

FCC TEST REPORT

for

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

Equipment : IPC
Model No. : AMB-2457
FCC ID : N/A
Filing Type : Verification
Applicant : **AAEON TECHNOLOGY INC.**
5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien
City, 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.

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CERTIFICATE OF COMPLIANCE

for

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

Equipment : IPC

Model No. : AMB-2457

FCC ID : N/A

Applicant : **AAEON TECHNOLOGY INC.**
5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien
City, 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 A limits. Testing was carried out on Mar. 23, 2001 at **SPORTON International Inc. LAB.**

 Mar. 27, 2001

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

AAEON TECHNOLOGY INC.
5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien
City, Taipei, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment : IPC
Model No. : AMB-2457
FCC ID : N/A
Trade Name : AAEON
STP DATA CABLE : Double-Shielded, 10m
Panel DATA CABLE : Double-Shielded, 0.2m
Power Supply Type : Switching
AC Power Cord : Non-Shielded, 1.75m, 3 pin

1.4. Feature of Equipment under Test

- CPU : INTEL CELERON 366MHz
- 15" XGA color TFT LCD display
- Aluminum alloy front panel heavy -duly steel chassis
- Memory : 32MB SDRAM (Up to 768MB)
- LCD/CRT controller : C&T 89000 VGA controller 2MB SDRAM embedded. CRT& LCD panel support
- Network (LAN) : Realtek RTL8139B 10/100 Base-T Ethernet controller (optional)
- 1 x RS-232
- 1 parallel port (supports ECP/EPP)
- 1 PS/2 keyboard interface
- CDROM : VINTECH/VISS24A/24x
- Expansion Slots : 7 ISA/PCI slots
- HDD : Quantum/3.5"
- Power : MAGIC/MPI-925A

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. The EUT has been associated with 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 remote workstation, SONY Monitor, DELL PS/2 Keyboard, HP Printer and ACEEX Modem were connected to the EUT for EMI test. The remote workstation included SONY Monitor, DELL PS/2 Keyboard and FIC PC.
- c. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 2000MHz.

2.2. Description of Test System

Support Unit 1. -- Monitor (SONY) – for remote and local workstation

FCC ID	: AK8GDM17SE2T
Model No.	: GDM-17SE2T
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0013
Data Cable	: Shielded, 1.15m

Support Unit 2. -- PS/2 Keyboard (DELL) – for remote and local workstation

FCC ID	: GYUM90SK
Model No.	: AT101W
Serial No.	: SP0019
Data Cable	: Shielded, 1.5m

Support Unit 3. -- Printer (HP) – for local workstation

FCC ID	: DSI6XU2225
Model No.	: 2225C
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0014
Data Cable	: Shielded, 360 degree via metal backshells, 1.2m

Support Unit 4. -- Modem (ACEEX) – for local workstation

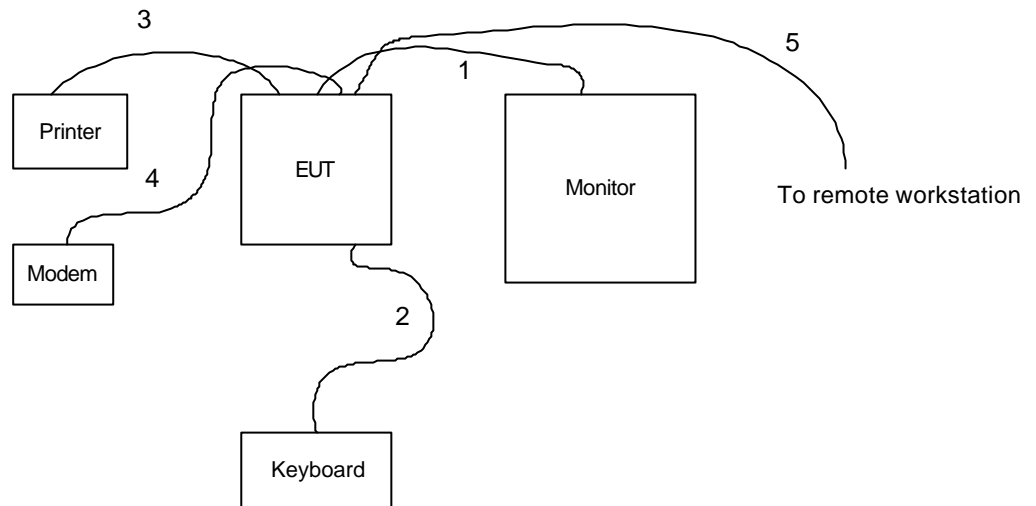
FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0015
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

Support Unit 5. -- Personal Computer (FIC) – for remote workstation

FCC ID : N/A
Model No. : P2L97
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0037
Data Cable : Shielded
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

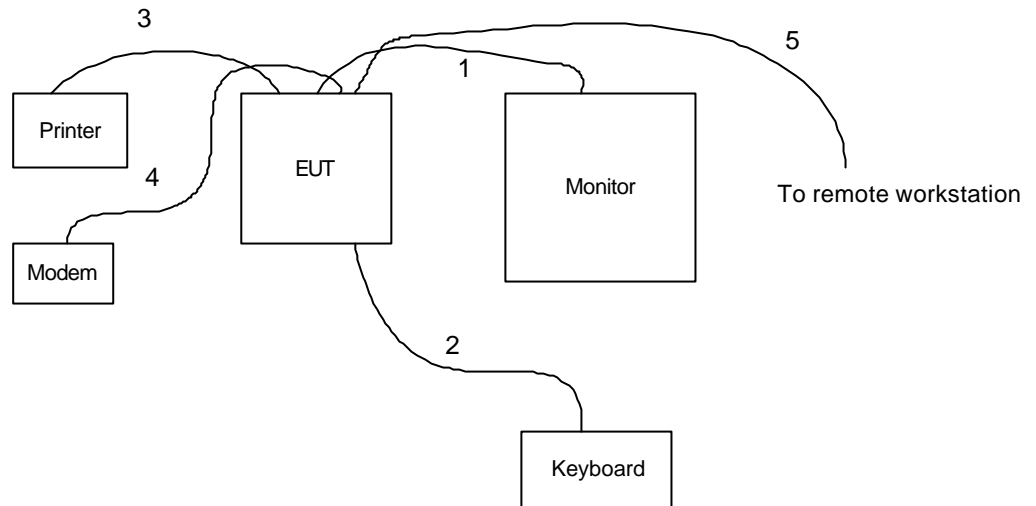
2.3. Connection Diagram of Test System

CRT+LCD



1. The I/O cable is connected from EUT to the support unit 1.
2. The I/O cable is connected from EUT to the support unit 2.
3. The I/O cable is connected from EUT to the support unit 3.
4. The I/O cable is connected from EUT to the support unit 4.
5. The STP cable is connected from EUT to the remote workstation.

CRT only



- 6. The I/O cable is connected from EUT to the support unit 1.
- 7. The I/O cable is connected from EUT to the support unit 2.
- 8. The I/O cable is connected from EUT to the support unit 3.
- 9. The I/O cable is connected from EUT to the support unit 4.
- 10. The STP cable is connected from EUT to the remote workstation.

3. Test Software

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

The programs were 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, the following programs were executed:

- Executed "CD player" to play music.
- Executed "LANTEST.BAT" was executed to link with the remote workstation to receive and transmit data by STP cable.

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

CISPR PUB. 22 Class A

4.4. Frequency Range Investigated

- a. Conduction: from 150 kHz to 30 MHz
- b. Radiation : from 30 MHz to 2,000 MHz

4.5. Test Distance

- a. The test distance of radiated emission from antenna to EUT is 10M. (30M ~ 1GHz),
- b. The test distance of radiated emission from antenna to EUT is 3 M. (1G Hz~ 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.

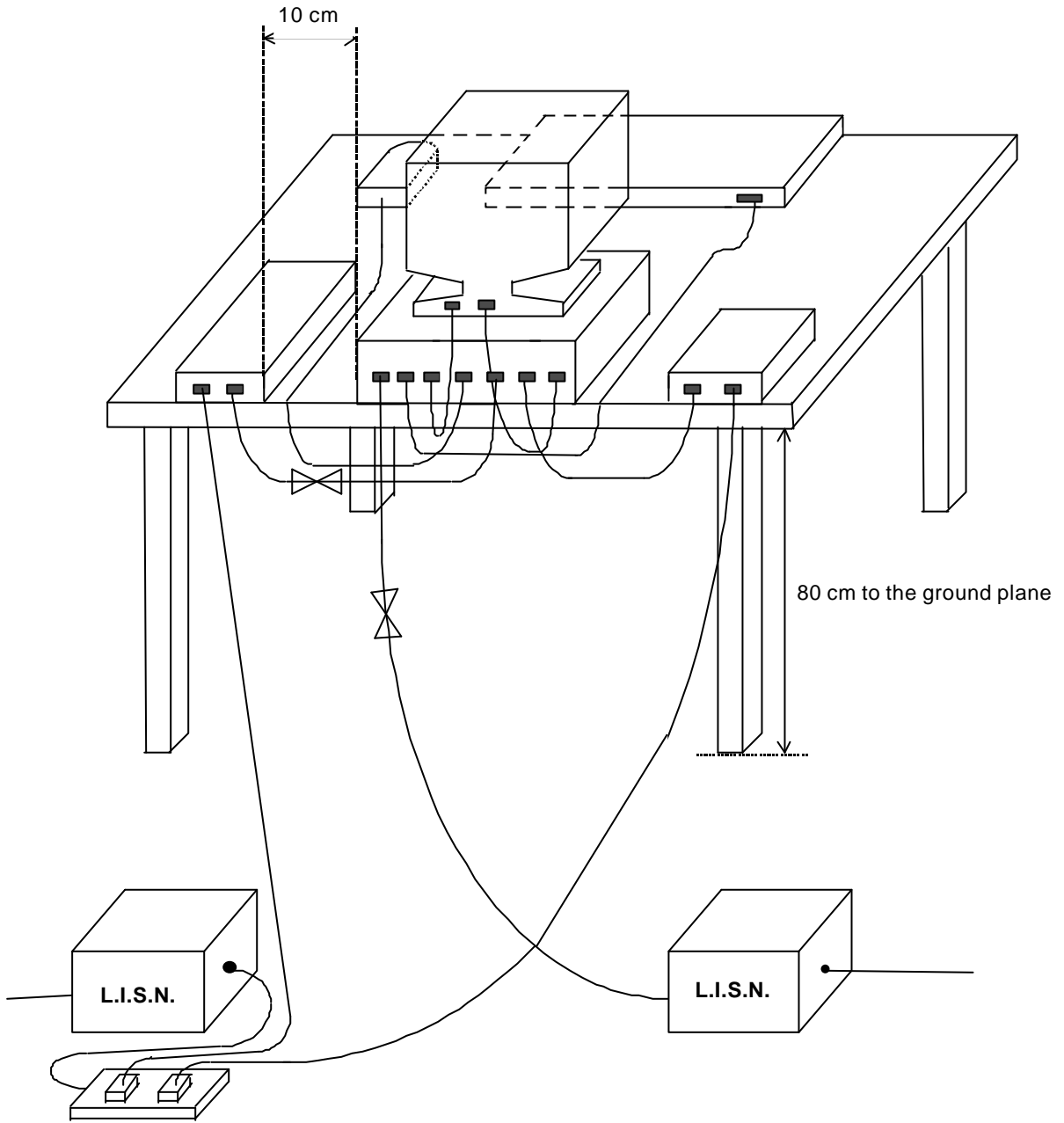
5.1. Major Measuring Instruments

● Test Receiver	(R&S ESH3)
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

5.4.1. Test mode : 1280x1024 75K/80Hz LAN : 10 CRT only

- Temperature : 23°C
- Relative Humidity : 52 %
- Test Date : Mar. 23, 2001

The Conducted Emission test was passed at minimum margin

LINE 0.179 MHz / 48.60 dBuV.

Freq. (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)
0.179	L	52.30	48.60	412.10	269.15	79.00	66.00	8912.51	1995.26	-26.7	-17.4
0.219	L	46.10	42.80	201.84	138.04	79.00	66.00	8912.51	1995.26	-32.9	-23.2
0.279	L	40.50	38.70	105.93	86.10	79.00	66.00	8912.51	1995.26	-38.5	-27.3
0.178	N	51.70	46.60	384.59	213.80	79.00	66.00	8912.51	1995.26	-27.3	-19.4
0.218	N	44.20	40.90	162.18	110.92	79.00	66.00	8912.51	1995.26	-34.8	-25.1
0.278	N	40.10	37.40	101.16	74.13	79.00	66.00	8912.51	1995.26	-38.9	-28.6

Test Engineer : 
 Samuel Chang


5.4.2. Test mode : 1024x768 48K/60Hz LAN : 100 CRT+PANEL

- Temperature : 23°C
- Relative Humidity : 52 %
- Test Date : Mar. 23, 2001

The Conducted Emission test was passed at minimum margin

LINE 0.191 MHz / 44.30 dBuV.

Freq. (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)
0.191	L	48.60	44.30	269.15	164.06	79.00	66.00	8912.51	1995.26	-30.4	-21.7
0.248	L	43.50	40.90	149.62	110.92	79.00	66.00	8912.51	1995.26	-35.5	-25.1
0.304	L	38.10	35.50	80.35	59.57	79.00	66.00	8912.51	1995.26	-40.9	-30.5
0.191	N	47.80	43.50	245.47	149.62	79.00	66.00	8912.51	1995.26	-31.2	-22.5
0.247	N	42.60	40.20	134.90	102.33	79.00	66.00	8912.51	1995.26	-36.4	-25.8
0.304	N	37.40	34.60	74.13	53.70	79.00	66.00	8912.51	1995.26	-41.6	-31.4

Test Engineer : 
 Samuel Chang

5.5. Photographs of Conducted Powerline Test Configuration

- The photographs show the configuration that generates the maximum emission.

CRT+LCD

FRONT VIEW



REAR VIEW



SIDE VIEW



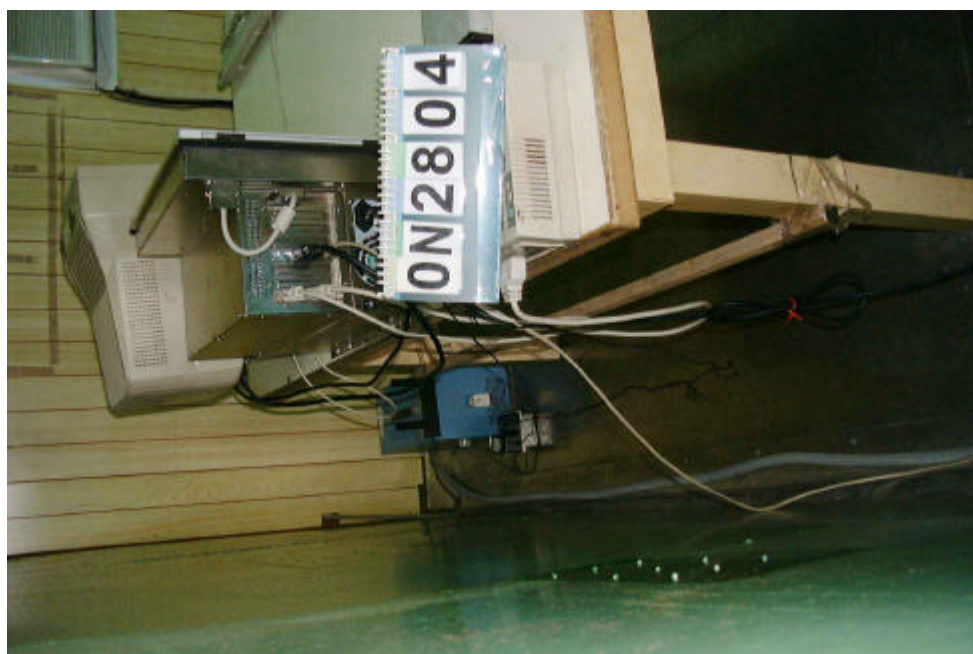
- The photographs show the configuration that generates the maximum emission.

CRT only

FRONT VIEW



REAR VIEW



SIDE VIEW



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 100MHz

- Amplifier (HP 8447D)
 - Attenuation 0 dB
 - RF Gain 25 dB
 - Signal Input 0.1 MHz to 1.3 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

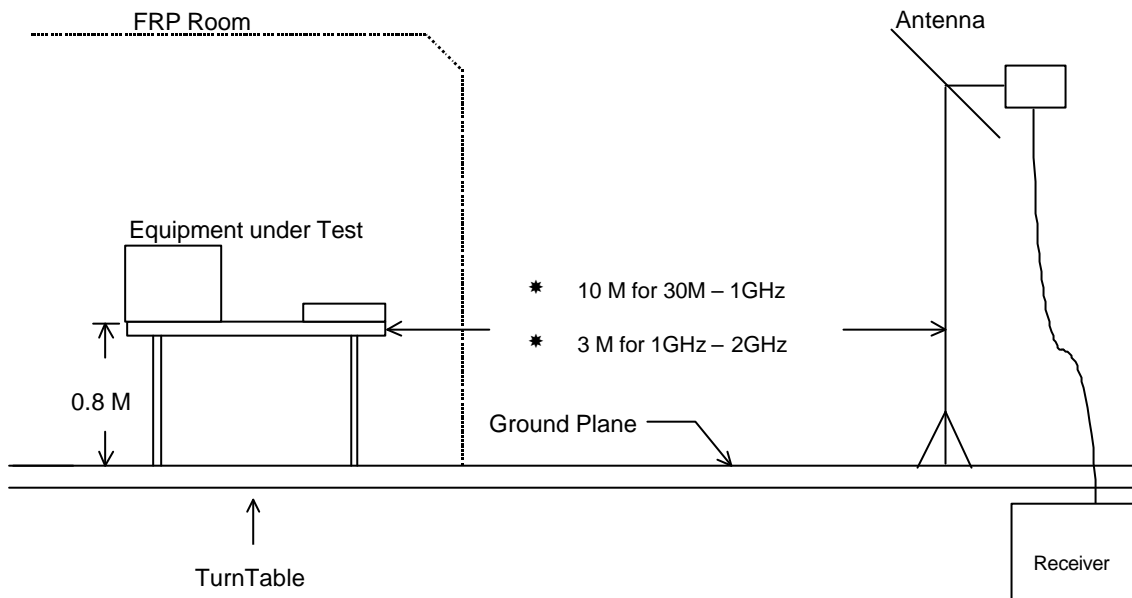
6.1.2. from 1GHz to 2GHz

- Receiver (HP 8546A)
 - Attenuation 0 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 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 75K/80Hz LAN : 10 CRT only

- Temperature : 25°C
- Relative Humidity : 60 %
- Test Date : Mar. 23, 2001
- 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

40.600 MHz / 36.92 dBuV (VERTICAL) Antenna Height 1 Meter, Turntable Degree 360 °.

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

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)			
40.600	V	14.77	1.04	21.11	40.00	100.00	36.92	70.15	-3.08
67.000	V	6.23	1.25	29.35	40.00	100.00	36.83	69.42	-3.17
120.100	V	12.82	1.80	22.00	40.00	100.00	36.62	67.76	-3.38
133.800	V	12.89	1.87	19.76	40.00	100.00	34.52	53.21	-5.48
154.700	V	10.20	2.09	22.85	40.00	100.00	35.14	57.15	-4.86
216.000	V	10.17	2.68	23.27	40.00	100.00	36.12	63.97	-3.88

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 : 
 Samuel Chang

6.4.2. Test mode : 1024x768 48K/60Hz LAN: 100 CRT+PANEL

- Temperature : 25°C
- Relative Humidity : 60 %
- Test Date : Mar. 23, 2001
- 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

194.800 MHz / 36.93 dBuV (VERTICAL) Antenna Height 1 Meter, Turntable Degree 360 °.

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

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)			
120.000	V	12.82	1.80	22.12	40.00	100.00	36.74	68.71	-3.26
143.800	V	11.93	1.95	22.20	40.00	100.00	36.08	63.68	-3.92
194.800	V	8.91	2.50	25.52	40.00	100.00	36.93	70.23	-3.07
228.800	V	11.06	2.87	22.27	40.00	100.00	36.20	64.57	-3.80
96.100	H	9.70	1.44	24.71	40.00	100.00	35.85	62.02	-4.15
228.800	H	11.06	2.87	22.27	40.00	100.00	36.20	64.57	-3.80

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 : 
 Samuel Chang

6.5. Photographs of Radiated Emission Test Configuration

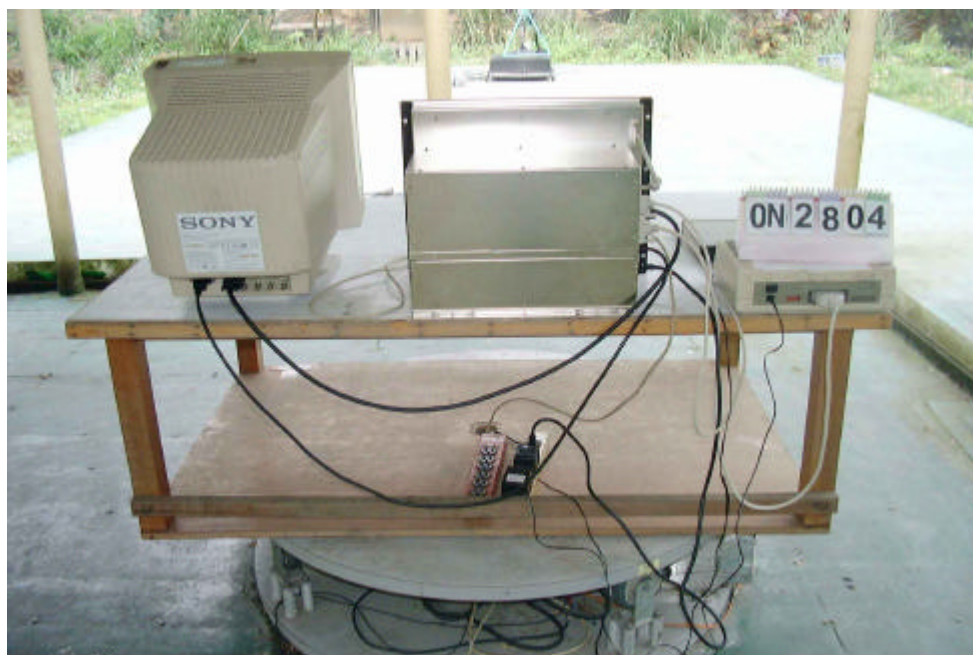
- The photographs show the configuration that generates the maximum emission.

CRT+LCD

FRONT VIEW



REAR VIEW



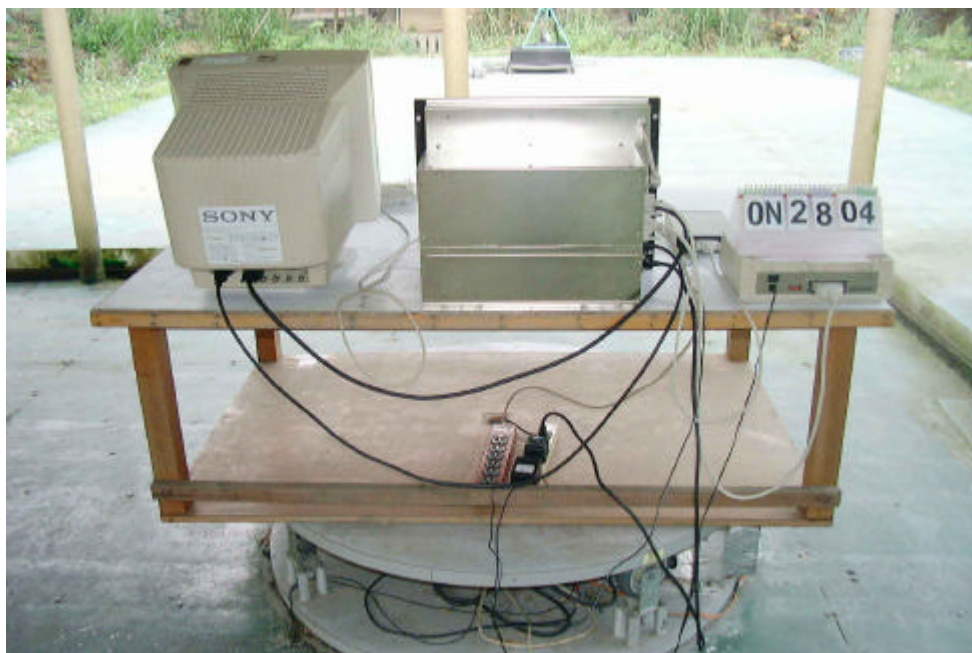
- The photographs show the configuration that generates the maximum emission.

CRT only

FRONT VIEW



REAR VIEW



7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	17.1	0.9
35	17.5	1.0
40	15.1	1.0
45	12.9	1.1
50	11.4	1.2
55	8.8	1.2
60	6.3	1.2
65	6.2	1.3
70	6.2	1.3
75	6.5	1.3
80	6.8	1.3
85	7.7	1.3
90	8.7	1.4
95	9.5	1.4
100	10.4	1.5
110	11.6	1.7
120	12.8	1.8
130	13.0	1.8
140	12.7	1.9
150	10.6	2.0
160	9.9	2.2
170	9.5	2.3
180	8.6	2.3
190	8.8	2.4
200	9.0	2.6
220	10.4	2.7
240	11.8	3.1
260	12.7	3.0
280	13.2	3.1
300	13.6	3.6
320	14.1	3.7
340	14.6	3.8
360	15.2	3.9
380	15.7	4.1
400	16.3	4.2
450	17.6	4.5
500	19.0	4.8
550	19.5	4.9
600	19.9	5.3
650	19.3	5.8
700	18.6	6.3
750	19.2	6.5
800	19.8	6.8
850	21.2	6.8
900	22.6	7.4
950	22.4	7.6
1000	22.1	8.0
2000	17.1	0.9

NHOP4

8. List of Measuring Equipment Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Test Receiver	R&S	ESH3	893495/013	9KHz – 30MHz	Jun. 19, 2000	Conduction
Spectrum Monitor	R&S	EZM	894987/011	-	Jun. 19, 2000	Conduction
LISN	EMCO	3810/2	9703-1838	50uH / 50 ohm	Sep. 01, 2000	Conduction
LISN	KYORITSU	KNW-407	8-1010-15	50uH / 50 ohm	Nov. 13, 2000	Conduction
Power Filter	CORCOM	MR12030	N/A	30A*2	N/A	Conduction
Spectrum Analyzer (site 4)	Advantest	R3261C	81720145	9KHz - 2.6GHz	May. 03, 2000	Radiation
Amplifier (Site 4)	HP	8447D	2944A07523	0.1MHz -1.3GHz	Mar. 30, 2000	Radiation
Bilog Antenna (Site 4)	CHASE	CBL6112B	2444	30MHz - 2GHz	Jun. 24, 2000	Radiation
Half-wave dipole antenna (Site 4)	EMCO	3121C	8912-495	20MHz - 1GHz	Aug. 06, 2000	Radiation
Turn Table	EMCO	2080	9805-2065	0 ~ 360 degree	N/A	Radiation
Antenna Mast	EMCO	2075	9804-2151	1 m - 4 m	N/A	Radiation
Receiver	HP	8546A	3325A00108	9KHz~2GHz	Dec.14, 2000	Radiation
Horn Antenna	EMCO	3115	4976	1GHz~18GHz	Jun. 22, 2000	Radiation

9. 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
LISN coupling specification	rectangular	± 1.5
Transducer factor frequency interpolation	rectangular	± 0.2
Mismatch Receiver VSWR $\Gamma_1=0.09$ LISN VSWR $\Gamma_2=0.33$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	U-shaped	0.2
combined standard uncertainty Ue(y)	normal	± 1.66
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	± 3.32

$U = \{(0.3/2)^2 + (2^2 + 1.5^2 + 0.2^2)/3 + (0.2)^2/2\} = 1.66$

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	± 3	± 3
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 $\Gamma_1=0.09$ Antenna VSWR $\Gamma_2=0.67$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	U-shaped	± 0.54	± 0.54
combined standard uncertainty Ue(y)	normal	± 3.1	± 2.6
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	± 6.2	± 5.2

$U = \{(1.6/2)^2 + (0.3/2)^2 + (3^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\} = 2.6$ for 10m test distance

$U = \{(1.6/2)^2 + (0.3/2)^2 + (3^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\} = 3.1$ for 3m test distance

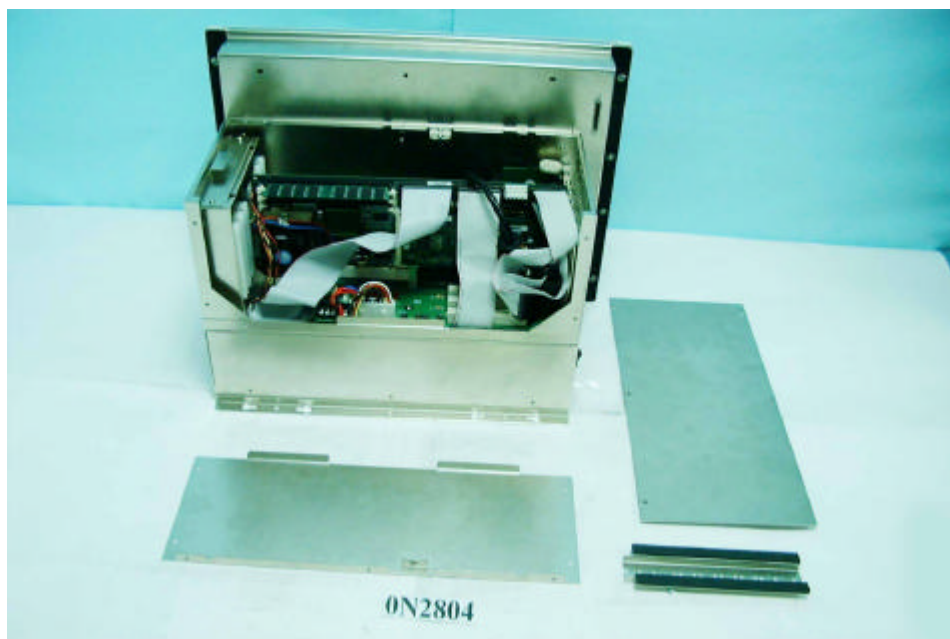
APPENDIX A. Photographs of EUT



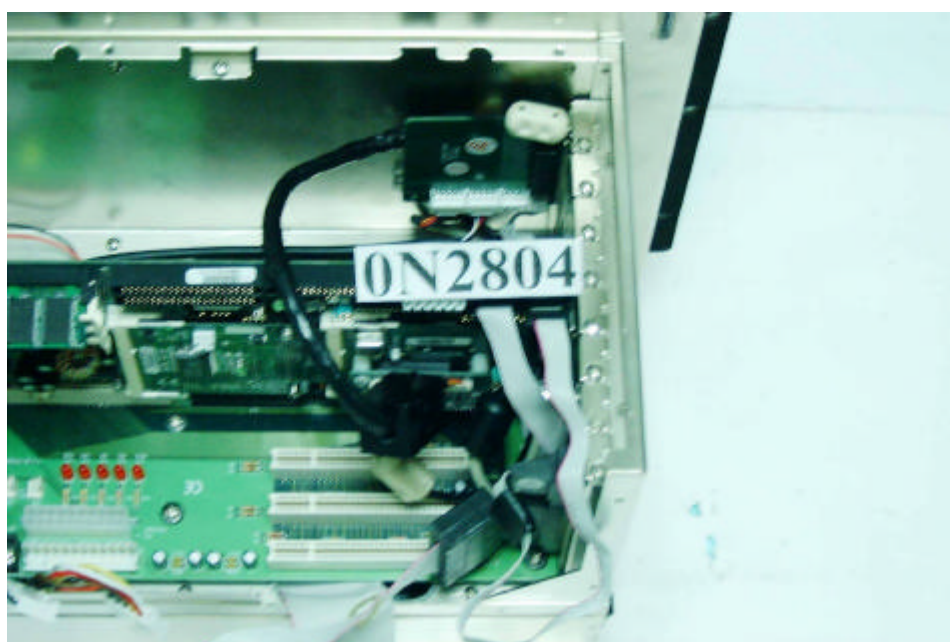
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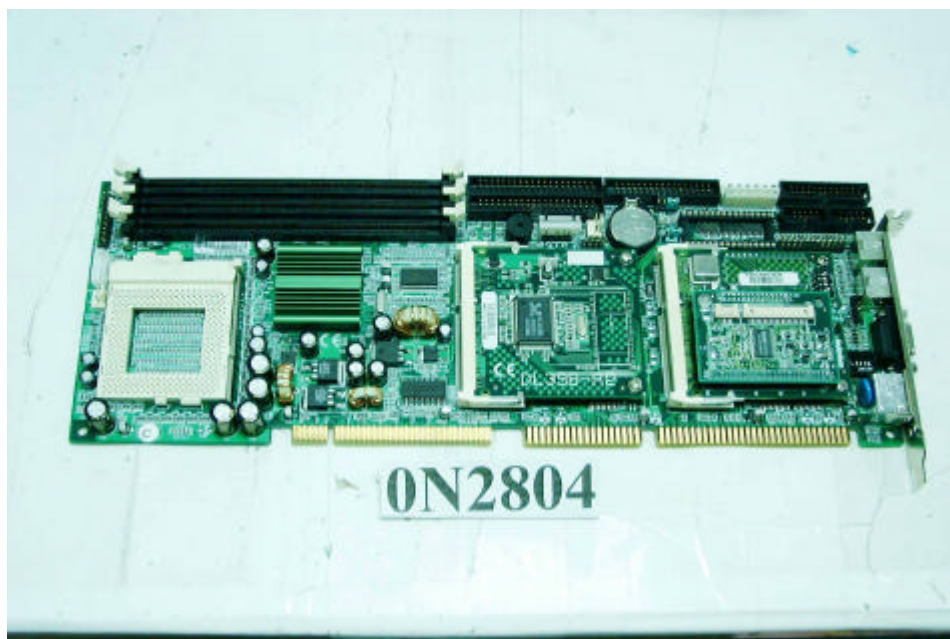
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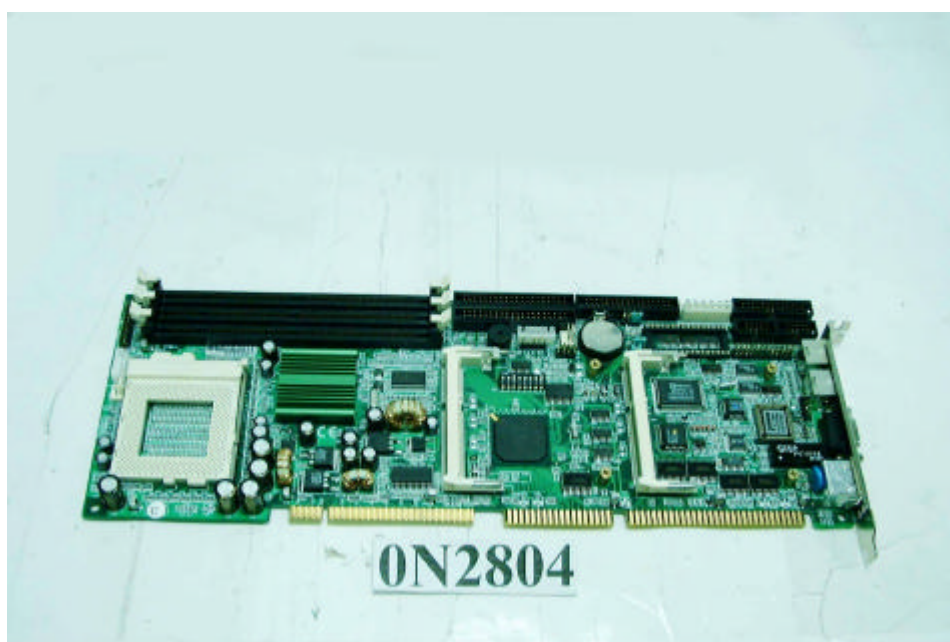
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0N2804-04.jpg



0N2804-05.jpg



0N2804-06.jpg



0N2804-07.jpg



0N2804-08.jpg



0N2804-09.jpg



0N2804-10.jpg



0N2804-11.jpg



0N2804-12.jpg



0N2804-13.jpg



0N2804-14.jpg



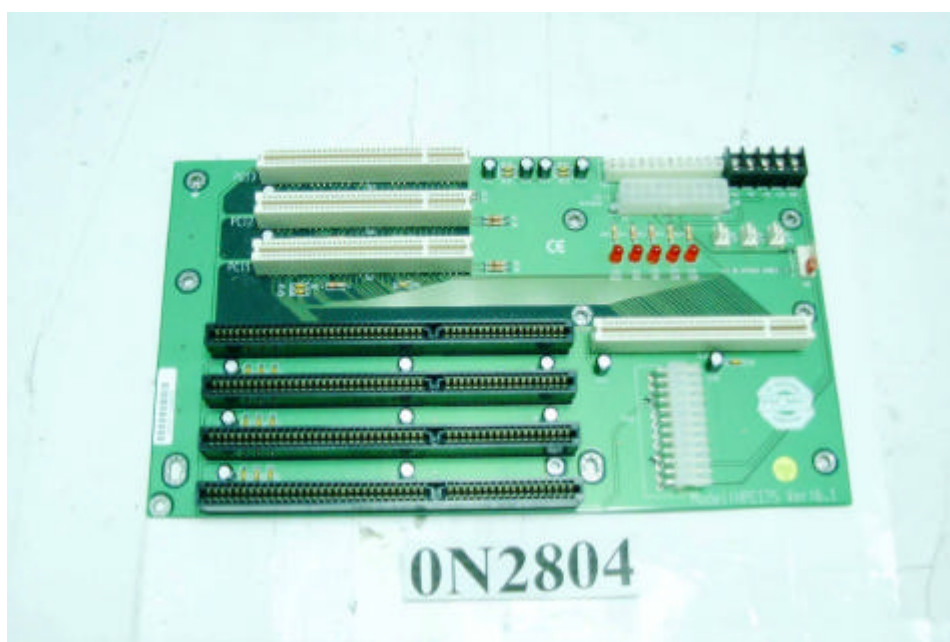
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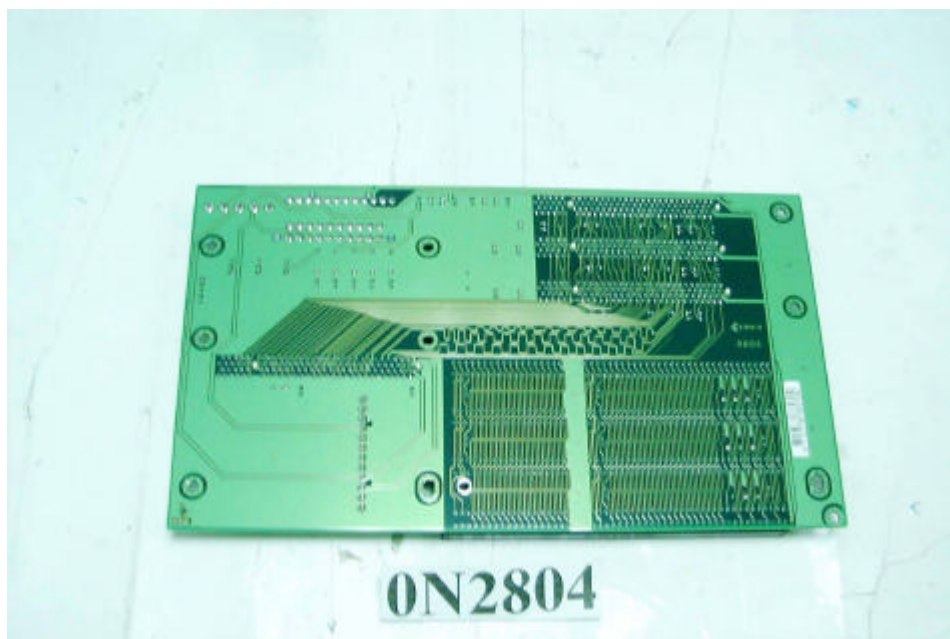
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0N2804-17.jpg



0N2804-18.jpg



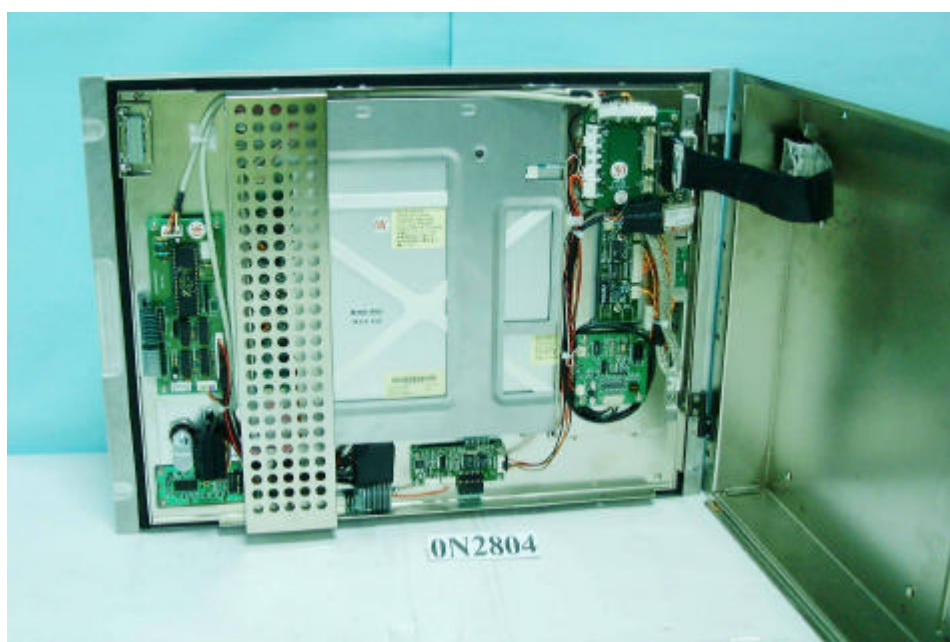
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0N2804-20.jpg



0N2804-21.jpg



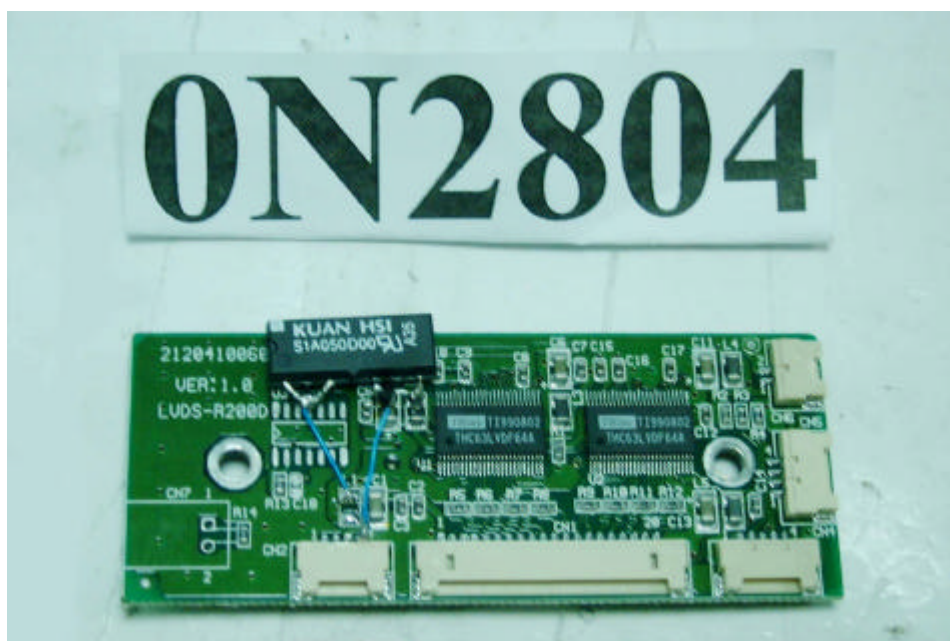
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0N2804-25.jpg



0N2804-26.jpg



0N2804-27.jpg



0N2804-28.jpg



0N2804-29.jpg



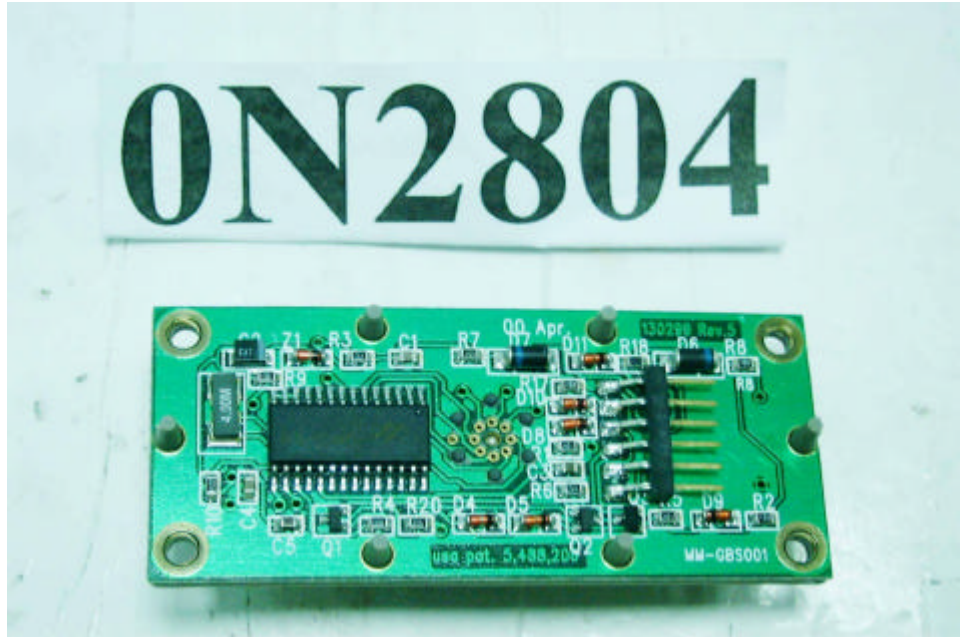
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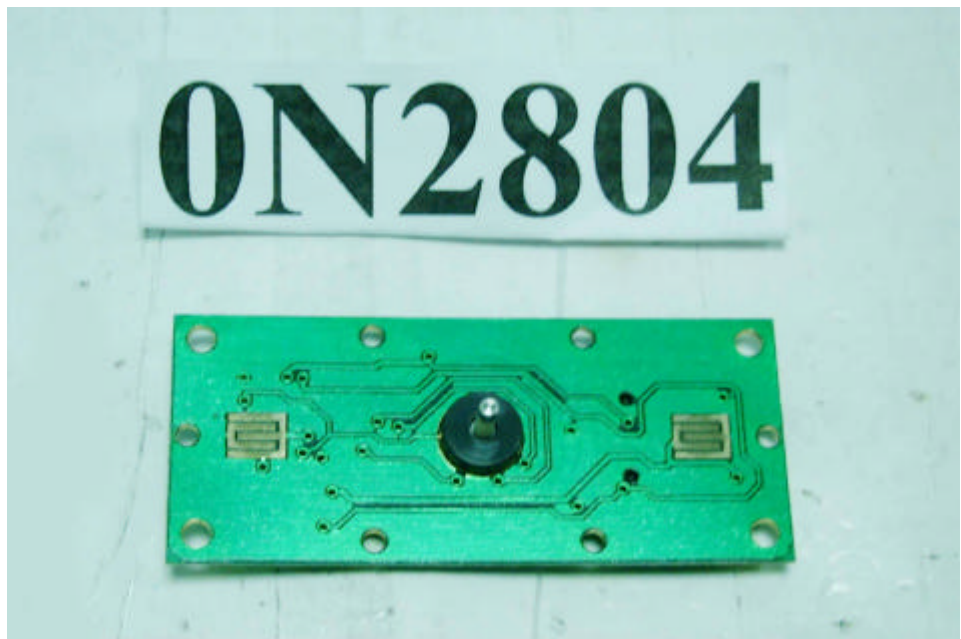
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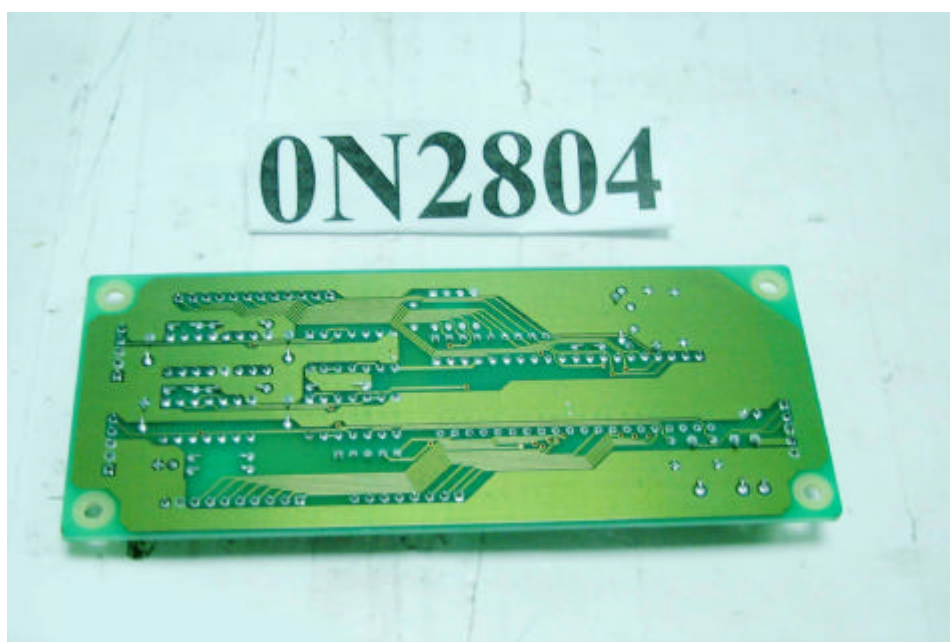
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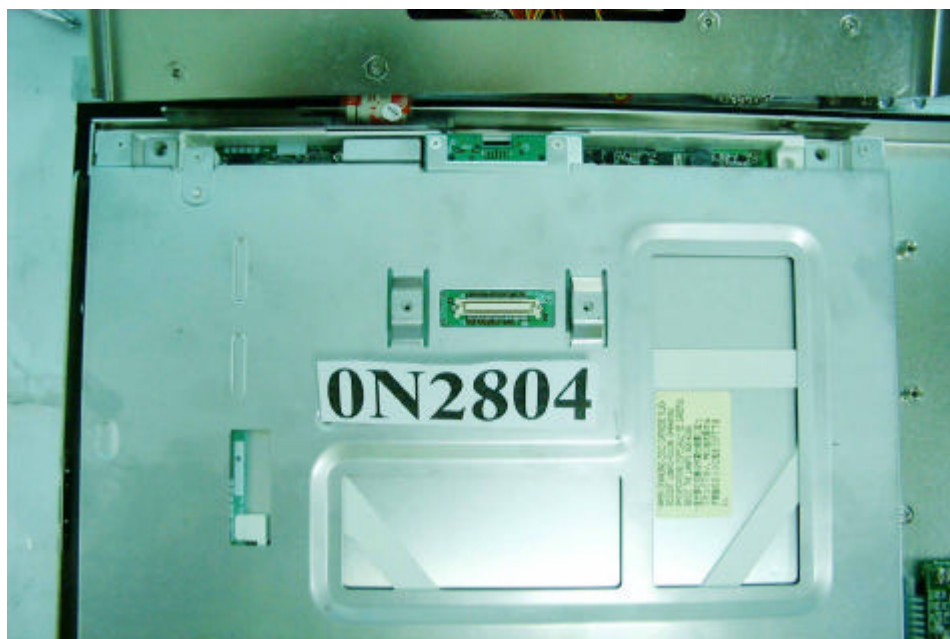
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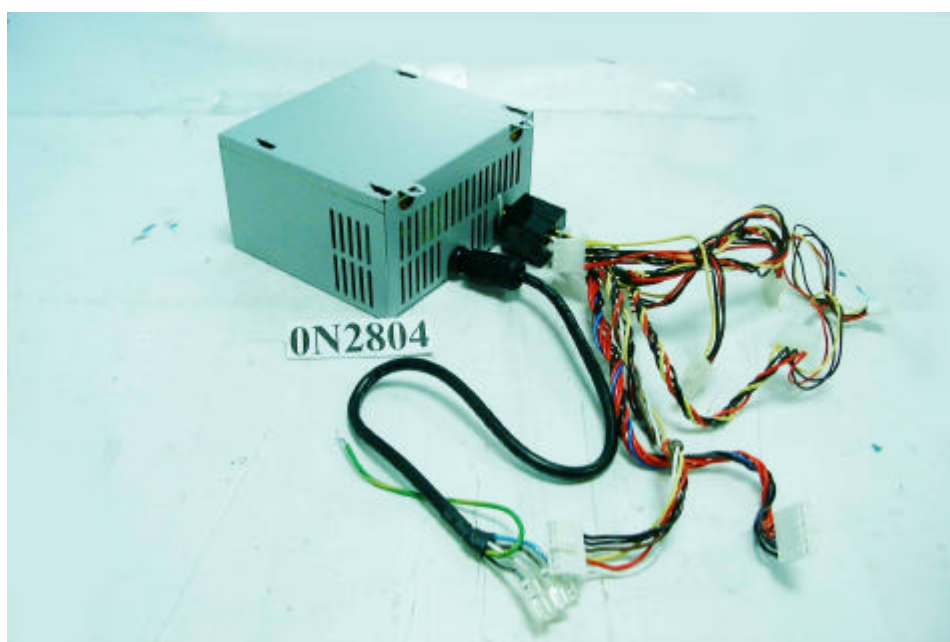
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0N2804-38.jpg



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0N2804-40.jpg