV)	(dBuV)	(uV)	(uV)	(dB)	(dB)
0.241	L	43.80	31.00	154.88	35.48	62.06	52.06	1267.90	400.94	-18.3	-21.1
0.487	L	39.50	38.30	94.41	82.22	56.22	46.22	647.05	204.62	-16.7	-7.9
0.964	L	37.30	31.80	73.28	38.90	56.00	46.00	630.96	199.53	-18.7	-14.2
1.932	L	40.20	36.40	102.33	66.07	56.00	46.00	630.96	199.53	-15.8	-9.6
2.051	L	43.30	37.60	146.22	75.86	56.00	46.00	630.96	199.53	-12.7	-8.4
13.137	L	35.40	30.10	58.88	31.99	60.00	50.00	1000.00	316.23	-24.6	-19.9
0.241	N	45.10	36.10	179.89	63.83	62.06	52.06	1267.90	400.94	-17.0	-16.0
0.487	N	39.80	38.40	97.72	83.18	56.22	46.22	647.05	204.62	-16.4	-7.8
0.964	N	37.90	32.70	78.52	43.15	56.00	46.00	630.96	199.53	-18.1	-13.3
1.932	N	46.20	42.00	204.17	125.89	56.00	46.00	630.96	199.53	-9.8	-4.0
2.051	N	47.80	42.70	245.47	136.46	56.00	46.00	630.96	199.53	-8.2	-3.3
13.137	N	35.30	30.40	58.21	33.11	60.00	50.00	1000.00	316.23	-24.7	-19.6

Test Engineer : 

Jason Chang

5.4.3 Test Mode: Mode 3

- Frequency Range of Test : from 0.15 MHz to 30 MHz
- Temperature : 25°C
- Relative Humidity : 56 %
- Test Date : Sep. 27, 2002
- All emissions not reported here are more than 10 dB below the prescribed limit.

The Conducted Emission test was passed at minimum margin LINE 1.948 MHz / 38.80 dBuV.

Freq.	Line	Meter Reading				Limits				Margin	
	or	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.
(MHz)	Neutral	(dBuV)	(dBuV)	(uV)	(uV)	(dBuV)	(dBuV)	(uV)	(uV)	(dB)	(dB)
0.487	L	39.50	38.40	94.41	83.18	56.22	46.22	647.05	204.62	-16.7	-7.8
0.974	L	35.40	34.00	58.88	50.12	56.00	46.00	630.96	199.53	-20.6	-12.0
1.948	L	40.00	38.80	100.00	87.10	56.00	46.00	630.96	199.53	-16.0	-7.2
2.045	L	43.20	38.50	144.54	84.14	56.00	46.00	630.96	199.53	-12.8	-7.5
3.367	L	46.70	38.20	216.27	81.28	56.00	46.00	630.96	199.53	-9.3	-7.8
15.792	L	34.50	22.00	53.09	12.59	60.00	50.00	1000.00	316.23	-25.5	-28.0
0.487	N	39.30	38.50	92.26	84.14	56.22	46.22	647.05	204.62	-16.9	-7.7
0.974	N	35.20	33.80	57.54	48.98	56.00	46.00	630.96	199.53	-20.8	-12.2
1.948	N	39.90	38.70	98.86	86.10	56.00	46.00	630.96	199.53	-16.1	-7.3
2.045	N	43.30	38.40	146.22	83.18	56.00	46.00	630.96	199.53	-12.7	-7.6
3.367	N	46.60	38.10	213.80	80.35	56.00	46.00	630.96	199.53	-9.4	-7.9
5.051	N	39.20	30.70	91.20	34.28	60.00	50.00	1000.00	316.23	-20.8	-19.3

Test Engineer : Jason

Jason Chang

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

6.1.1 from 30MHz to 1GHz

- Amplifier (HP 8447D)
  - Attenuation 10 dB
  - RF Gain 25 dB
  - Signal Input 0.1 MHz to 1.3 GHz

- Spectrum Analyzer (ADVANTEST R3261C)
  - Attenuation 10 dB
  - Start Frequency 30 MHz
  - Stop Frequency 1000 MHz
  - Resolution Bandwidth 120 KHz
  - Signal Input 9kHz – 2.6GHz

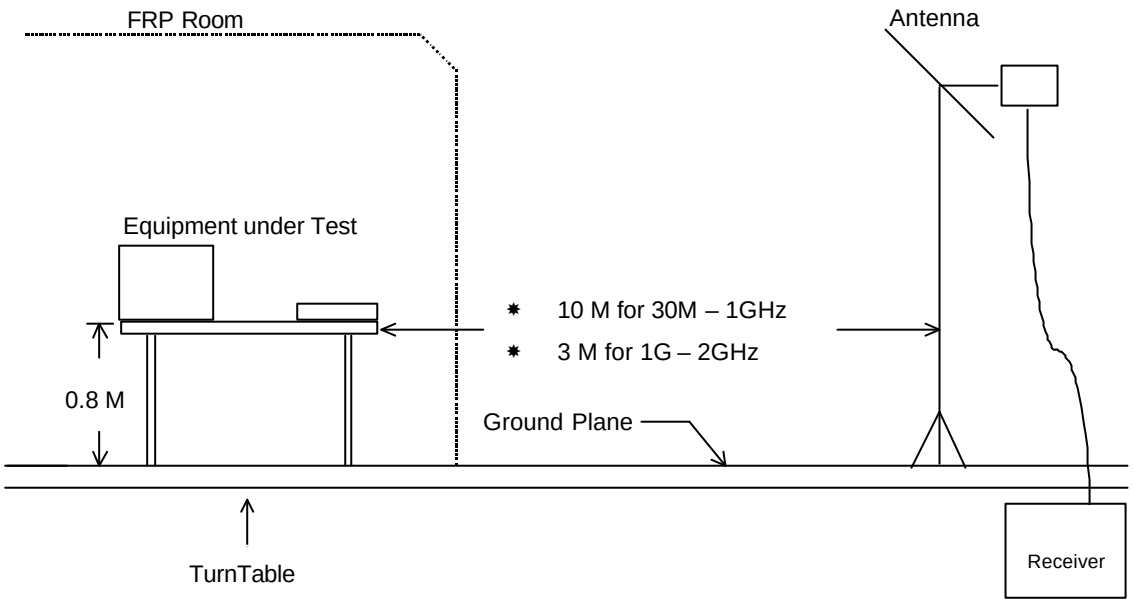
6.1.2 from 1GHz to 2GHz

- Spectrum (HP 85462A)
  - Attenuation 10 dB
  - Start Frequency 1000 MHz
  - Stop Frequency 2000 MHz
  - Resolution Bandwidth 1 MHz
  - Video Bandwidth 1 MHz
  - Signal Input 9 KHz to 6.5 GHz

6.2 Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3/10 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 3 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 3 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: Mode 1

- Frequency Range of Test : from 30 MHz to 2000 MHz
- Temperature : 26°C
- Relative Humidity : 65 %
- Test Date : Sep. 26, 2002
- 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

982.400 MHz / 35.39 dBuV/m (VERTICAL) Antenna Height 2 Meter, Turntable Degree 47 °.

- Test Distance : 10M for 30MHz ~ 1GHz

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission	Level	Margin
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
999.000	H	21.78	10.72	2.87	37.00	70.79	35.37	58.68	-1.63
33.979	V	16.20	1.03	8.46	30.00	31.62	25.69	19.25	-4.31
46.954	V	11.81	1.26	12.29	30.00	31.62	25.36	18.54	-4.64
874.400	V	19.90	10.32	3.22	37.00	70.79	33.44	46.99	-3.56
897.600	V	20.17	10.70	3.69	37.00	70.79	34.56	53.46	-2.44
982.400	V	21.52	10.73	3.14	37.00	70.79	35.39	58.82	-1.61

- Test Distance : 3M for 1GHz ~ 2GHz

Remark: Frequency from 1000MHz to 2000MHz, the emission emitted by the EUT is too low to be measured

Test Engineer :

William Lee

6.4.2 Test Mode: Mode 2

- Frequency Range of Test : from 30 MHz to 2000 MHz
- Temperature : 26°C
- Relative Humidity : 65 %
- Test Date : Sep. 26, 2002
- 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

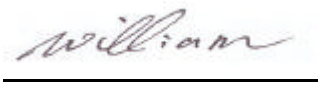
972.000 MHz / 35.79 dBuV/m (VERTICAL) Antenna Height 2 Meter, Turntable Degree 44 °.

- Test Distance : 10M for 30MHz ~ 1GHz

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Limits (uV/m)	Emission (dBuV/m)	Level (uV/m)	Margin (dB)
656.000	H	19.35	8.07	6.99	37.00	70.79	34.41	52.54	-2.59
999.000	H	21.78	10.72	3.16	37.00	70.79	35.66	60.67	-1.34
195.561	V	9.64	2.92	14.79	30.00	31.62	27.35	23.31	-2.65
257.600	V	12.87	3.68	12.02	37.00	70.79	28.57	26.82	-8.43
972.000	V	21.35	10.73	3.71	37.00	70.79	35.79	61.59	-1.21
999.000	V	21.78	10.72	3.09	37.00	70.79	35.59	60.19	-1.41

- Test Distance : 3M for 1GHz ~ 2GHz

Remark: Frequency from 1000MHz to 2000MHz, the emission emitted by the EUT is too low to be measured

Test Engineer : 

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6.4.3 Test Mode: Mode 3

- Frequency Range of Test : from 30 MHz to 1000 MHz
- Test Distance : 10 M
- Temperature : 26°C
- Relative Humidity : 65 %
- Test Date : Sep. 26, 2002
- 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

999.000 MHz / 35.98 dBuV/m (HORIZONTAL) Antenna Height 1 Meter, Turntable Degree 62 °.

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Limits (uV/m)	Emission (dBuV/m)	Level (uV/m)	Margin (dB)
227.200	H	11.31	3.27	10.86	30.00	31.62	25.44	18.71	-4.56
999.000	H	21.78	10.72	3.48	37.00	70.79	35.98	62.95	-1.02
47.473	V	11.26	1.28	13.89	30.00	31.62	26.43	20.97	-3.57
226.400	V	11.25	3.26	10.25	30.00	31.62	24.76	17.30	-5.24
843.200	V	19.52	9.76	3.14	37.00	70.79	32.42	41.78	-4.58
982.400	V	21.52	10.73	1.54	37.00	70.79	33.79	48.92	-3.21

Test Engineer :

William Lee

7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Remark
30	15.7	1.0	10m
35	16.3	1.0	10m
40	15.6	1.2	10m
45	12.4	1.2	10m
50	9.6	1.3	10m
55	7.9	1.4	10m
60	6.2	1.5	10m
65	6.3	1.5	10m
70	6.4	1.5	10m
75	6.6	1.5	10m
80	7.0	1.5	10m
85	7.7	1.7	10m
90	8.5	1.8	10m
95	9.3	1.9	10m
100	10.1	2.0	10m
110	10.8	2.1	10m
120	11.5	2.1	10m
130	12.6	2.2	10m
140	11.8	2.4	10m
150	10.6	2.5	10m
160	10.1	2.6	10m
170	9.7	2.7	10m
180	9.6	2.8	10m
190	9.6	2.9	10m
200	9.6	3.0	10m
220	10.9	3.2	10m
240	12.1	3.4	10m
260	12.9	3.7	10m
280	13.3	4.1	10m
300	13.7	4.4	10m
320	14.2	4.6	10m
340	14.7	4.7	10m
360	15.2	4.9	10m
380	15.7	5.1	10m
400	16.2	5.3	10m
450	17.2	5.8	10m
500	18.2	6.3	10m
550	18.9	6.8	10m
600	19.6	7.3	10m
650	19.4	8.0	10m
700	19.1	8.7	10m
750	19.1	8.9	10m
800	19.0	9.0	10m
850	19.6	9.9	10m
900	20.2	10.8	10m
950	21.0	10.7	10m
1000	21.8	10.7	10m
1000	25.1	3.8	3m
2000	31.0	5.8	3m

8. EMI Suppression Component List

No EMI suppression components.

9. List of Measuring Equipment Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum	HP	8591EM	3710A01187	9KHz ~ 1.8GHz	Sep. 23, 2002	Conduction (CL01)
LISN	Rolf Heine	NNB-2/16Z	98009	9KHz ~ 30MHz	Dec. 17, 2001	Conduction (CL01)
LISN	Rolf Heine	NNB-2/16Z	980877	9KHz ~ 30MHz	Dec. 17, 2001	Conduction (CL01)
Spectrum Analyzer	Advantest	R3261C	81720145	9KHz-2.6GHz	May 16, 2002	Radiation (OL01)
Amplifier	HP	8447D	2944A08242	100KHz -1.3GHz	Apr. 06, 2002	Radiation (OL01)
Bilog Antenna	CHASE	CBL6112A	2672	30MHz -2GHz	Jun. 22, 2002	Radiation (OL01)
Half-wave dipole antenna	R&S	HZ12 HZ13	83924403 83924503	30MHz - 1GHz	Sep. 23, 2002	Radiation (OL01)
Turn Table	EMCO	2080	9711-2022	0 ~ 360 degree	N/A	Radiation (OL01)
Antenna Mast	EMCO	2075	9710-2101	1 m- 4 m	N/A	Radiation (OL01)
Spectrum	HP	85462A	3325A00158	9KHz~6.5GHz	Jan. 15, 2002	Radiation
Horn Antenna	EMCO	3115	9610-4976	1GHz~18GHz	Jul. 12, 2002	Radiation

※ Calibration Interval of instruments listed above is one year.

10. Uncertainty of Test Site

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	Rectangular	±2.5
LISN coupling specification	Rectangular	±1.5
Transducer factor frequency interpolation	Rectangular	±0.2
Mismatch Receiver VSWR Γ1=0.09 LISN VSWR Γ2=0.33 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	0.2
combined standard uncertainty Ue(y)	**Normal**	**±1.7**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**±3.4**

$U=\sqrt{\{(0.3/2)^2+(2.5^2+1.5^2+0.2^2)/3+(0.2)^2/2\}}=1.7$

Uncertainty of Radiated Emission Measurement

Contribution	**Probability Distribution**	3m	10m
Antenna factor calibration	normal(k=2)	±1.6	±1.6
cable loss calibration	normal(k=2)	±0.3	±0.3
RCV/SPA specification	rectangular	±2.5	±2.5
Antenna Directivity	rectangular	±3	±0.5
Antenna Factor V.S. Height	rectangular	±2	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25	±0.25
site imperfection	rectangular	±2	±2
Mismatch Receiver VSWR Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	±0.54	±0.54
combined standard uncertainty Ue(y)	**normal**	**±2.9**	**±2.4**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**±5.8**	**±4.8**

$U=\sqrt{\{(1.6/2)^2+(0.3/2)^2+(3^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.4$ for 10m test distance

$U=\sqrt{\{(1.6/2)^2+(0.3/2)^2+(3^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.8$ for 3m test distance