

EMISSION COMPLIANCE REPORT

for

Electromagnetic Emissions

of

Mobile Computer

Model Number : Maverick 2000
Serial Number : N/A
Report Number : 02E0017-C
Date : March 21, 2002

Prepared for :

Logica PTY Ltd.
17-19 Orion Road, Lane Cove,
NSW 2066

Prepared by :

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VERIFICATION OF COMPLIANCE

Equipment Under Test: Mobile Computer
Model Number: Maverick 2000
Serial Number: N/A
Applicant: **Logica PTY Ltd.**
17-19 Orion Road, Lane Cove,
NSW 2066

Type of Test: C-Tick Class A
Measurement Procedure: AS/NZS 3548:1995+A1: 1997+A2: 1997
File Number: 02E0017-C
Date of test: March 20, 2002
Deviation: None
Condition of Test Sample: Normal

The above equipment was tested by C&C Laboratory Co., Ltd. for compliance with the requirements set forth in the Australian EMC regulations and the requirements procedure according to AS/NZS 3548. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.



Rick Yeo / Manager

SYSTEM DESCRIPTION

EUT Test Procedure:

1. Windows 98 Boots System.
2. Run Winemc.Exe To Activate All Peripherals And Display “H” Pattern On Monitor Screen.

PRODUCT INFORMATION

Housing Type:	Plastic
EUT Power Rating:	12VDC from Battery
OSC/Clock Frequencies:	X1= 14.318MHz; X2= 25MHz; Y1= 14.318MHz
CPU Manufacture / Type:	Intel / Pentium III-850MHz
Memory Capacity Manufacture / Model:	128MB / NEC / D4564841G5-A10-9JF
LCD Panel Manufacture / Model:	LG 10.4" / LP104V2
Main Board Model:	PCM-6890B
HDD Manufacture / Model:	IBM / DARA-206000
DC Power Cable:	Shielded, 1.5m (Detachable)
EUT I/O Cable:	Mini-DB26 Cable: Shielded, 5.0m (Detachable, with two ferrite cores) DB15 Cable: Shielded, 5.2m (Detachable) BNC Cable: Shielded, 2.0m (Detachable) Coax Cable x 2: Shielded, 5.0m (Detachable)

I/O Port of EUT (System):

I/O PORT TYPES	Q'TY	TESTED WITH
1). Parallel Port	1	1
2). Serial Port	3	3
3). VGA Port	1	1
4). PS/2 Port	2	2
5). Mini Din-8 Pin	1	N/A
6). USB Port	2	2
7). LVDS Connect Port	1	1
8). Panel Link Port	1	1
9). Metal Connector	3	3

I/O Port of EUT (LCD Panel):

I/O PORT TYPES	Q'TY	TESTED WITH
1). PS/2 Pot	2	N/A
2). LVDS Connect Port	1	1
3). Panel Link Port	1	1

Note: N/A

SUPPORT EQUIPMENT

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	USB Mouse	MU3UE	N/A	DoC	ACROX	Shielded, 1.7m	N/A
2.	USB Mouse	MU3UE	N/A	DoC	ACROX	Shielded, 1.7m	N/A
3.	PS/2 Mouse	M-S34	LZA13454288	DZL211029	LOGITECH	Shielded, 1.9m	N/A
4.	PS/2 Keyboard	6311-TA	N/A	DoC	ACER	Shielded, 1.7m	N/A
5.	Probe	N/A	N/A	N/A	N/A	Shielded, 2.0m	N/A
6.	Antenna	N/A	N/A	N/A	N/A	Shielded, 5.0m	N/A
7.	Modem	231AA	A25331083841	BFJ9D9308US	HAYES	Shielded, 0.8m	Unshielded, 1.8m
8.	Modem	1414	N/A	IFAXDM1414	ACEEX	Shielded, 1.2m	Unshielded, 1.8m
9.	Modem	1414	N/A	IFAXDM1414	ACEEX	Shielded, 1.4m	Unshielded, 1.8m
10.	Monitor	PN19LT	N/A	DoC	SAMSUNG	Shielded, 1.8m with two cors	Unshielded, 1.8m
11.	Antenna	N/A	N/A	N/A	N/A	Shielded, 5.0m	N/A
12.	Printer	KX-P1080i	N/A	ACJ5Z6KX-P1080i	PANASONIC	Shielded, 1.7m	Unshielded, 1.8m
13.	Battery	N/A	N/A	N/A	Tudor	N/A	Shielded, 1.5m

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

MEASUREMENT PROCEDURE (PRELIMINARY LINE CONDUCTED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) The EUT received power through Line Impedance Stabilization Network (LISN) which supplied power source of 240VAC±10%/50Hz and was grounded to the ground plane.
- 5) All support equipment received power from a second LISN supplying power of 110VAC/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

Mode: N/A (EUT No Any AC Power Source)

- 10) After the preliminary scan, we found the following test mode(s) producing the highest emission level.

Mode:

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

MEASUREMENT PROCEDURE (FINAL LINE CONDUCTED EMISSION TEST)

- 1) EUT and support equipment was set up on the test bench as per step 10 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Q.P. mode, then the emission signal was re-checked using an Average detector.
- 3) The test data of the worst case condition(s) was reported on the Summary Data page.

Data Sample:

Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Margin (dB)	Reading Type (P/Q/A)	Line (L1/L2)
x.xx	x.xx	x.xx	38.38	56.00	-17.62	P	L1

C.F.(Correction Factor)=Insertion Loss + Cable Loss
 Corrected Reading = Metering Reading + C.F.
 Margin=Corrected Reading - Limits
 P=Peak Reading L1=Hot
 Q=Quasi-peak L2=Neutral
 A=Average Reading

Comments: N/A

LINE CONDUCTED EMISSION LIMIT

Frequency	Maximum RF Line Voltage	
	Q.P.	AVERAGE
150kHz-500kHz	66-56dBuV	56-46dBuV
500kHz-5MHz	56dBuV	46dBuV
5MHz-30MHz	60dBuV	50dBuV

Note: The lower limit shall apply at the transition frequency.

MEASUREMENT PROCEDURE (PRELIMINARY RADIATED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) The EUT received DC 12V power source from Battery. All support equipment received 110VAC/60Hz power from another socket under the turntable, if any.
- 5) The antenna was placed at 10 meter away from the EUT as stated in ANSI C63.4: 1992. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The following test mode(s) were scanned during the preliminary test:

Mode(s):

No.	Mode of operation	Date	Data Report/Plot No.
1	640X480	03/20/2002	9462E#(06)
2	800X600	03/20/2002	9462E#(07)
3	1024X768	03/20/2002	9462E#(08, 12)
4	1280X1024	03/20/2002	9462E#(10)

- 8) After the preliminary scan, we found the following test mode(s) producing the highest emission level.

Mode: 3.

Then, the EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for reference of final testing.

MEASUREMENT PROCEDURE (FINAL RAIDATED EMISSION TEST)

- 1) EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- 2) The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 3) Recorded at least the six highest emissions. Emission frequency, amplitude, were recorded into a computer (The antenna position, polarization and turntable position were kept in raw data file) in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- 4) The test data of the worst case condition(s) was reported on the Summary Data page.

Data Sample:

Freq (MHz)	Meter Reading (dBUV)	C.F. (dB/m)	Corrected Reading (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Reading Type P/Q/A	Pol. H/V
x.xx	x.xx	x.xx	30.82	37.00	-5.18	P	V

C.F.(Correction Factor)=Antenna Factor + Cable Loss + Attenuator(3/6 dB) - Amplifier Gain

Corrected Reading = Metering Reading + C.F.

Margin=Corrected Reading – Limits

P=Peak Reading

H=Horizontal Polarization/Antenna

Q=Quasi-peak

V=Vertical Polarization/Antenna

A=Average Reading

Comments: N/A

RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBU V/m/ Q.P.)
30-230	10	30
230-1000	10	37

Note: The lower limit shall apply at the transition frequency.

SUMMARY DATA (LINE CONDUCTED TEST)

Model Number: N/A

Location: Conducted Room

Tested by: N/A

Test Model: N/A

Test Results: N/A

Temperature: N/A

Humidity: N/A

(The chart below shows the highest readings taken from the final data)

Frequency Range Investigated				150 kHz TO 30 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Margin (dB)	Reading Type (P/Q/A)	Line (L1/L2)

C.F.(Correction Factor)=Insertion Loss + Cable Loss

Corrected Reading = Metering Reading + C.F.

Margin=Corrected Reading - Limits

P=Peak Reading L1=Hot

Q=Quasi-peak L2=Neutral

A=Average Reading

Comments: N/A (EUT No Any AC Power Source)

SUMMARY DATA (RADIATED EMISSION TEST)

Model Number: Maverick 2000

Location: Site # E

Tested by: Cliff Lai

Polar: Vertical / Horizontal- 10m

Test Mode: Mode 3

Test Results: Passed

Temperature: 27

Humidity: 71%RH

(The chart below shows the highest readings taken from the final data)

Frequency Range Investigated (30 MHz TO 1000 MHz)							
Freq (MHz)	Meter Reading (dBUV)	C.F. (dB/m)	Corrected Reading (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Reading Type P/Q/A	Pol. H/V
36.020	47.06	-9.57	37.49	40.00	-2.51	Q	V
330.000	48.33	-6.34	41.99	47.00	-5.01	P	V
390.000	45.85	-4.71	41.14	47.00	-5.86	P	V
420.000	44.71	-4.19	40.52	47.00	-6.48	P	V
390.000	45.68	-4.71	40.97	47.00	-6.03	P	H
486.500	43.15	-3.30	39.85	47.00	-7.15	P	H

C.F.(Correction Factor)=Antenna Factor + Cable Loss - Amplifier Gain (+ Attenuator 3dB)

Corrected Reading = Metering Reading + C.F.

Margin=Corrected Reading - Limits

P=Peak Reading

H=Horizontal Polarization/Antenna

Q=Quasi-peak

V=Vertical Polarization/Antenna

A=Average Reading

Comments: N/A

TEST FACILITY

- Location:** No. 199, Chung Sheng Road, Hsin Tien City,
Taipei, Taiwan, R. O. C.
- Description:** There are two 3/10m open area test sites and one line conducted lab for final test
The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 22/EN 55022 requirements.
- Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.

Registration also was made with Voluntary Control Council for Interference (VCCI).
- Site Accreditation:** Accredited by A2LA (Certificate #: 824.01) for EMC.

Also accredited by BSMI for the product category of Information Technology Equipment.
- Instrument Tolerance:** All measuring equipment is in accord with ANSI C63.4 and CISPR 22 requirements that meet industry regulatory agency and accreditation agency requirement.
- Ground Plane:** Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at C & C Laboratory, Co., Ltd. for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2-1988 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10kHz to 1.0GHz or above.

Equipment used during the tests:

Open Area Test Site: #E

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
SPECTRUM ANALYZER	H.P.	8566B	2937A06102	06/06/01	06/05/02
SPECTRUM DISPLAY	H.P.	85662A	2848A18276	06/06/01	06/05/02
QUASI-PEAK DETECTOR	H.P.	85650A	2811A01439	06/07/01	06/06/02
AMPLIFIER	H.P.	8447D B	1644A02328	05/07/01	05/06/02
ANTENNA	EMCO	3142	1310	06/30/01	06/29/02
CABLE	BELDEN	9913	N-TYPE07	01/02/02	01/01/03

Conducted Area Test Site: Conducted Room

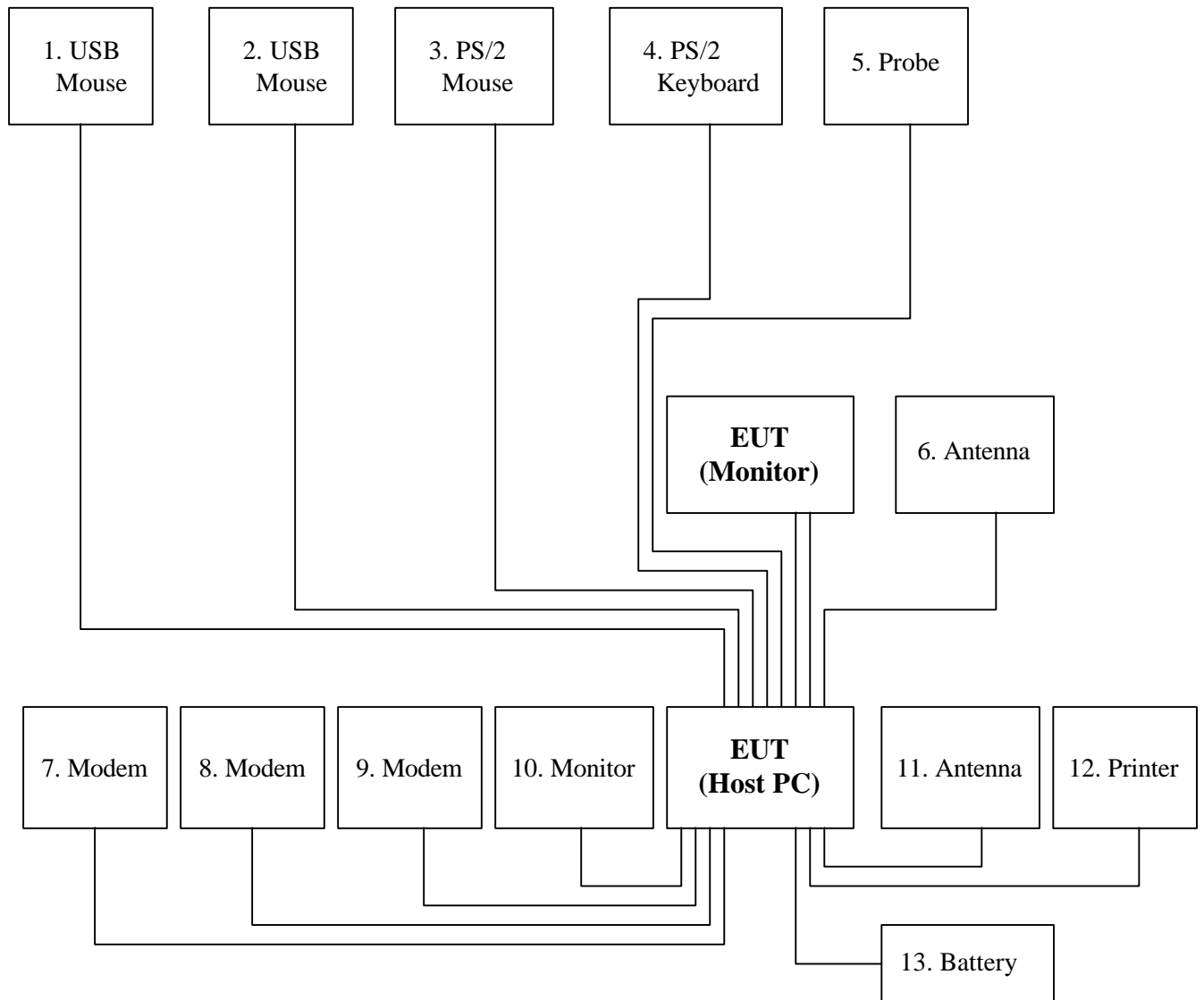
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
TEST RECEIVER	R&S	ESHS20	840455/006	03/16/02	03/15/03
LISN	SOLAR	8012-50-R-24-BNC	8305114	07/23/01	07/22/02
LISN(EUT)	EMCO	3825/2	1435	01/16/02	01/15/03

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators

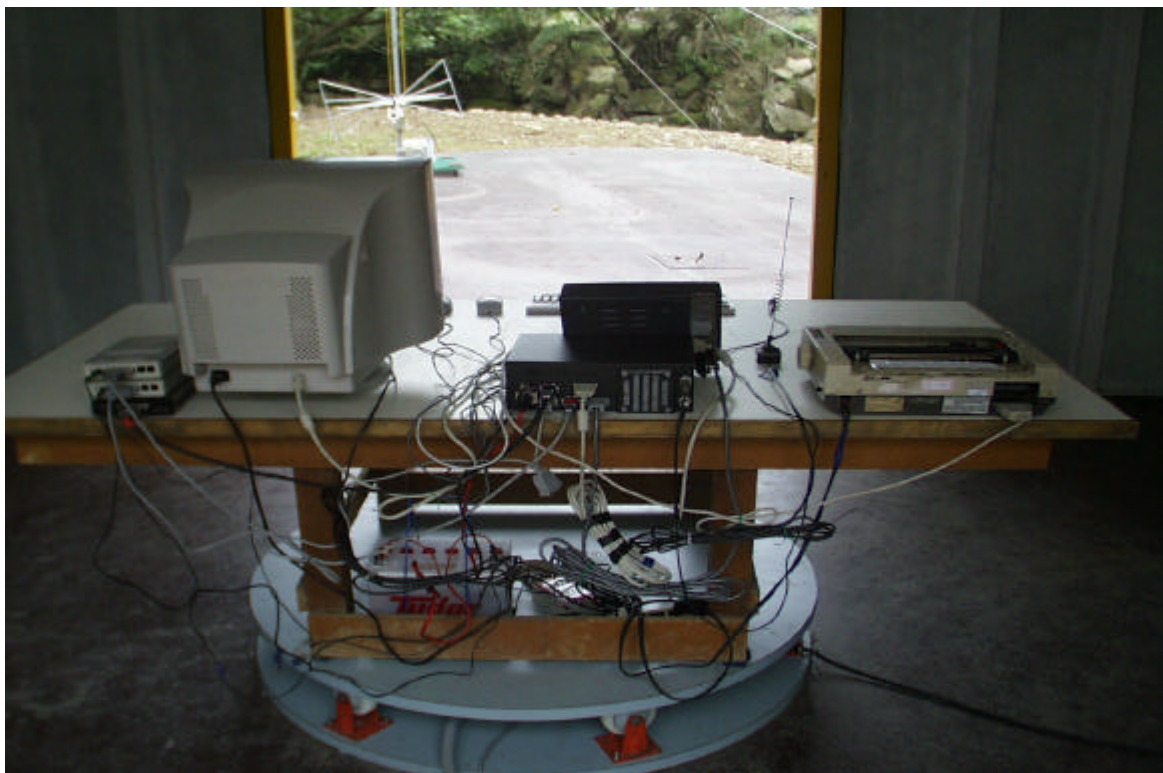
EUT: Mobile Computer
Trade Name: N/A
Model Number: Maverick 2000



APPENDIX 1

PHOTOGRAPHS OF TEST SETUP

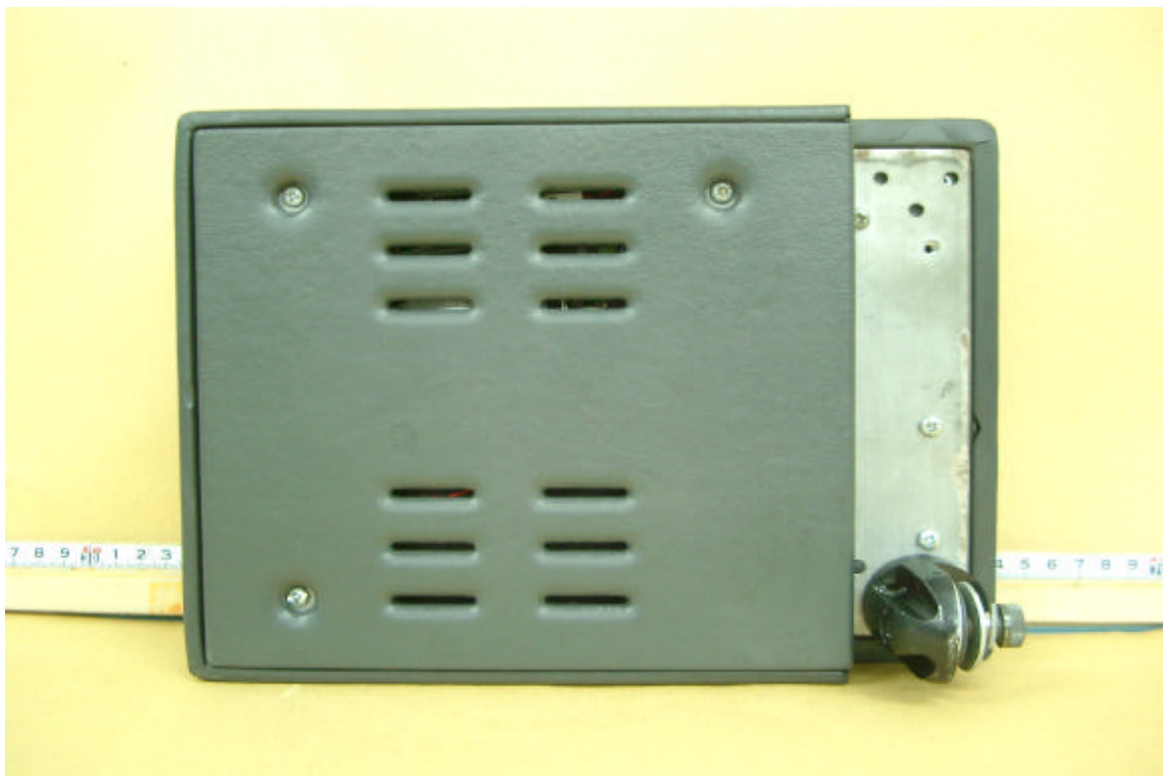
RADIATED EMISSION TEST



APPENDIX 2

PHOTOGRAPHS OF EUT

External of Monitor





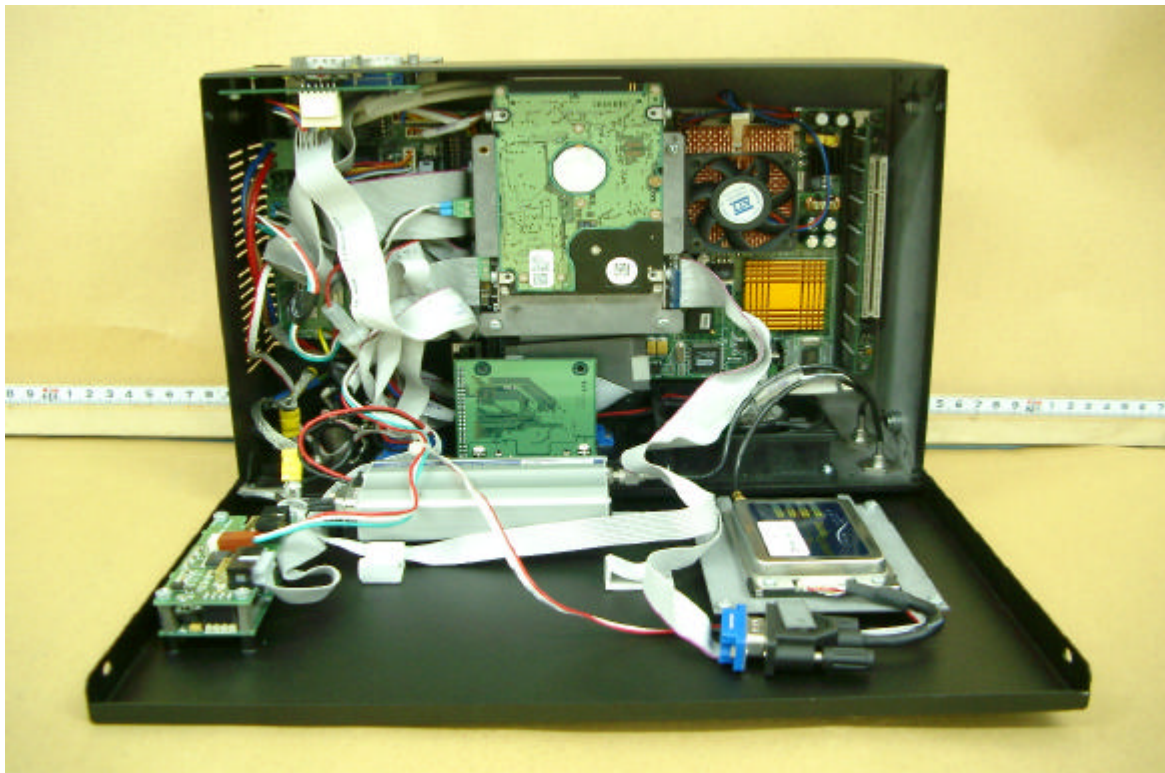


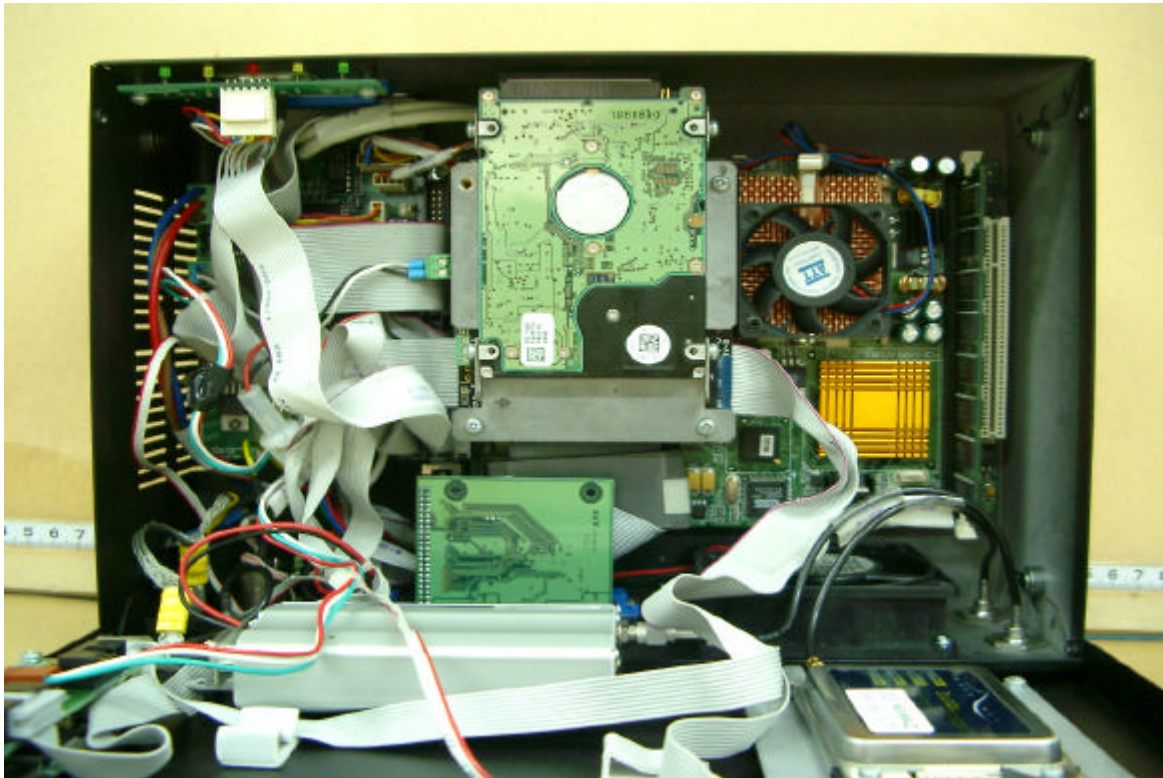
External of Host PC

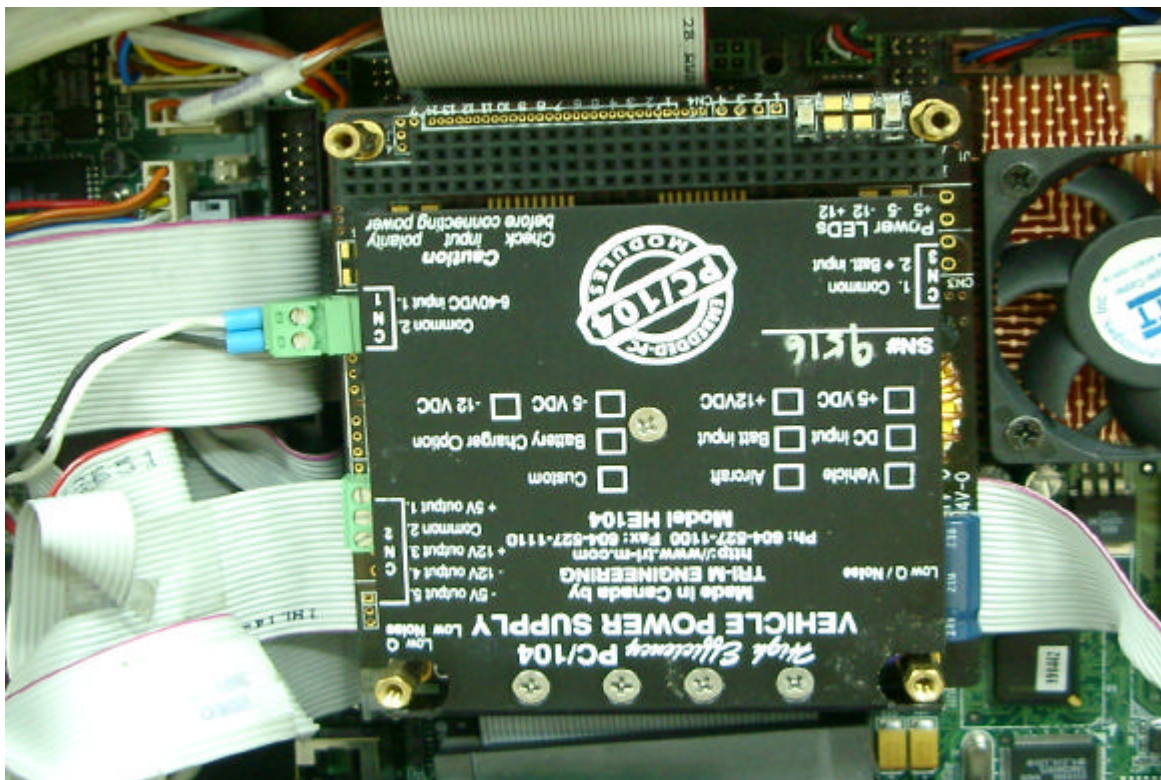


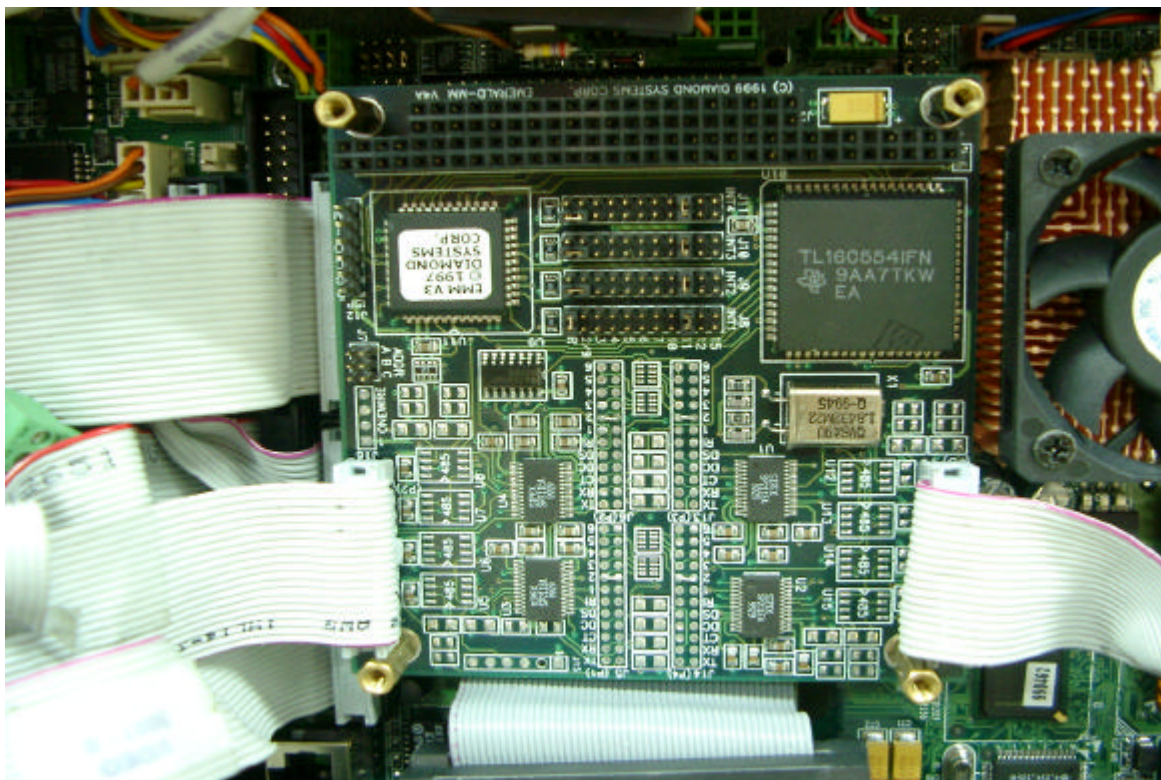
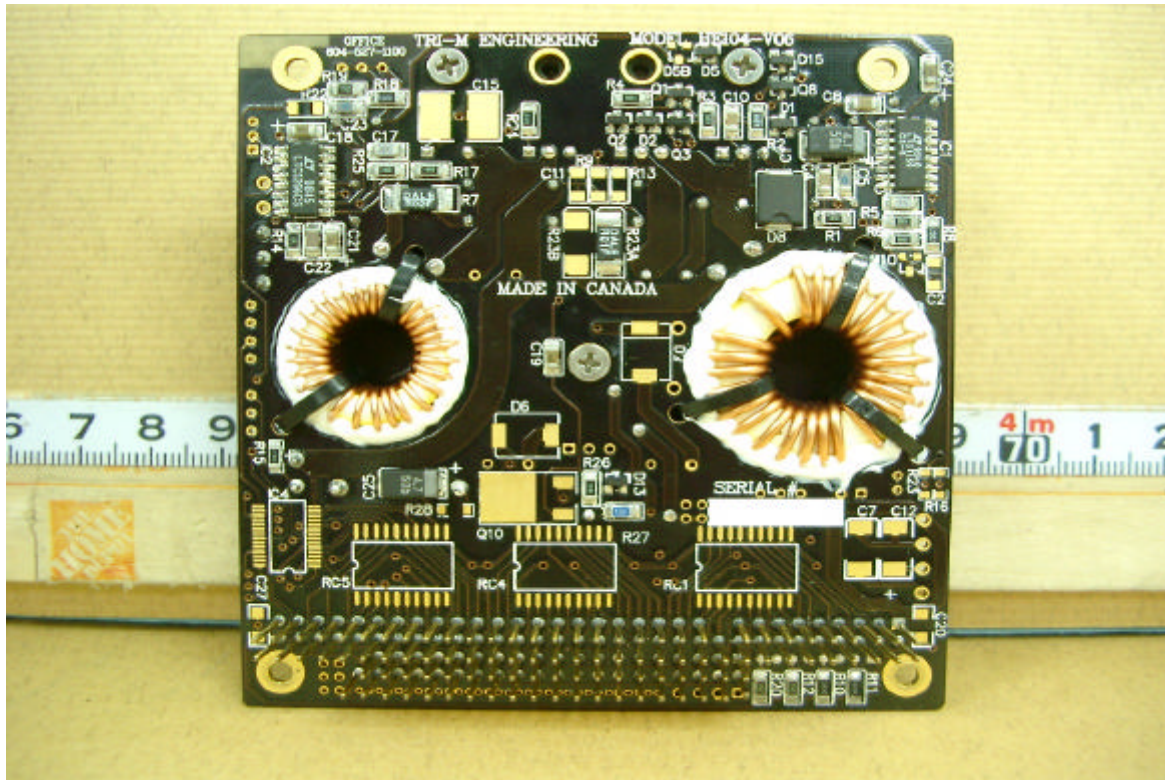


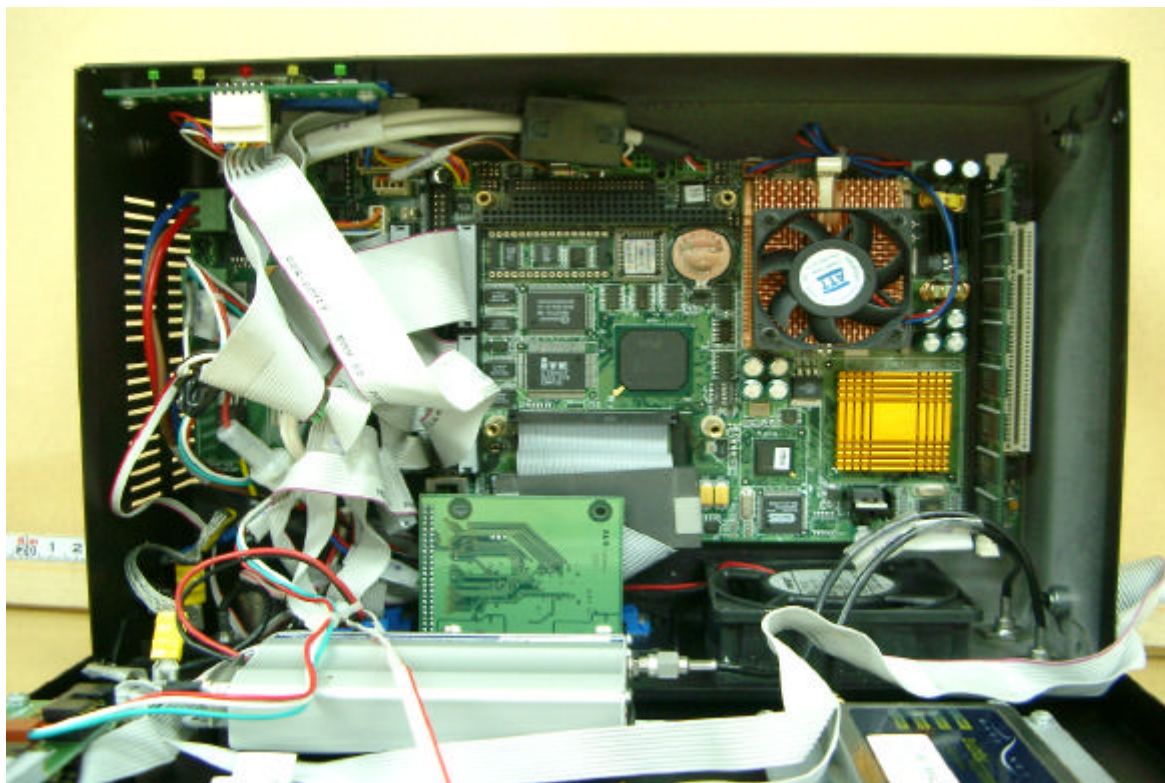
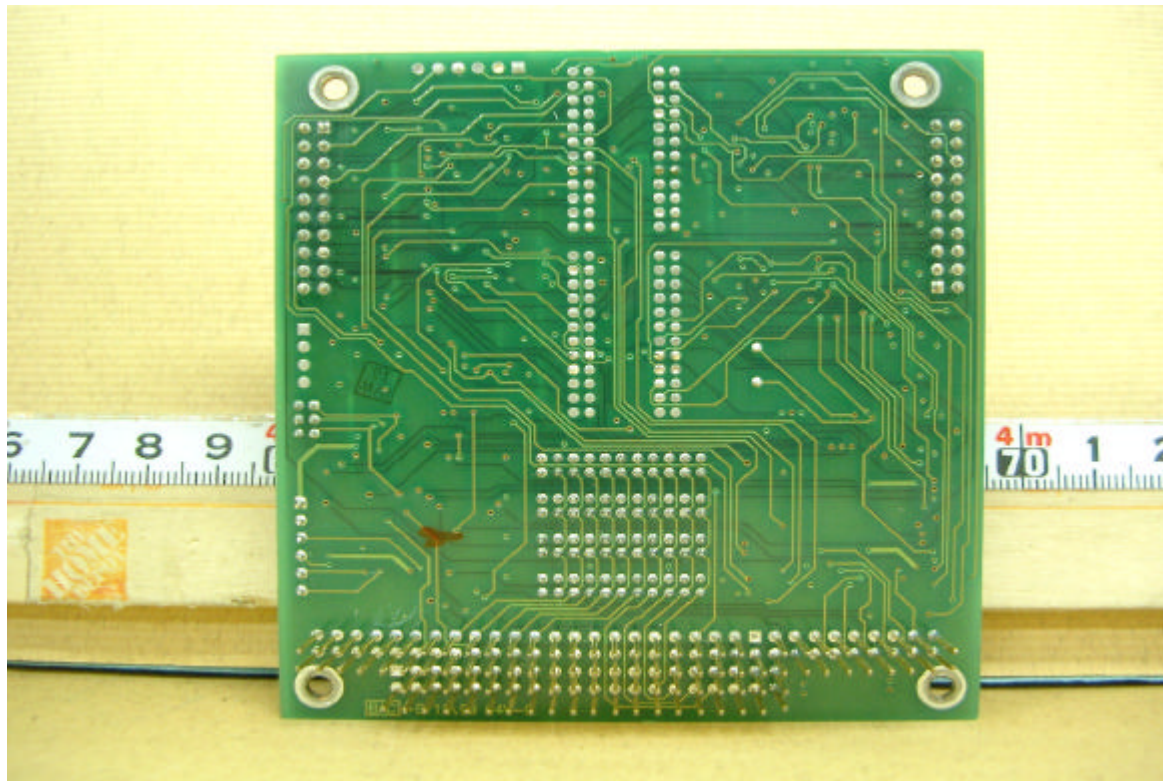
Internal Photo of Host PC

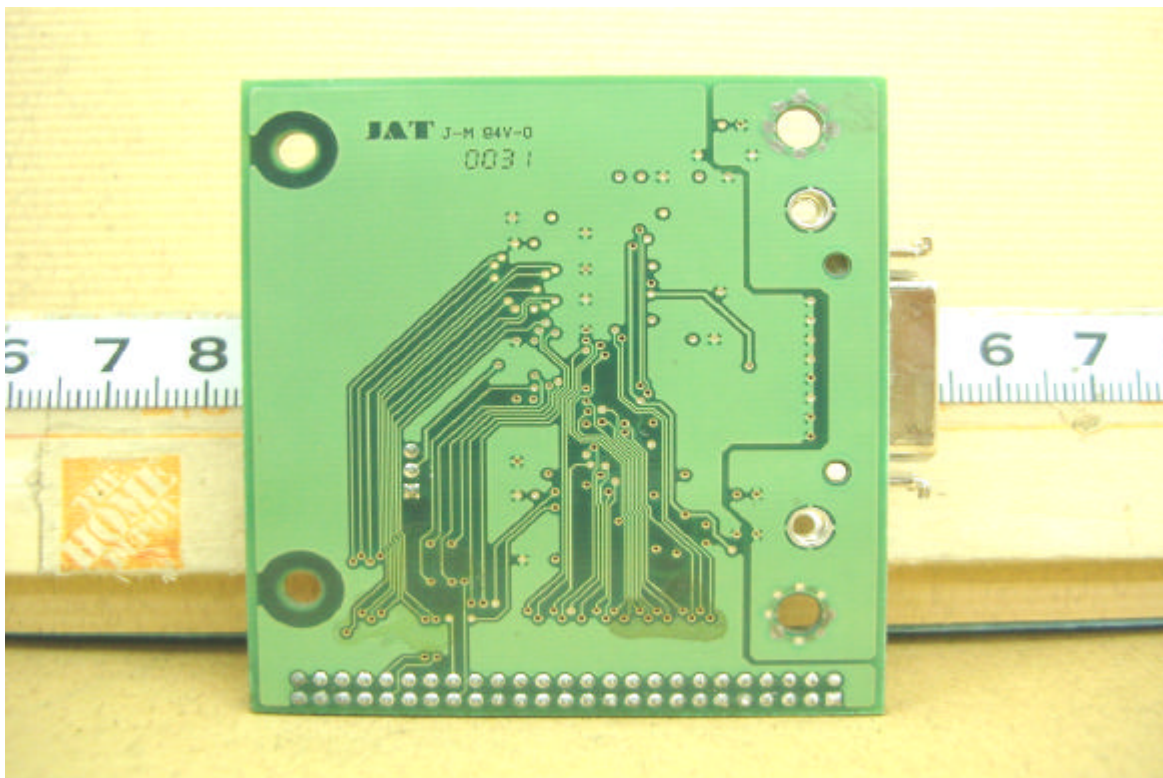
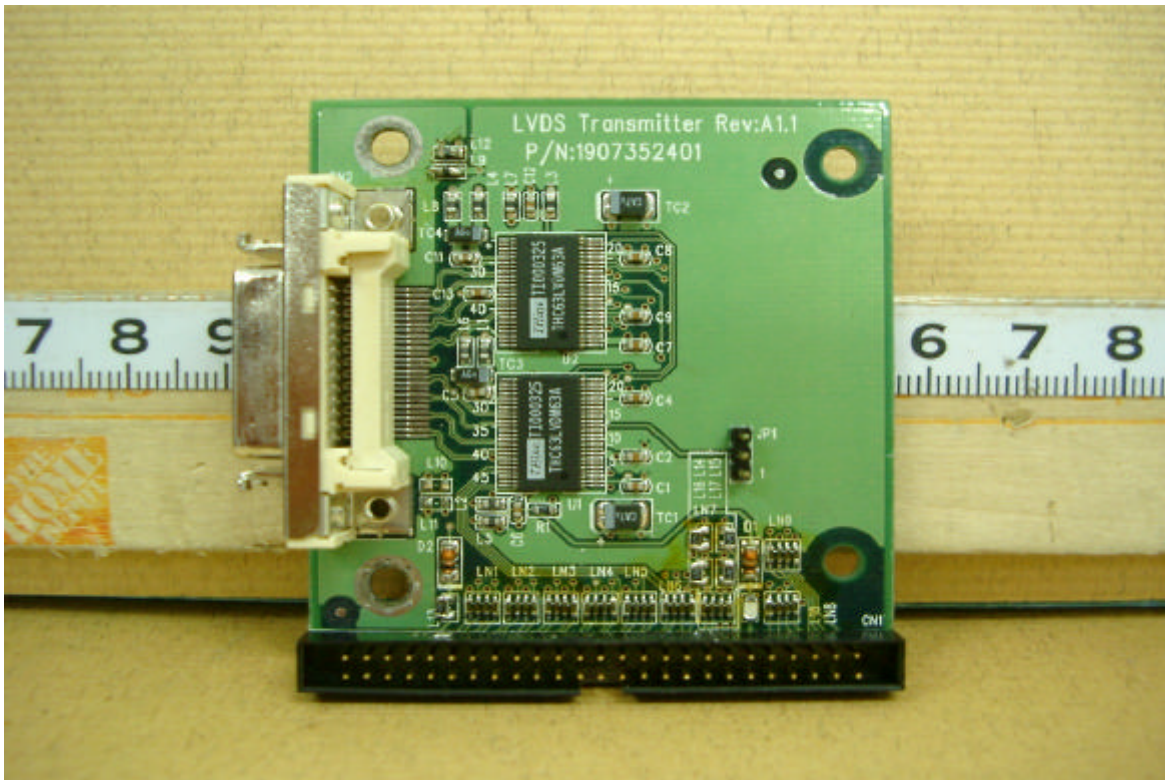


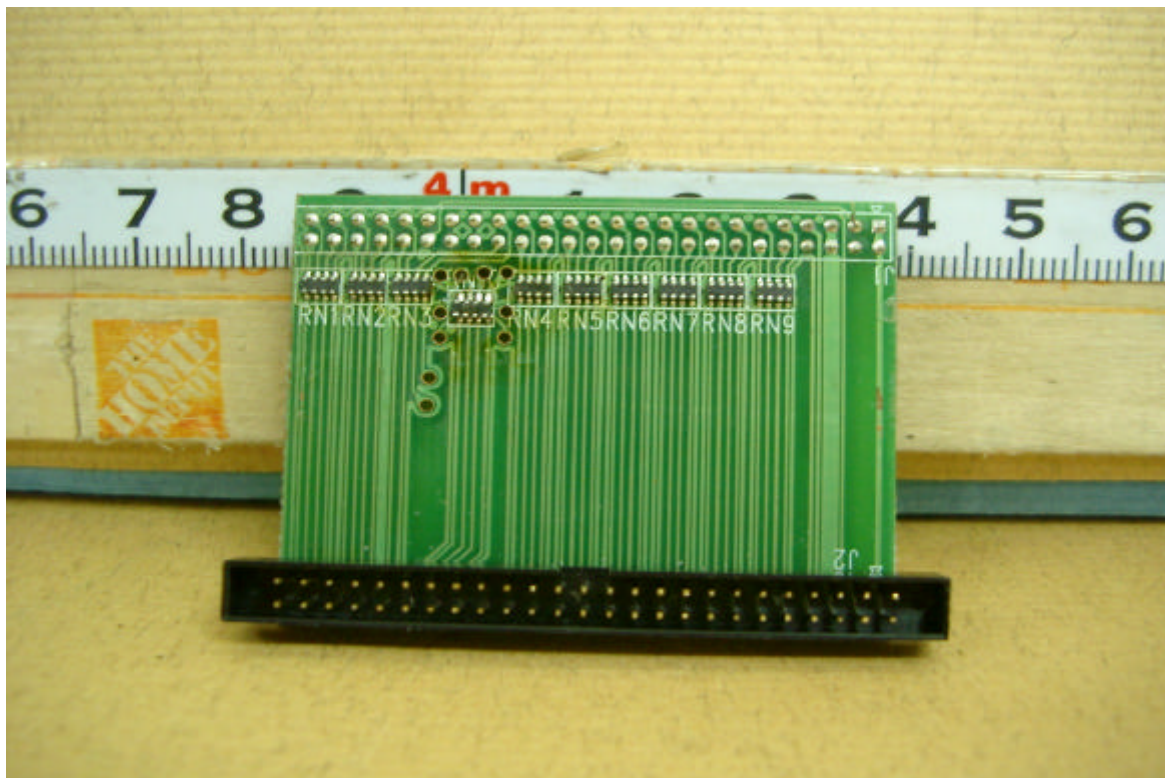
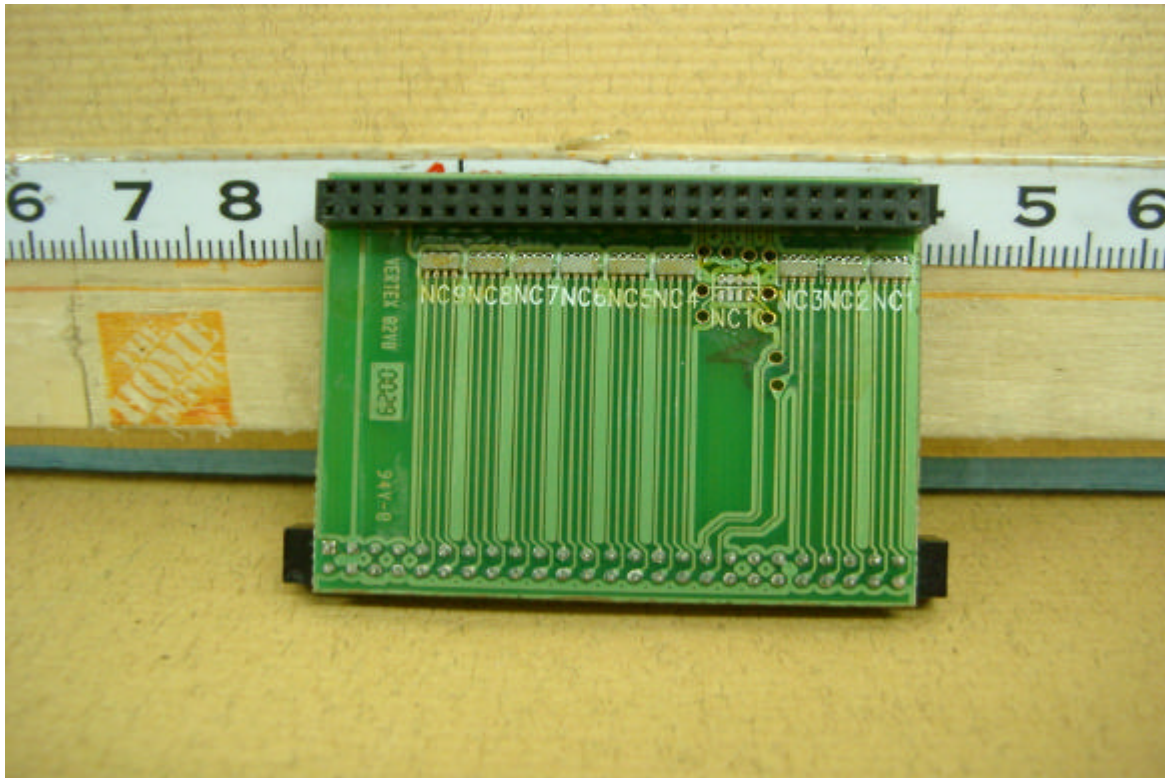


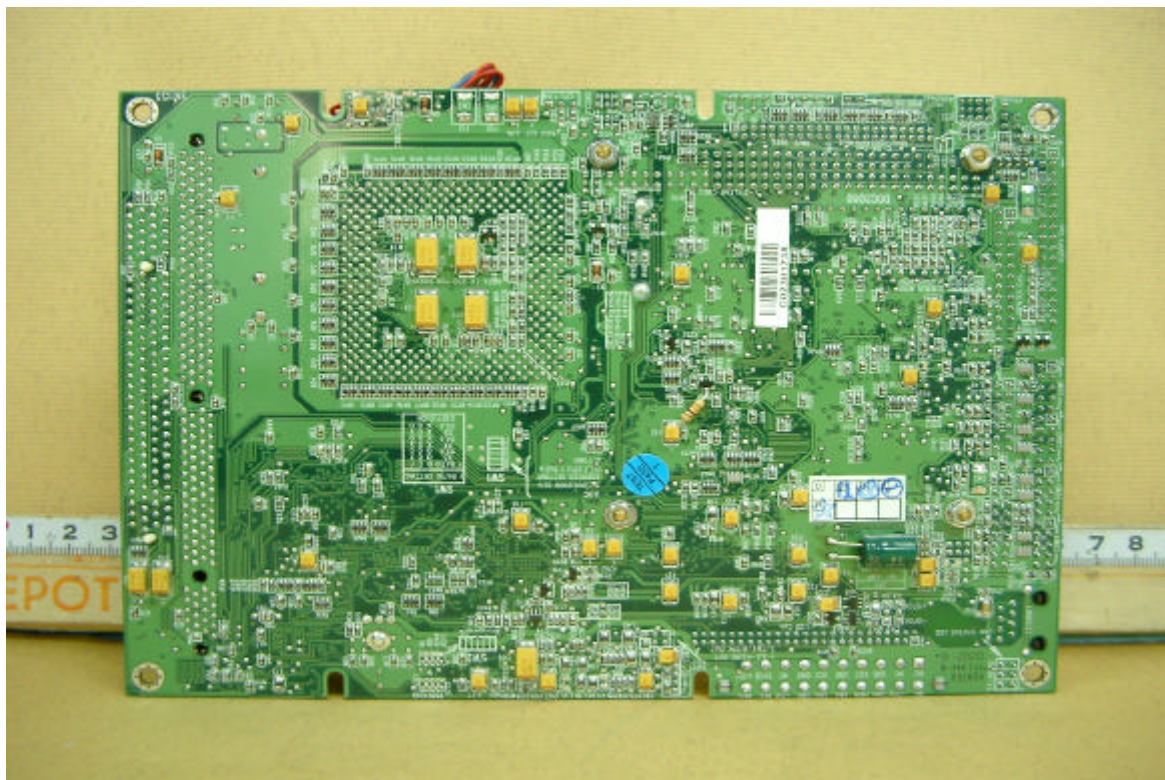
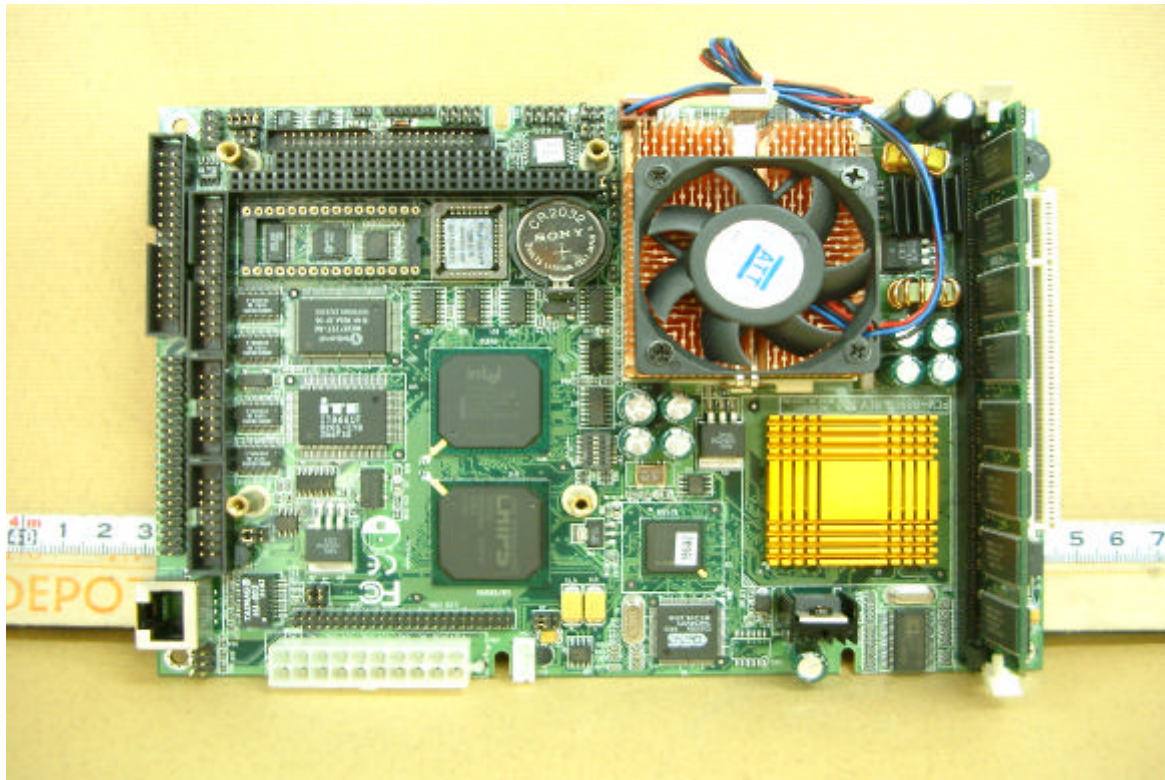


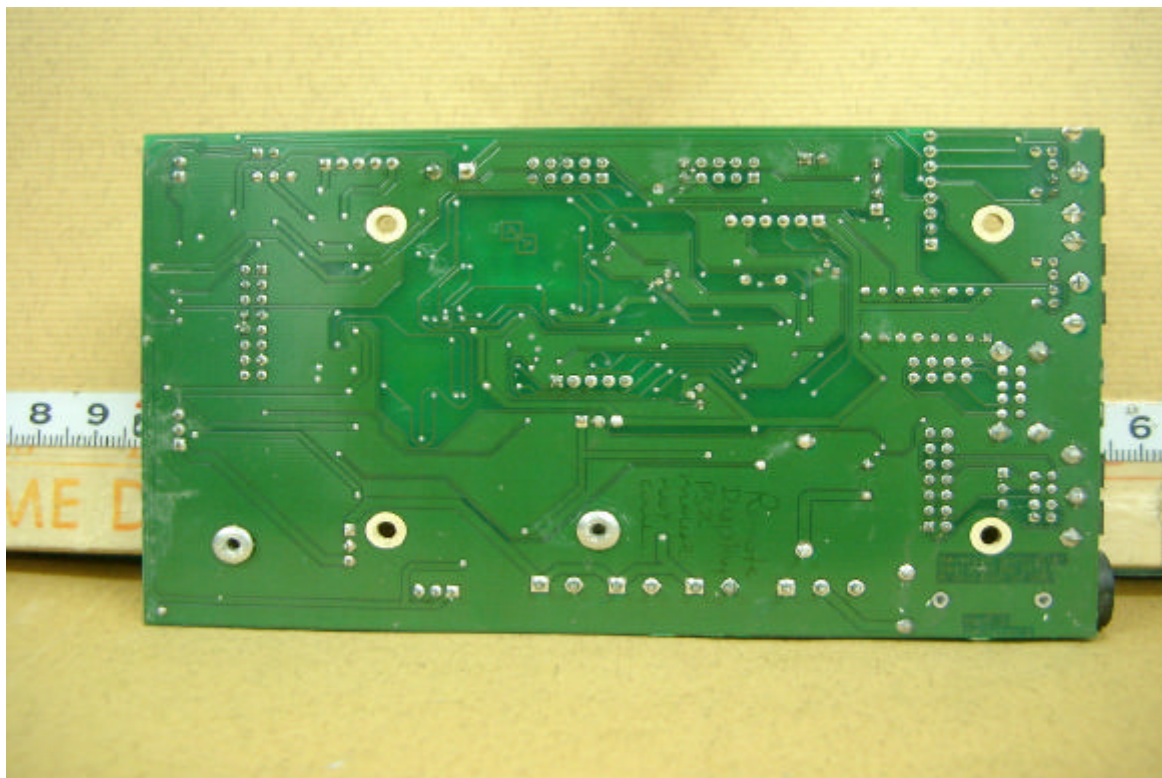
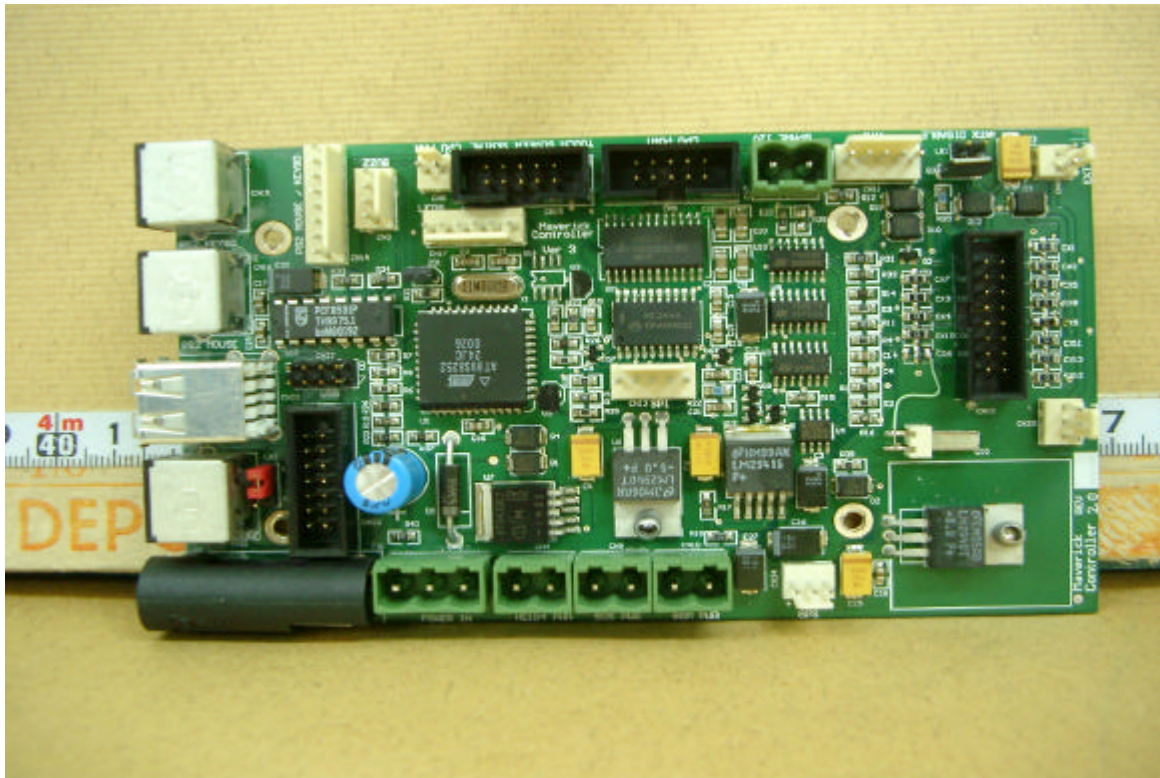












APPENDIX 3

CONDUCTED EMISSION PLOT RADIATED EMISSION DATA



Data#: 8 File#: 9462e.emi
E-Site

Date: 2002-03-20 Time: 11:13:06

Condition: VERTICAL
Report No. : 02E0017
Test Engr. : CLIFF LAI
Company : Logica PTY Ltd.
EUT : Maverick 2000
Test Config : EUT/ ALL PERIPHERALS
Type of Test: EN 55022 CLASS A
Mode of Op. : 1024X768 (WORST)

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	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	36.020	47.06	-9.57	37.49	40.00	-2.51	QP
2	57.700	47.52	-15.89	31.63	40.00	-8.37	Peak
3	83.940	45.95	-17.10	28.85	40.00	-11.15	Peak
4	110.990	44.59	-15.50	29.09	40.00	-10.91	Peak
5	113.980	47.56	-15.64	31.93	40.00	-8.08	Peak
6	131.460	47.52	-16.17	31.36	40.00	-8.65	Peak
7	167.030	45.31	-13.31	32.00	40.00	-8.00	Peak
8	195.100	38.70	-11.88	26.82	40.00	-13.18	Peak
9	200.430	40.45	-11.75	28.70	40.00	-11.30	Peak
10	240.000	40.21	-8.74	31.47	47.00	-15.53	Peak
11	249.000	39.42	-8.07	31.35	47.00	-15.65	Peak
12	261.000	37.15	-7.77	29.38	47.00	-17.62	Peak
13	291.000	43.57	-7.31	36.26	47.00	-10.74	Peak
14	300.000	42.25	-7.18	35.07	47.00	-11.93	Peak
15	330.000	48.33	-6.34	41.99	47.00	-5.01	Peak
16	390.000	45.85	-4.71	41.14	47.00	-5.86	Peak
17	420.000	44.71	-4.19	40.52	47.00	-6.48	Peak

Data#: 12 File#: 9462e.emi
E-Site

Date: 2002-03-20 Time: 11:49:48

Condition: HORIZONTAL
Report No. : 02E0017
Test Engr. : CLIFF LAI
Company : Logica PTY Ltd.
EUT : Maverick 2000
Test Config : EUT/ ALL PERIPHERALS
Type of Test: EN 55022 CLASS A
Mode of Op. : 1024X768 (WORST)

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	36.030	37.56	-9.57	27.99	40.00	-12.01	Peak
2	53.930	47.78	-14.98	32.80	40.00	-7.20	Peak
3	65.960	43.93	-17.10	26.83	40.00	-13.17	Peak
4	83.940	46.19	-17.10	29.09	40.00	-10.91	Peak
5	110.990	43.75	-15.50	28.25	40.00	-11.75	Peak
6	167.050	41.03	-13.31	27.72	40.00	-12.28	Peak
7	200.430	44.46	-11.75	32.71	40.00	-7.29	Peak
8	239.930	41.48	-8.74	32.74	47.00	-14.26	Peak
9	261.080	40.84	-7.77	33.07	47.00	-13.93	Peak
10	279.080	45.16	-7.50	37.66	47.00	-9.34	Peak
11	293.930	42.64	-7.27	35.37	47.00	-11.63	Peak
12	330.000	45.22	-6.34	38.88	47.00	-8.12	Peak
13	390.000	45.68	-4.71	40.97	47.00	-6.03	Peak
14	486.500	43.15	-3.30	39.85	47.00	-7.15	Peak
15	590.000	39.79	-0.86	38.93	47.00	-8.07	Peak