CE TEST REPORT

according to

European Standard EN 55022:1998 Class A, EN 61000-3-2: 2000, EN 61000-3-3:1995 and EN 61000-6-2:1999 (IEC 61000-4-2:1995, IEC 61000-4-3:1995, IEC 61000-4-4:1995, IEC 61000-4-5:1995, IEC 61000-4-6:1996, IEC 61000-4-8:1993, IEC 61000-4-11:1994)

Equipment : HALF SIZE SBC

Model No. : SBC-657

Applicant : **AAEON TECHNOLOGY INC.**
5F, No. 135, Lane235, Pao Chiao Rd.,
Hsin-Tien City, Taipei, 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.

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History of this test report

Original Report Issue Date: Jan. 27, 2003

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : C311802

CERTIFICATE OF COMPLIANCE

according to

European Standard EN 55022:1998 Class A, EN 61000-3-2: 2000, EN 61000-3-3:1995 and EN 61000-6-2:1999 (IEC 61000-4-2:1995, IEC 61000-4-3:1995, IEC 61000-4-4:1995, IEC 61000-4-5:1995, IEC 61000-4-6:1996, IEC 61000-4-8:1993, IEC 61000-4-11:1994)

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5F, No. 135, Lane235, 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 **EUROPEAN COUNCIL DIRECTIVE 89/336/EEC.** The equipment was ***passed*** the test performed according to **European Standard EN55022:1998 Class A, EN61000-3-2:2000, EN61000-3-3:1995 and EN 61000-6-2:1999 (IEC 61000-4-2:1995, IEC 61000-4-3:1995, IEC 61000-4-4:1995, IEC 61000-4-5:1995, IEC 61000-4-6:1996, IEC 61000-4-8:1993, IEC 61000-4-11:1994).** The test was carried out on **Jan. 24, 2003** at **SPORTON International Inc.** LAB.

Jan. 28, 2003

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, Lane235, 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	: HALF SIZE SBC
Model No.	: SBC-657
Trade Name	: AAEON
Data cable	: Please see section 2.2 of this test report for details
TP Cable	: Non-Shielded, 10m
Power Supply Type	: Switching
AC Power Cord	: Non-Shielded, 1.8m, 3 pin

1.4 Feature of Equipment under Test

- Supports VIA C3 Samuel 2 EBGA mobile CPU **677** / 733/800 MHz
- Integrated AGP 4X 2D/3D
- Graphics Accelerator
- Supports CRT and 36-bit TFT panels
- Supports Compact Flash Storage
- Dual channel LVDS interface onboard
- Supports Single 100Base-T Fast Ethernet
- Supports Ultra DMA/100 mode with data transfer rate up to 100 MB/Sec.
- 4 COMs / 1 Parallel / 4USB / 1 IrDA Port
- ATX Power support
- PC/104 Connector

General Functions

CPU type: VIA Eden C3 mobile EBGA (**667** / 733MHz) integrated processor (133 FSB)

BIOS: Award 256KB FLASH BIOS

Chipset: VT8606 (66/100/133 FSB) / VT82C686B

Memory: Up to 512MB. One 144-Pin SODIMM socket onboard.

Enhanced IDE device interface:
Supports up to two hard disk drives. BIOS auto-detect. Supports PIO mode 5 and Bus Master. Also supports Multi-word DMA and Ultra DMA/100 One (20*2) 2.54mm pin header with box

Floppy disk drive interface: Supports up to two floppy disk drives, 5.25" (360KB and 1.2MB) and /or 3.5" (720KB, 1.44MB and 2.88MB)

Parallel port:
Supports SPP, ECP, and EPP.
One 17*2 2.54 mm pin header with box

Serial ports: W83977EF, Three RS-232 and one RS-232/422/485 serial ports. Ports can be configured as COM1, COM2,COM3,COM4 or disabled individually.(16C550 equivalent)

Ethernet Interface Onboard 100Base-T RJ-45 connector

Chipset: Realtek 8139C 10/100Base-T Ethernet controller, Optional Boot ROM function

IR interface: Supports one IrDA Tx / Rx header, Support SIR /CIR (don't test)
One 6-pin 2.54mm header

Keyboard/mouse connector: Dual 6-pin mini DIN connector supports PC/AT keyboard and PS/2 mouse.

USB connector: Two 5 x 2 header onboard supports four USB ports
Connector: Two 5*2 2.0mm pin header

Battery: Lithium battery for data retention

DMA channel: 7 DMA channels (8237 equivalent)

Interrupt level: 15 interrupt levels (8259 equivalent)

- HDD : Maxtor / 4D040H2 / 40GB
- FDD : MITSUMI / D353M3 / 1.44MB
- POWER : Seventeam / ST-300BLV / 300W

2. Test Configuration of Equipment under Test

2.1 Test Manner

a. During testing, the interface cables and equipment positions were varied according to European Standard EN 55022.

b. The complete test system included remote workstation, SONY Monitor, GENUINE PS/2 Keyboard, LOGITECH PS/2 Mouse, LOGITECH USB Mouse, HP Printer, ACEEX Modem and EUT for EMI test. The remote workstation included SONY Monitor, GENUINE PS/2 Keyboard, LOGITECH PS/2 Mouse , LOGITECH PS/2 Mouse and FIC PC.

c. The following test modes were performed for Disturbances at Telecommunication Ports test:
Mode 1: LAN: 100Mbps
Mode 2: LAN: 10Mbps

d. The complete test system included remote workstation, VIEWSONIC Monitor, LOGITECH USB Mouse, BTC USB Keyboard, HP PS/2 Mouse, LOGITECH PS/2 Keyboard, LOGITECH PS/2 Mouse, HP Printer, ACEEX Modem and EUT for EMS test. The remote workstation included DELL PC, VIEWSONIC Monitor, DELL PS/2 Mouse and DELL PS/2 Keyboard.

e. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 1000MHz.

2.2 Description of Test System

< EMI >

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

FCC ID	: AK8GDM17SE2T
Model No.	: GDM-17SE2T
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0013
Data Cable	: Shielded, 1.15m
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) – for local and remote workstation

FCC ID	: N/A
Model No.	: K288
Serial No.	: SP0014
Data Cable	: Shielded, 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) – for local and remote workstation

FCC ID	: DZL211029
Model No.	: M-S34
Serial No.	: SP0011
Data Cable	: Shielded, 1.7m

Support Unit 4. -- USB Mouse (LOGITECH) – for local workstation

FCC ID	: N/A
Model No.	: M-BE58
Serial No.	: SP0011
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 5. -- Printer (HP) – for local workstation

FCC ID	: B94C2642X
Model No.	: DJ400
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0048
Data Cable	: Shielded, 360 degree via metal backshells, 1.35m

Support Unit 6. -- 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 7. – Personal Computer (FIC) -- for remote workstation

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

< EMS >

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

FCC ID	: N/A
Model No.	: VCDTS21553-3J
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0034
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- USB Keyboard (BTC) -- for local workstation

FCC ID	: E5XKBUCP10410
Model No.	: 7932
Serial No.	: SP0054
Data Cable	: Shielded, 1.6m

Support Unit 3. – USB Mouse (LOGITECH) -- for local workstation

FCC ID	: N/A
Model No.	: M-BE58
Serial No.	: SP0054
Data Cable	: Shielded, 1.8m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 4. -- PS/2 Mouse (LOGITECH) – for local workstation

FCC ID	: DZL211029
Model No.	: M-S34
Serial No.	: SP0011
Data Cable	: Shielded, 1.7m

Support Unit 5. -- Printer (HP) – for local workstation

FCC ID	: DSI6XU2225
Model No.	: 2225C
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0048
Data Cable	: Shielded, 360 degree via metal backshells, 1.35m

Support Unit 6. -- 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 7. – PS/2 Mouse (DELL) -- for remote workstation

FCC ID	: N/A
Model No.	: M-S34
Serial No.	: SP0054
Data Cable	: Shielded, 1.8m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 8. -- PS/2 Keyboard (DELL) -- for remote workstation

FCC ID	: GYUM92SK
Model No.	: AT101(DE8M)
Serial No.	: SP0054
Data Cable	: Shielded, 1.9m

Support Unit 9. – Personal Computer (DELL) -- for remote workstation

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

3. Test Software

< EMI >

An executive program, ″ EMITEST.EXE″ under WIN 2000, which generate 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.

At the same time, "Ping.EXE" was executed to link with the remote workstation receive and transmit data by TP Cable.

< EMS >

Two executive programs, ″ EMITEST.EXE & WINFCC.EXE ″ under WIN 98, which generate a complete line of continuously repeating " H" pattern were used as the test software.

The program were 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.

At the same time, "DIR.BAT" was executed to link with the remote workstation receive and transmit data by TP Cable.

4. General Information of Test

4.1 Test Facility

<EMI>

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. : CO01-LK, OS02-LK

<EMS>

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055

4.2 Test Voltage

230V/50Hz

4.3 Standard for Methods of Measurement

EMI Test (conduction and radiation) : European Standard EN 55022 Class A
Harmonics Test : European Standard EN 61000-3-2.
Voltage Fluctuations Test : European Standard EN 61000-3-3.
EMS Test : European Standard EN 61000-6-2.
(ESD: IEC 61000-4-2, RS: IEC 61 000-4-3, EFT: IEC 61000-4-4, SURGE: IEC 61000-4-5,
CS: IEC 61000-4-6, Power Frequency Magnetic Field: IEC 61000-4-8, DIPS: IEC 61000-4-11)

4.4 Test in Compliance with

EMI Test (conduction and radiation) : European Standard EN 55022 Class A
Harmonics Test : European Standard EN 61000-3-2.
Voltage Fluctuations Test : European Standard EN 61000-3-3.
EMS Test : European Standard EN 61000-6-2.
(ESD: IEC 61000-4-2, RS: IEC 61 000-4-3, EFT: IEC 61000-4-4, SURGE: IEC 61000-4-5,
CS: IEC 61000-4-6, Power Frequency Magnetic Field: IEC 61000-4-8, DIPS: IEC 61000-4-11)

4.5 Frequency Range Investigated

a. Conducted emission test: from 150 kHz to 30 MHz
b. Radiated emission test: from 30 MHz to 1,000 MHz
c. Radio frequency electromagnetic field immunity test : 80-1000 MHz.

4.6 Test Distance

a. The test distance of radiated emission test from antenna to EUT is 10 M.
b. The test distance of radio frequency electromagnetic field immunity test from antenna to EUT is 3 M.

5. Test of Conducted Powerline

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 55022 Clause 9. 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 producing maximum conducted emissions.

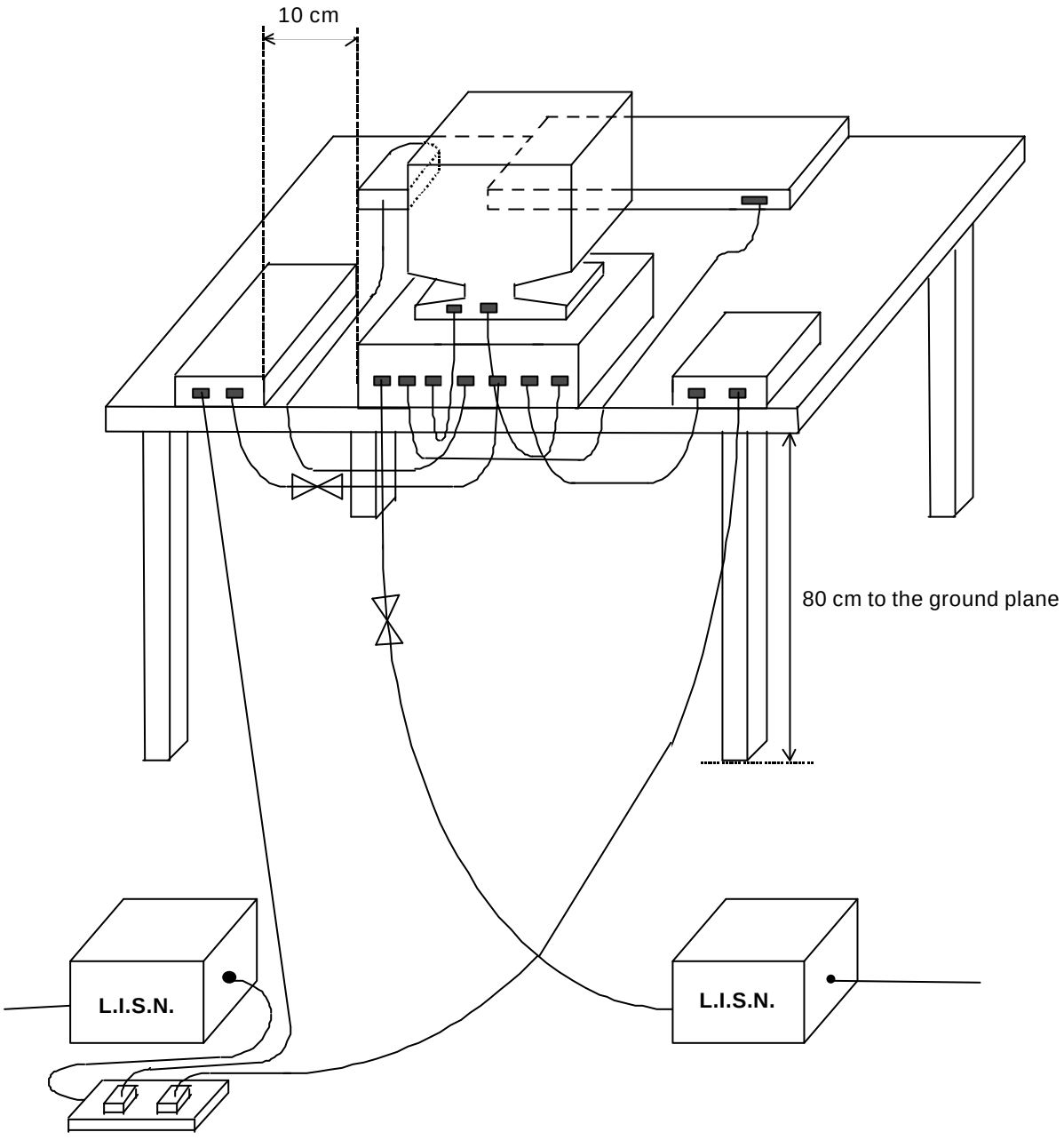
5.1 Description of Major Test Instruments

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

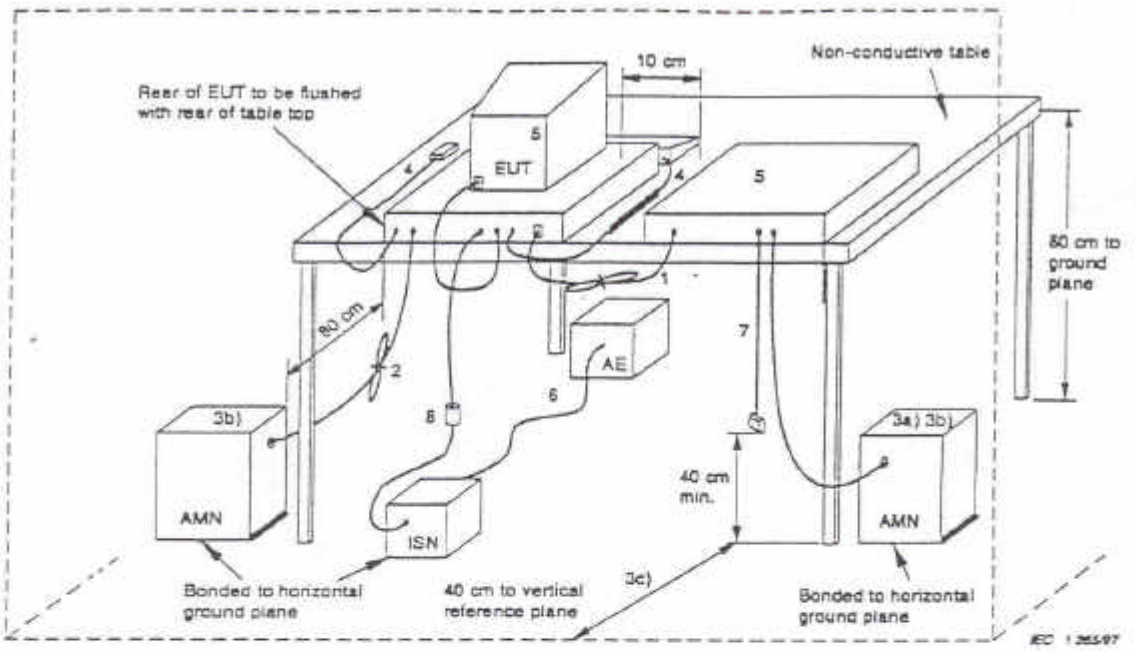
5.2 Test Procedures

a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. Connect Telecommunication port to ISN (Impedance Stabilization Network)
d. All the support units are connect to the other LISN.
e. The LISN provides 50 ohm coupling impedance for the measuring instrument.
f. The CISPR states that a 50 ohm , 50 microhenry LISN should be used.
g. Both sides of AC line were checked for maximum conducted interference.
h. The frequency range from 150 kHz to 30 MHz was searched.
i. 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 Typical Test Setup Layout of Disturbances at Telecommunication Ports



AMN = Artificial mains network
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

1) If cables, which hang closer than 40 cm to the horizontal metal groundplane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.

2) Excess mains cord shall be bundled in the centre or shortened to appropriate length.

3) EUT is connected to one artificial mains network (AMN). All AMNs and ISNs may alternatively be connected to a vertical reference plane or metal wall (see figures 5 and 6).

a) All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.

b) AMN and ISN are 80 cm from the EUT and at least 80 cm from other units and other metal planes.

c) Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.

4) Cables of hand operated devices, such as keyboards, mouses, etc. shall be placed as for normal usage.

5) Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.

6) I/O signal cable intended for external connection.

7) The end of the I/O signal cables which are not connected to an AE may be terminated, if required, using correct terminating impedance.

8) If used, the current probe shall be placed at 0,1 m from the ISN.

Figure 4 – Test configuration: tabletop equipment (conducted measurement)

5.5 Test Result of AC Powerline Conducted Emission

- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 20°C
- Relative Humidity: 59 %
- Test Date: Jan. 22, 2003
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked under gray area in the following table

Frequency	Line	Meter Reading		Limits		Margin	
	or	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.
(MHz)	Neutral	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
0.241	L	40.70	39.20	79.00	66.00	-38.30	-26.80
0.320	L	41.00	40.30	79.00	66.00	-38.00	-25.70
0.401	L	40.80	38.90	79.00	66.00	-38.20	-27.10
7.001	L	42.00	41.20	73.00	60.00	-31.00	-18.80
8.003	L	43.70	43.00	73.00	60.00	-29.30	-17.00
27.034	L	48.10	42.70	73.00	60.00	-24.90	-17.30
0.240	N	41.30	39.20	79.00	66.00	-37.70	-26.80
0.321	N	41.00	40.20	79.00	66.00	-38.00	-25.80
0.401	N	40.30	38.70	79.00	66.00	-38.70	-27.30
7.003	N	42.30	41.60	73.00	60.00	-30.70	-18.40
8.002	N	44.10	43.30	73.00	60.00	-28.90	-16.70
27.034	N	48.10	42.70	73.00	60.00	-24.90	-17.30

Test Engineer : Neil Huang

5.6 Test Result of Disturbances at Telecommunication Ports

5.6.1 Test Mode: Mode 1

- Frequency Range of Test : from 150 kHz to 30 MHz
- Temperature: 20°C
- Relative Humidity: 59 %
- Test Date: Jan. 22, 2003
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked under gray area in the following table

Frequency	Meter Reading		Limits		Margin	
	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
17.696	66.40	62.60	87.00	74.00	-20.60	-11.40
18.246	66.90	63.10	87.00	74.00	-20.10	-10.90
19.711	66.00	62.10	87.00	74.00	-21.00	-11.90
20.261	66.10	62.40	87.00	74.00	-20.90	-11.60
21.665	67.50	64.10	87.00	74.00	-19.50	-9.90
23.132	68.50	65.20	87.00	74.00	-18.50	-8.80

Test Engineer : Neil Huang

5.6.2 Test Mode: Mode 2

- Frequency Range of Test : from 150 kHz to 30 MHz
- Temperature: 22°C
- Relative Humidity: 59 %
- Test Date: Jan. 22, 2003
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked under gray area in the following table

Frequency	Meter Reading		Limits		Margin	
	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
0.405	35.70	30.40	88.75	75.75	-53.05	-45.35
0.963	33.80	23.60	87.00	74.00	-53.20	-50.40
2.012	36.60	21.20	87.00	74.00	-50.40	-52.80
7.014	35.30	21.40	87.00	74.00	-51.70	-52.60
20.003	44.60	43.80	87.00	74.00	-42.40	-30.20
24.960	49.10	48.40	87.00	74.00	-37.90	-25.60

Test Engineer : 

Neil Huang

5.7 Photographs of Counducted Powerline Test Configuration

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

FRONT VIEW

REAR VIEW

5.8 Photographs of Disturbances at Telecommunication Ports

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

FRONT VIEW

REAR VIEW

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in European Standard EN 55022, Clause 10. 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 Description of Major Test Instruments

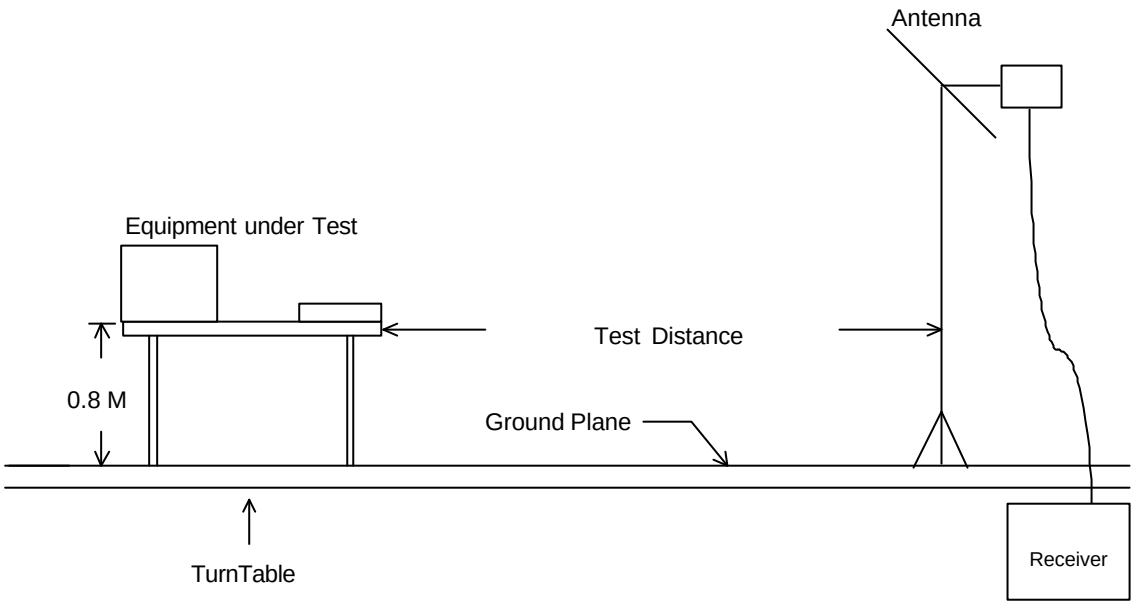
- Amplifier (HP 87405A)
  RF Gain 25 dB
  Signal Input 10 MHz – 3 GHz

- Spectrum Analyzer (HP 8560E)
  Attenuation 10 dB
  Start Frequency 30 MHz
  Stop Frequency 1000 MHz
  Resolution Bandwidth 120 KHz
  Signal Input 30 MHz – 2.9 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 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

- Frequency Range of Test: from 30 MHz to 1000 MHz
- Test Distance: 10M
- Temperature: 27°C
- Relative Humidity: 53%
- Test Date: Jan. 19, 2003
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Antenna Factor + Cable Loss + Reading = Emission

■ **The test was passed at the minimum margin that marked under gray area in the following table, and its antenna height is 1m, turn table degree is 320°**

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Level (dBuV/m)	Margin (dB)
32.400	V	17.15	0.37	19.34	40.00	36.86	-3.14
137.400	V	10.92	1.20	20.74	40.00	32.86	-7.14
166.400	V	9.40	1.95	23.93	40.00	35.28	-4.72
194.500	V	8.20	1.75	23.83	40.00	33.78	-6.22
510.500	V	18.15	2.32	18.45	47.00	38.92	-8.08
166.700	H	9.40	1.95	24.03	40.00	35.38	-4.62

Carr

Test Engineer : _____

Carr Chuang

6.5 Photographs of Radiated Emission Test Configuration

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

FRONT VIEW

REAR VIEW

7. Harmonics Test

7.1 STANDARD

- Product Standard : EN 61000-3-2:2000

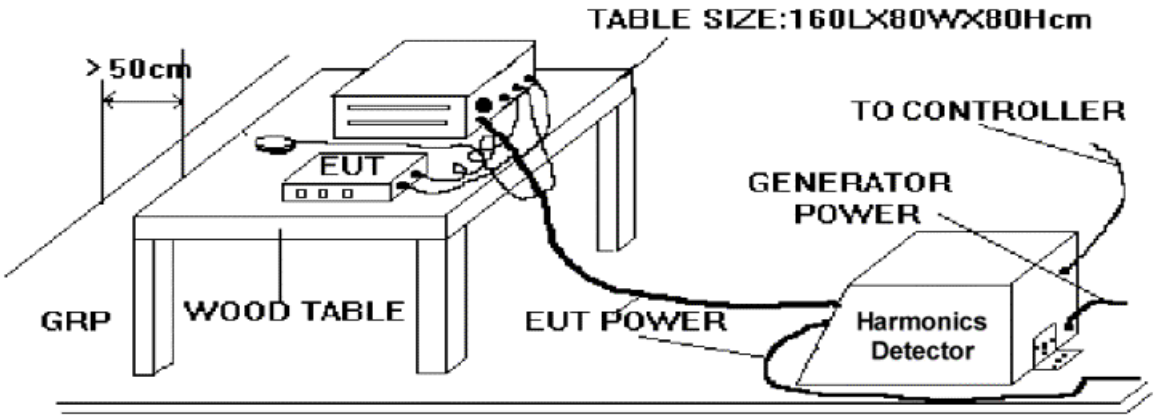
7.2 TEST PROCEDURE

The measured values of the harmonics components of the input current, including line current and neutral current, shall be compared with the limits given in Clause 4.

7.3 TEST EQUIPMENT SETTINGS :

- Line Voltage : 230 V
- Line Frequency : 50 Hz
- Device Class : D
- Current Measurement Range : High
- Measurement Delay : 10.0 seconds
- Test Duration : 2.00 minutes
- Class determination Pre-test Duration : 10.00 seconds

7.4 TEST SETUP



7.5 CURRENT HARMONICS TEST

7.5.1 TEST DATA OF CURRENT HARMONICS

- FINAL TEST RESULT : ***PASS***
- Temperature : 22 ℃
- Relative Humidity : 53% RH
- Test Date : Jan. 24, 2003

Urms =	228.5V	Freq =	50.000	Range:	2 A
Irms =	0.358A	Ipk =	1.472A	cf =	4.106
P =	37.55W	Pap =	81.91VA	pf =	0.458
THDi =	89.2 %	THDu =	0.10 %	Class A	

Test - Time : 2min (100 %)

Test completed, Result: PASSED

Order	Iavg [A]	Iavg% [%]	Irms [A]	Irms% [%]	Imax [A]	Imax% [%]	Limit Status [A]
1	0.1704	47.548	0.1656	46.219	0.4784	133.48	
2	0.0000	0.0000	0.0007	0.2044	0.0009	0.2384	1.0800
3	0.1616	45.095	0.1594	44.482	0.1628	45.436	2.3000
4	0.0000	0.0000	0.0011	0.3065	0.0012	0.3406	0.4300
5	0.1521	42.439	0.1505	41.996	0.1532	42.745	1.1400
6	0.0000	0.0000	0.0013	0.3747	0.0015	0.4087	0.3000
7	0.1382	38.556	0.1375	38.351	0.1390	38.794	0.7700
8	0.0000	0.0000	0.0015	0.4087	0.0016	0.4428	0.2300
9	0.1211	33.787	0.1212	33.822	0.1217	33.958	0.4000
10	0.0000	0.0000	0.0016	0.4428	0.0017	0.4768	0.1840
11	0.1018	28.406	0.1028	28.678	0.1030	28.747	0.3300
12	0.0000	0.0000	0.0017	0.4768	0.0018	0.5109	0.1533
13	0.0813	22.684	0.0835	23.297	0.0837	23.365	0.2100
14	0.0000	0.0000	0.0016	0.4428	0.0017	0.4768	0.1314
15	0.0613	17.098	0.0643	17.950	0.0646	18.018	0.1500
16	0.0000	0.0000	0.0015	0.4087	0.0016	0.4428	0.1150
17	0.0428	11.955	0.0464	12.943	0.0466	13.011	0.1324
18	0.0000	0.0000	0.0012	0.3406	0.0013	0.3747	0.1022
19	0.0269	7.4932	0.0305	8.5150	0.0308	8.5831	0.1184
20	0.0000	0.0000	0.0010	0.2725	0.0011	0.3065	0.0920
21	0.0134	3.7466	0.0171	4.7684	0.0173	4.8365	0.1071
22	0.0000	0.0000	0.0007	0.2044	0.0007	0.2044	0.0836
23	0.0017	0.4768	0.0067	1.8733	0.0070	1.9414	0.0978
24	0.0000	0.0000	0.0005	0.1362	0.0005	0.1362	0.0767
25	0.0000	0.0000	0.0011	0.3065	0.0033	0.9196	0.0900
26	0.0000	0.0000	0.0002	0.0681	0.0002	0.0681	0.0708
27	0.0072	2.0095	0.0055	1.5327	0.0072	2.0095	0.0833
28	0.0000	0.0000	0.0000	0.0000	0.0001	0.0341	0.0657
29	0.0087	2.4183	0.0077	2.1458	0.0087	2.4183	0.0776
30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0613
31	0.0083	2.3161	0.0081	2.2480	0.0083	2.3161	0.0726
32	0.0000	0.0000	0.0001	0.0341	0.0001	0.0341	0.0575
33	0.0067	1.8733	0.0071	1.9755	0.0072	2.0095	0.0682
34	0.0000	0.0000	0.0001	0.0341	0.0001	0.0341	0.0541
35	0.0005	0.1362	0.0052	1.4646	0.0054	1.4986	0.0643
36	0.0000	0.0000	0.0001	0.0341	0.0001	0.0341	0.0511
37	0.0000	0.0000	0.0033	0.9196	0.0035	0.9877	0.0608
38	0.0000	0.0000	0.0001	0.0341	0.0001	0.0341	0.0484
39	0.0000	0.0000	0.0022	0.6131	0.0024	0.6812	0.0577
40	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0460

Test Engineer : 

Bruce Huang

8. Voltage Fluctuations Test

8.1 Standard

- Standard : EN 61000-3-3:1995

8.2 Test Procedure

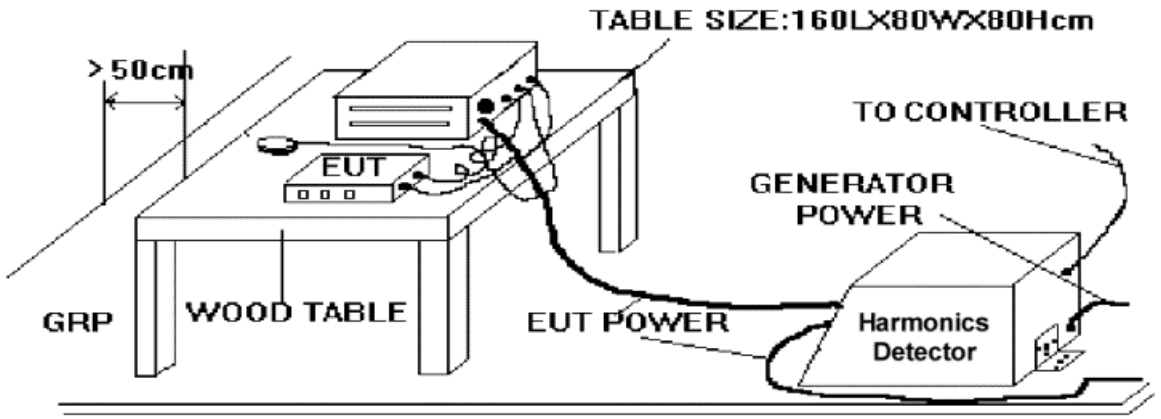
The equipment shall be tested under the conditions of **Clause 5.**

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of ±8% is achieved during the whole assessment procedure.

8.3 Test Equipment Settings

- Line Voltage : 230 V
- Line Frequency : 50 Hz
- Measurement Delay : 10.0 seconds
- Pst Integration Time : 10 minutes
- Pst Integration Periods : 1
- Test Duration : 00:10:00 minutes

8.4 Test Setup



8.5 Test Result Of Voltage Fluctuation And Flicker Test

8.5.1 Test Data Of Voltage Fluctuation And Flicker

- FINAL TEST RESULT : **PASS**
- Temperature : 22°C
- Relative Humidity : 53%
- Test Date : Jan. 24, 2003

Urms =	228.5V	Freq =	50.000	Range:	2 A
Irms =	0.349A	Ipk =	1.452A	cf =	4.165
P =	36.27W	Pap =	79.68VA	pf =	0.455

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : Soft LIN 0.24 Ohm +j 0.15 Ohm N: 0.16 Ohm +j 0.10 Ohm

Limits :	PIt :	0.65	Pst :	1.00
	dmax :	4.00 %	dc :	3.00 %
	dtLim:	3.00 %	dt>Lim:	200ms

Test completed, Result: PASSED

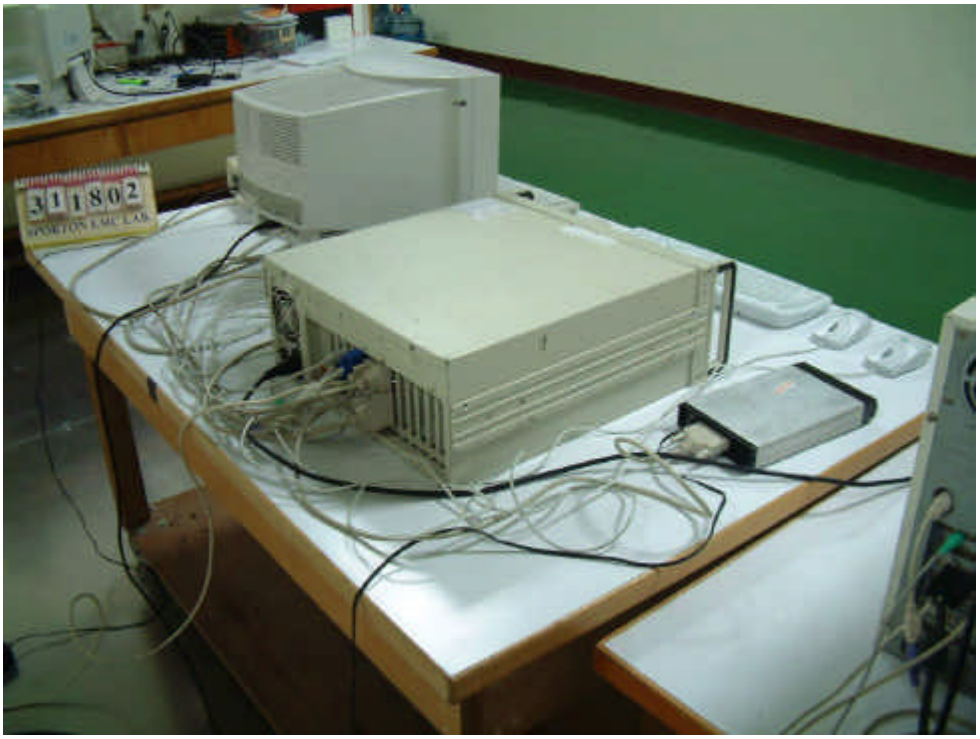
Test Engineer : Bruce

Bruce Huang

8.6 Photographs Of Harmonics Test, Voltage Fluctuation And Flicker Test

FRONT VIEW

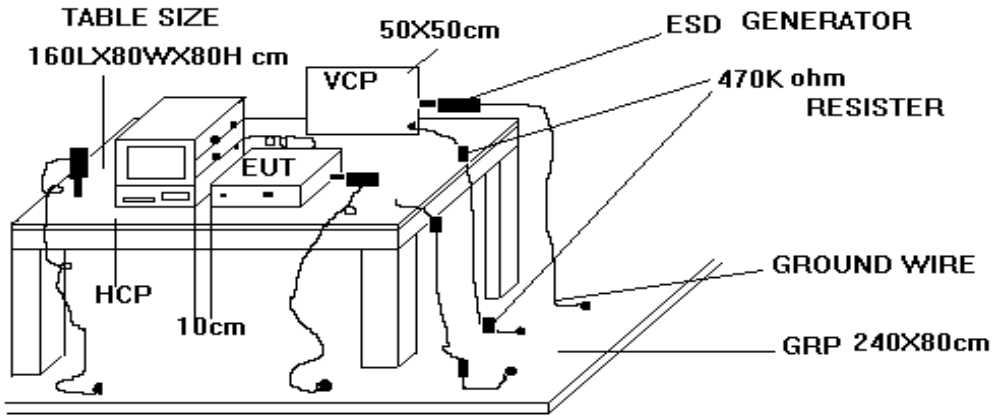
REAR VIEW



9. Electrostatic Discharge Immunity Test (ESD)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : A
- Required performance criteria : B
- Basic Standard : IEC 61000-4-2:1995
- Generic Standard : EN 61000-6-2 :1999
- Level : 3 for air discharge
  : 2 for contact discharge
- Test Voltage : ±2 / ±4 / ±8 KV for air discharge
  : ±2 / ±4 KV for contact discharge
- Temperature : 22°C
- Relative Humidity : 53%
- Test Date : Jan. 24, 2003
- Observation : Normal

9.1 Test setup



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner :

a. CONTACT DISCHARGE to the conductive surfaces and to coupling plane;
b. AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

9.2 Test Setup for Tests Performed in Laboratory

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the SPORTON EMC LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resister located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.

9.3 ESD Test Procedure

a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
   - ambient temperature: 15℃ to 35℃;
   - relative humidity : 30% to 60%;
   - atmospheric pressure : 68 KPa (680 mbar) to 106 KPa (1060 mbar).

b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.

c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.

d. The test shall be performed with both air discharge and contact discharge. On preselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On preselected points at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge.

e. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

f. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

g. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :
   - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
   - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
   - The contact discharge test shall not be applied to such surfaces.

h. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

9.4 Test Severity Levels

9.4.1 Contact Discharge

Level	Test Voltage (KV) of Contact discharge
1	±2
2	±4
3	±6
4	±8
X	Specified

Remark : "X" is an open level.

9.4.2 Air Discharge

Level	Test Voltage (KV) of Air Discharge
1	±2
2	±4
3	±8
4	±15
X	Specified

Remark : "X" is an open level.

9.5 Test Points

9.5.1 Test Result of Air Discharge

Test Point	Voltage	Tested No.
FAN	±2 / ±4 / ±8 KV	BY 10
LED	±2 / ±4 / ±8 KV	BY 10
AC SOCKET	±2 / ±4 / ±8 KV	BY 10
RESET Switch	±2 / ±4 / ±8 KV	BY 10
PS/2 Port	±2 / ±4 / ±8 KV	BY 10
Power Switch	±2 / ±4 / ±8 KV	BY 10

9.5.2 Test Result of Contact Discharge

Polarity	Voltage	Tested No.
Horizontal (At Front)	±2 / ±4 KV	BY 10
Horizontal (At Left)	±2 / ±4 KV	BY 10
Horizontal (At Right)	±2 / ±4 KV	BY 10
Horizontal (At Rear)	±2 / ±4 KV	BY 10
Vertical (At Front)	±2 / ±4 KV	BY 10
Vertical (At Left)	±2 / ±4 KV	BY 10
Vertical (At Right)	±2 / ±4 KV	BY 10
Vertical (At Rear)	±2 / ±4 KV	BY 10
Case	±2 / ±4 KV	BY 10
Screw	±2 / ±4 KV	BY 10
Bracket	±2 / ±4 KV	BY 10
VGA Port	±2 / ±4 KV	BY 10
Printer Port	±2 / ±4 KV	BY 10
Com1/2 Port	±2 / ±4 KV	BY 10
USB Port	±2 / ±4 KV	BY 10
Key Hole	±2 / ±4 KV	BY 10

Test Engineer : Bruce

Bruce Huang

9.6 Photographs of Electrostatic Discharge Immunity Test

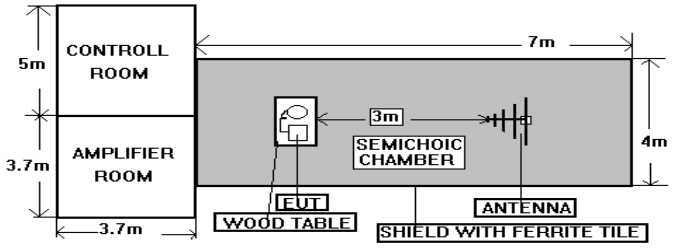
FRONT VIEW

REAR VIEW

10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : A
- Required performance criteria : A
- Basic Standard : IEC 61000-4-3:1995
- Generic Standard : EN 61000-6-2 :1999
- Level : 3
- Frequency Range : 80-1000 MHz
- Field Strength : 10 V/m (Modulated 80% AM)
- Temperature : 23°C
- Relative Humidity : 54%
- Test Date : Jan. 24, 2003
- Observation : Normal

10.1 Test setup



NOTE : The SPORTON 7m x 4m x 4m semichoic chamber is compliance with the sixteen points uniform field requirement as stated in IEC 1000-4-3 Section 6.2.

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semichoic chamber.

10.2 Test Procedure

a. The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
b. The bilog antenna which is enabling the complete frequency range of 80-1000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
c. The test is normally performed with the antenna facing the most sensitive side of the EUT. The polarization of the field generated by the biconical antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. The circular polarization of the field from the log-spiral antenna makes a change of position of the antenna unnecessary.
d. At each of the above conditions, the frequency range is swept 80-1000 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of 1.5*10-3 decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

10.3 Test Severity Levels

Frequency Band : 80-1000 MHz

Level	Test field strength (V/m)
1	1
2	3
3	10
X	Specified

Remark : "X" is an open class.

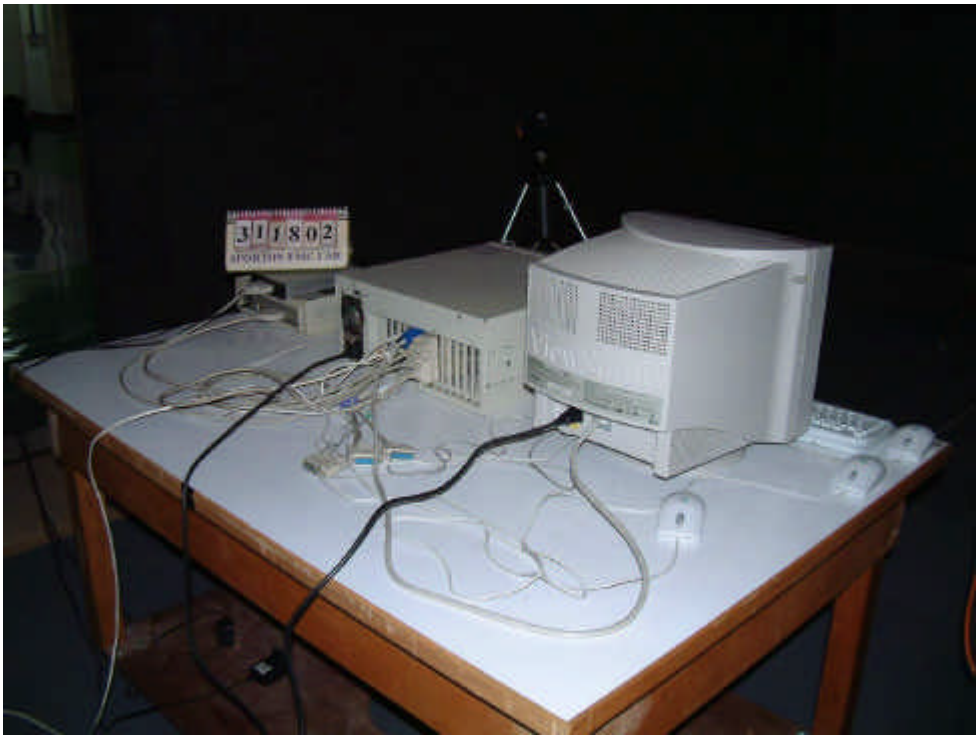
Test Engineer : Bruce

Bruce Huang

10.4 Photographs of Radio Frequency Electromagnetic Field Immunity Test

FRONT VIEW

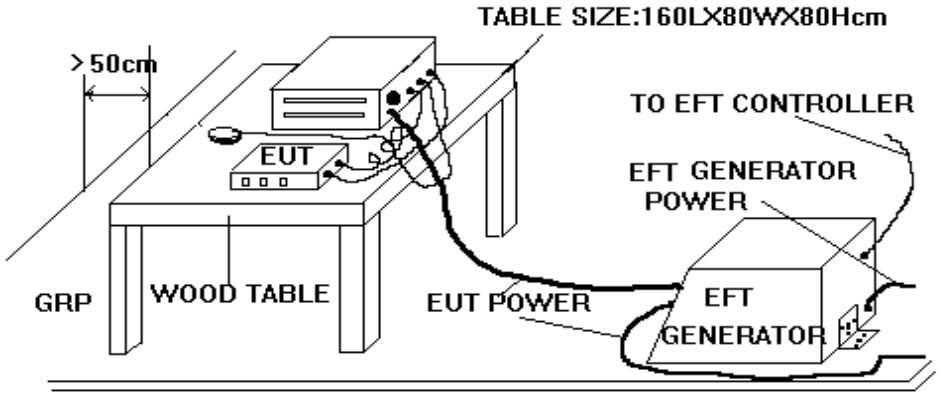
REAR VIEW



11. Electrical Fast Transient/Burst Immunity Test (EFT/BURST)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : B
- Required performance criteria : B
- Basic Standard : IEC 61000-4-4:1995
- Generic Standard : EN 61000-6-2 :1999
- Level : on Power Supply -- 3
  : on I/O signal, data and control line -- 3
- Test Voltage : on Power Supply -- ±0.5 / ±1.0 / ±2.0KV
  : on I/O signal, data and control line -- ±0.25 / ±0.5 / ±1.0KV
- Temperature : 22°C
- Relative Humidity : 53%
- Test Date : Jan. 24, 2003
- Observation : During testing, mal-function occurred to EUT. After the test, the equipment continued to operate as intended without operator intervention.

11.1 Test setup



The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1m thick. If the EUT is table-top equipment, it was located approximately 0.8m above the GRP.. The GRP. was a metallic sheet (copper or aluminum) of 0.25 mm ,minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. It shall project beyond the EUT by at least 0.1m on all sides and connected to the protective earth. In the SPORTON EMC LAB. we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system. The EUT was arranged and connected according to its functional requirements. The minimum distance between the EUT and other conductive structures, except the GRP. beneath the EUT, was more than 0.5 m. Using the coupling clamp, the minimum distance between the coupling plates and all other conductive structures, except the GRP. beneath the EUT, was more than 0.5 m. The length of the signal and power lines between the coupling device and the EUT was 1m or less.

11.2 Test on Power Line

a. The EFT/B-generator was located on the GRP.. The length from the EFT/B-generator to the EUT as not exceed 1 m.

b. The EFT/B-generator provides the ability to apply the test voltage in a non-symmetrical condition to the power supply input terminals of the EUT.

11.3 Test on Communication Lines

a. The coupling clamp is composed of a clamp unit for housing the cable (length more than 3 m), and was placed on the GRP..

b. The coupling clamp provides the ability of coupling the fast transient/bursts to the cable under test.

11.4 Test Procedure

a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
   - ambient temperature: 15℃ to 35℃;
   - relative humidity : 45% to 75%;
   - atmospheric pressure : 68 KPa (680 mbar) to 106 KPa (1060 mbar).

b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.

c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.

d. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
   - Normal performance within the specification limits.
   - Temporary degradation or loss of function or performance which is self-recoverable.
   - Temporary degradation or loss of function or performance which requires operator intervention or system reset.
   - Degradation or loss of function which is not recoverable due to damage of equipment (components).

11.5 Test Severity Levels

The following test severity levels are recommended for the fast transient/burst test :

Open circuit output test voltage ± 10%		
Level	On Power Supply	On I/O signal, data and control line
1	0.5 KV	0.25 KV
2	1.0 KV	0.50 KV
3	2.0 KV	1.00 KV
4	4.0 KV	2.00 KV
X	Specified	Specified

Remark : " X " is an open level. The level is subject to negotiation between the user and the manufacturer or is specified by the manufacturer.

Test Engineer : 

Bruce Huang

11.6 Photographs of Electrical Fast Transient/Burst Immunity Test

FRONT VIEW

REAR VIEW

CLAMP

12. Surge Immunity Test

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : A
- Required performance criteria : B
- Basic Standard : IEC 61000-4-5:1995
- Generic Standard : EN 61000-6-2 :1999
- Input Voltage, Frequency : 230Vac, 50Hz
- Surge wave form (Tr/Th) : 1, 2/50（8/20）μs
- Level : on Lan port – N/A
- : on Input AC Power Port – 3
- Test Voltage : on Lan port – N/A
- : on Input AC Power Port -- ±1.0/±2.0 KV
- Temperature : 23°C
- Relative Humidity : 52%
- Test Date : Jan. 24, 2003
- Observation : Normal
- Remark : The test on LAN ports is not required due to the normal functioning cannot be achieved because of the impact of the CDN on the EUT.

12.1 Test Record

Voltage (KV)	Test Location	Polarity	Phase Angle				Test Result
			0°	90°	180°	270°	
1 KV	L - N	+	A	A	A	A	***PASS***
		−	A	A	A	A	***PASS***
2 KV	L - PE	+	A	A	A	A	***PASS***
		−	A	A	A	A	***PASS***
	N-PE	+	A	A	A	A	***PASS***
		−	A	A	A	A	***PASS***

⌖ *Remark : PE = DC output GND*

12.2 Test Level

Level	Open-circuit test voltage, ± 10%, KV
1	0.5
2	1.0
3	2.0
4	4.0
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

12.3 Test Procedure

a. Climatic conditions

The climatic conditions shall comply with the following requirements :

-- ambient temperature : 15 ℃ to 35 ℃
-- relative humidity : 10 % to 75 %
-- atmospheric pressure : 86 kPa to 106 kPa (860 mbar to 1060 mbar)

b. Electromagnetic conditions

The electromagnetic environment of the laboratory shall not influence the test results.

c. The test shall be performed according the test plan that shall specify the test set-up with

-- generator and other equipment utilized;
-- test level (voltage/current);
-- generator source impedance;
-- internal or external generator trigger;
-- number of tests : at least five positive and five negative at the selected points;
-- repetition rate : maximum 1/min.
-- inputs and outputs to be tested;
-- representative operating conditions of the EUT;
-- sequence of application of the surge to the circuit;
-- phase angle in the case of a.c. power supply;
-- actual installation conditions, for example :
AC : neutral earthed,
DC : (+) or (-) earthed to simulated the actual earthing conditions.

d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).

e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.

f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.

g. All lower levels including the selected test level shall be satisfied. For testing the secondary protection, the output voltage of the generator shall be increased up to the worstcase voltage breakdown level (let-through level) of the primary protection.

h. If the actual operating signal sources are not available, the may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according the a test plan.

i. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test a previously unstressed equipment shall be used to the protection devices shall be replaced.

12.4 Operating Condition

Full system

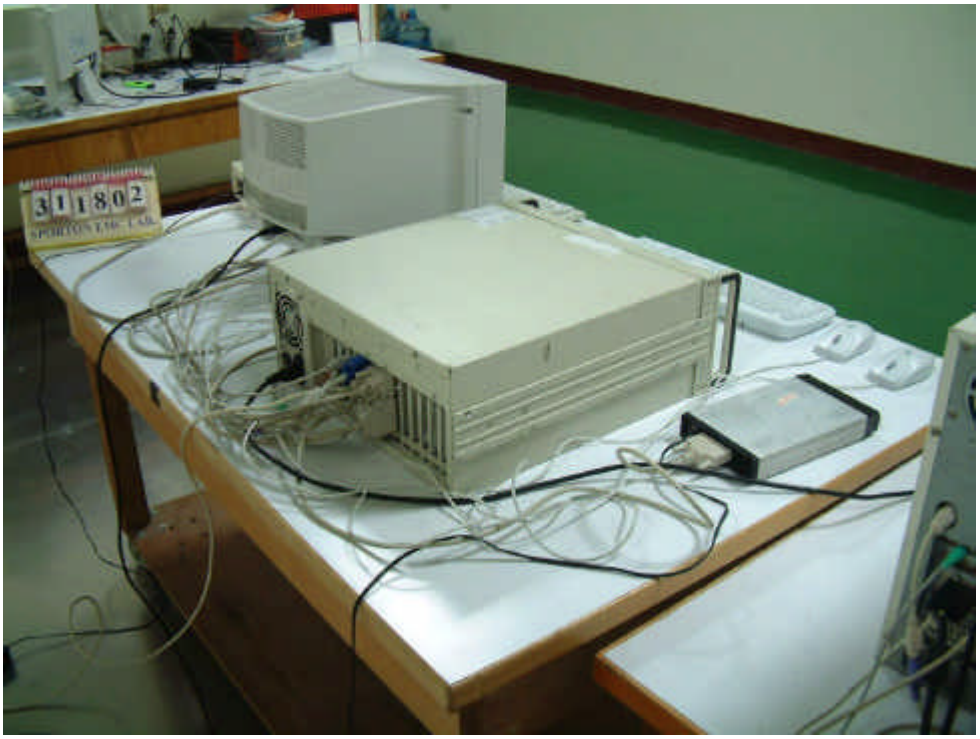
Test Engineer : Bruce

Bruce Huang

12.5 Photographs of Surge Immunity Test

FRONT VIEW

REAR VIEW



13. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (CS)

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : A
- Required performance criteria : A
- Basic Standard : IEC 61000-4-6:1996
- Generic Standard : EN 61000-6-2 :1999
- Input Voltage, Frequency : AC 230V, 50Hz
- Level : 3
- Test Voltage : 10 V rms (Modulated, 1KHz, 80%, AM)
- Frequency Range : 0.15 MHz to 80 MHz
- Test Port : on AC Power and Signal Ports
- Dwell time : 2.9 seconds
- Frequency step size : 1 %
- Coupling mode : CDN-M3 for AC power ports, CDN-RJ45 for Signal Ports
- Temperature : 21°C
- Relative Humidity : 53%
- Test Date : Jan. 24, 2003
- Observation : Normal

13.1 Test Level

Level	Voltage Level (EMF),
1	1 V
2	3 V
3	10 V
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

13.2 Operating Condition

Full system

13.3 Test Procedure

a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.

b. This test method test can be performed without using a sell shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.

c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.

d. Filters shall be used to prevent (higher order or sub-) harmonics form disturbing the EUT. A High-Pass Filter. 100KHz, (HPF) may be required with the test generator. The band stop characteristics of the Low-Pass Filters (LPF) shall be sufficient to suppress the harmonics down to the immunity level required within that band. These filters shall be inserted with the test generator before setting the test level.

e. The frequency range is swept from 150 KHz to 230 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1KHz sinewave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.

f. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency(ies) and harmonics or frequencies of dominant interest shall be analyzed separately.

g. An alternative test procedure may be adopted, wherein the frequency range is swept incrementally, with a step size not exceeding 4% of the start ad thereafter 4% of the preceding frequency value. The test level should be at least twice the value of the specified test level.

h. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.

i. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

j. The use of special exercising programs is recommended.

k. Testing shall be performed according to a Test Plan, which shall be included in the test report.

l. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

Test Engineer : 

Bruce Huang

13.4 Photographs of Conducted Disturbances Induced by Radio-Frequency Field Immunity Test

FRONT VIEW

REAR VIEW

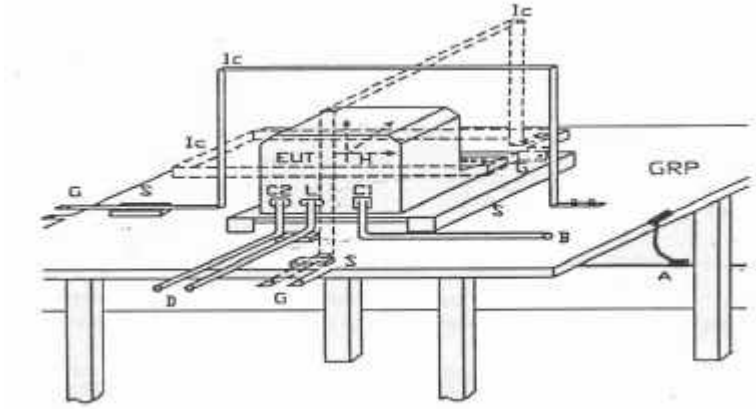
14. Power Frequency Magnetic Field immunity tests

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : A
- Required performance criteria : A
- Basic Standard : IEC 61000-4-8:1993
- Generic Standard : EN 61000-6-2 :1999
- Input Voltage, Frequency : AC 230V, 50Hz
- Temperature : 22°C
- Relative Humidity : 54%
- Test Date : Jan. 24, 2003
- Observation : Normal

14.1 Test Record

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Results	Remark
50Hz, 30A/m	1.0 Min	X-axis	Pass	Normal
50Hz, 30A/m	1.0 Min	Y-axis	Pass	Normal
50Hz, 30A/m	1.0 Min	Z-axis	Pass	Normal

14.2 Test Setup



GRP : Ground plane
A : Safety earth
S : Insulating support
EUT : Equipment under test
Lc : Induction coil
E : Earth terminal
C1 : Power supply circuit
C2 : Signal circuit
L : Communication line
B : To power supply source
D : To signal source, simulator
G : To the test generator

Test Engineer : Bruce

Bruce Huang

14.3 Photographs of Power Frequency Magnetic Field immunity tests

FRONT VIEW

REAR VIEW

15. Voltage Dips and Voltage Interruption Immunity Tests

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : C for voltage interruption, A/C for voltage dips
- Required performance criteria : C for voltage interruption, B/C for voltage dips
- Basic Standard : IEC 61000-4-11:1994
- Generic Standard : EN 61000-6-2 :1999
- Input Voltage, Frequency : AC 230V, 50Hz
- Temperature : 22°C
- Relative Humidity : 54%
- Test Date : Jan. 24, 2003

15.1 Test Record of Voltage Interruption

Voltage	Phase Angle		% Reduction	Periods (s)	**Observation**
(V)	0 °	180 °			
230	C	C	>95%	250	After the interruption, the power of EUT was off. The power of the EUT must be reset by the operator.

15.2 Test Record of Voltage Dips

Voltage	Phase Angle		% Reduction	Periods (s)	**Observation**
(V)	0 °	180 °			
230	A	A	30	0.5	Normal
230	A	A	60	5	Normal
230	C	C	60	50	Normal

15.3 Testing Requirement and Procedure

The test was based on IEC 61000-4-11:1994

15.4 Test Conditions

1. Source voltage and frequency : 230V / 50Hz, Single phase.
2. Test of interval : 10 sec.
3. Level and duration : Sequency of 3 dips/interrupts.
4. Voltage rise (and fall) time : 1 ~ 5 μs.
5. Test severity :

Voltage dip and Interrupt reduction (%)	Test Duration (ms)
30	500
60	100
100	10
100	80
100	5000

15.5 Operating Condition

Full system

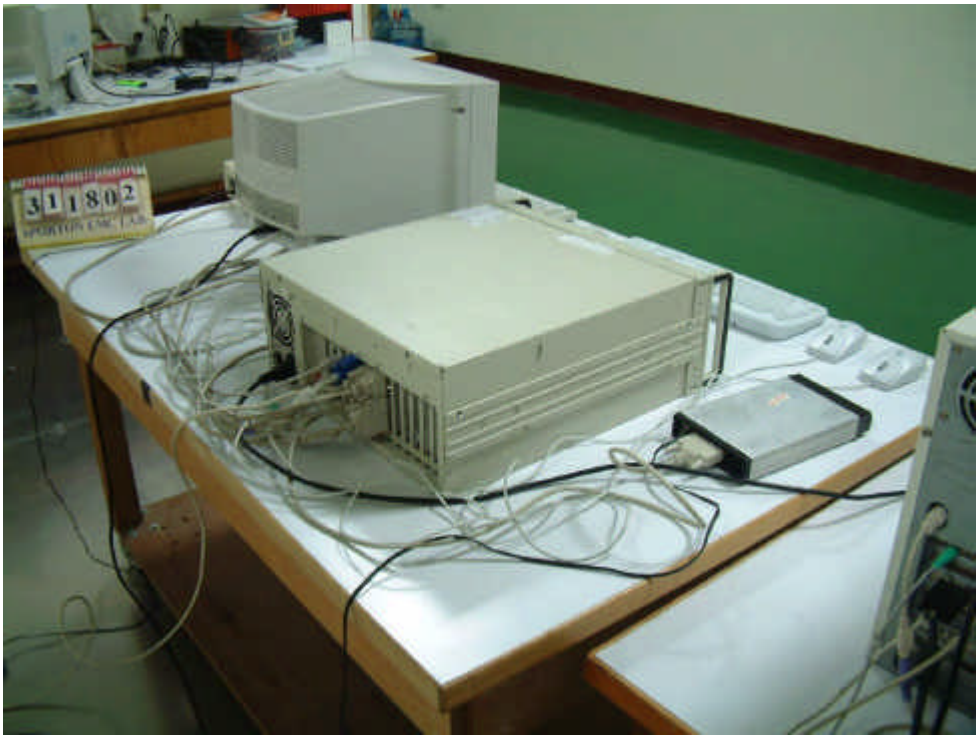
Test Engineer : Bruce

Bruce Huang

15.6 Photographs of Voltage Dips and Voltage Interruption Immunity Tests

FRONT VIEW

REAR VIEW



16. List of Measuring Equipment Used

< EMI >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Analyzer	HP	8591EM	3710A01187	9KHz ~ 1.8GHz	Sep. 23, 2002	Conduction (CO01-LK)
LISN	Rolf Heine	NNB-2/16Z	02/10070	9KHz ~ 30MHz	Jul. 29, 2002	Conduction (CO01-LK)
LISN	Rolf Heine	NNB-2/16Z	02/10084	9KHz ~ 30MHz	Jul. 29, 2002	Conduction (CO01-LK)
Spectrum Analyzer	HP	8560E	3728A03185	30MHz – 2.9GHz	Sep. 20, 2002	Radiation (OS02-LK)
Amplifier	HP	87405A	3207A01441	10MHz – 3GHz	Aug. 21, 2002	Radiation (OS02-LK)
Bilog Antenna	CHASE	CBL6111C	2715	30MHz -1GHz	Mar. 22, 2002	Radiation (OS02-LK)
Half-wave dipole antenna	R&S	HZ12 HZ13	83924403 83924503	30MHz - 1GHz	Sep. 23, 2002	Radiation (OS02-LK)
Turn Table	EMCO	2080	9711-1090	0 ~ 360 degree	N/A	Radiation (OS02-LK)
Antenna Mast	EMCO	2075	9711-2114	1 m- 4 m	N/A	Radiation (OS02-LK)

※ Calibration Interval of instruments listed above is one year.

< EMS>

Instrument	Manufacturer	Model No.	Characteristics	Calibration Date	Remark
ESD Simulator	KEYTEK	MZ-15/EC	0 KV - 15 KV	Apr. 25, 2002	ESD
Mini Zap	KEYTEK	TPC-2	0 KV - 15 KV	Apr. 25, 2002	ESD
Amplifier	AR	100W 1000M3	80 MHz - 1 GHz	N/A	RS
Isotropic Field Probe	AR	CP3000A	10 KHz - 1 GHz	Jun. 17, 2002	RS
IEEE-488 Interface	AR	CP3000	N/A	N/A	RS
System Interface	EMC Automation	200	HP-IB INTERFACE	N/A	RS
Power Meter	EMC Automation	438A	100 KHz -4.2 GHz	N/A	RS
Video Camera controller	EMC Automation	VCC-01	N/A	N/A	RS
Signal Generator	HP	8648A	100 KHz - 1 GHz	Sep. 08, 2002	RS
Antenna	CHASE	CBL6121A	26 MHz - 1 GHz	Jun. 10, 2002	RS
Amplifier	AR	75W 75A220	25MHz - 300MHz	Jun. 12, 2002	RS
EFT Generator	EMC PARTNER AG Switzerland	TRANSIENT 2000	Up to 4 KV	Feb. 03, 2002	EFT
Harmonic/Flicker Test System	EMC PARTNER	Harmonics -1000	4000VA 16A PEAK	Mar. 29, 2002	Harmonics, Flicker
Combination Wave Generator	EMC PARTNER AG Switzerland	TRANSIENT 2000	Up to 4 KV	Feb. 03, 2002	SURGE
Conducted Immunity Test System	FRANKONIA	CIT-10/W	100KHz ~ 266MHz	Jan. 06, 2003	CS
Magnetic field Antenna	EMC PARTNER AG Switzerland	TRANSIENT 2000	0.5 up to 150A / m	Feb. 03, 2002	Magnetic
EMC Immunity Tester	EMC PARTNER AG Switzerland	TRANSIENT 2000	0 ~ 260 rms, 16A	Feb. 03, 2002	DIP

17. Notice for Class A Product

This Notice is for class A product only. If the Equipment under Test is a class B product, this notice should be disregarded.

Class A ITE is a category of all other ITE which satisfies the class A ITE limits but not the class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use:

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

18. Declaration of Conformity and the CE Mark

There are three possible procedures pertaining to the declaration of conformity :

18.1 Conformity Testing and Declaration of Conformity by the Manufacturer or His Authorized Representative Established within the Community or by an Importer.

- Article 10 (1) of the EMC Directive,
- § 3 (1) no. 2a of the EMC Act.

18.2 Declaration of Conformity Issued by the Manufacturer or His Authorized Representative Established within the Community or by an Importer Following Testing of the Product and Issued of an EC certificate of conformity by a competent body.

- Article 10 (2) of the EMC Directive,
- § 3 (1) no. 2b of the EMC Act.

18.3 Declaration of Conformity Issued by the Manufacturer or His Authorized Representative Established within the Community or by an Importer Following Testing and Certification of the Product by a Notified Body.

- Article 10 (5) of the EMC Directive,
- § 3 (1) no. 2b of the EMC Act (radio transmitting installations).

18.4 Specimen For The CE Marking Of Electrical / Electronical Equipment

The components of the CE marking shall have substantially the same vertical dimension, which may not be less than 5 mm.

APPENDIX A. Photographs of EUT

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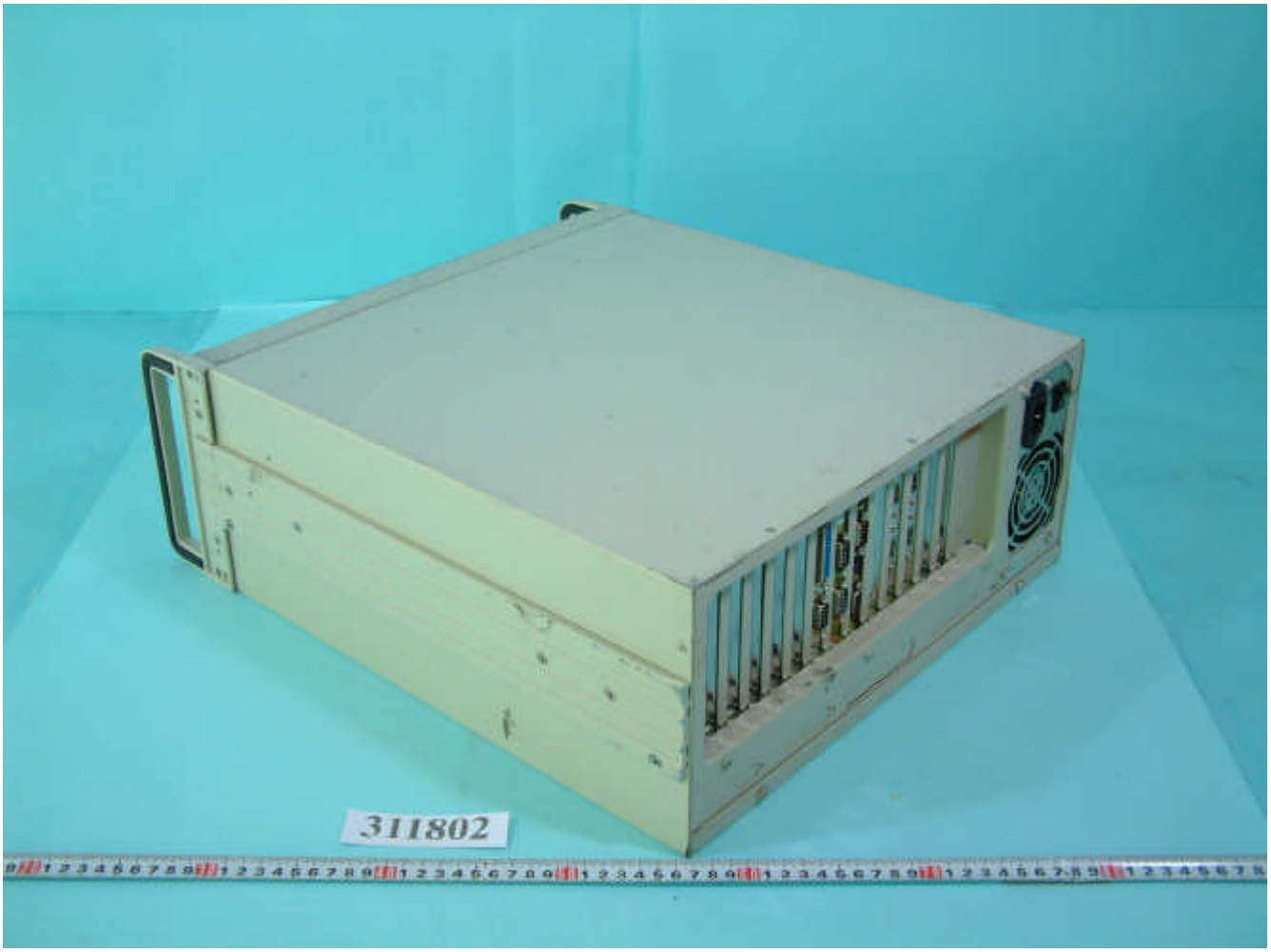

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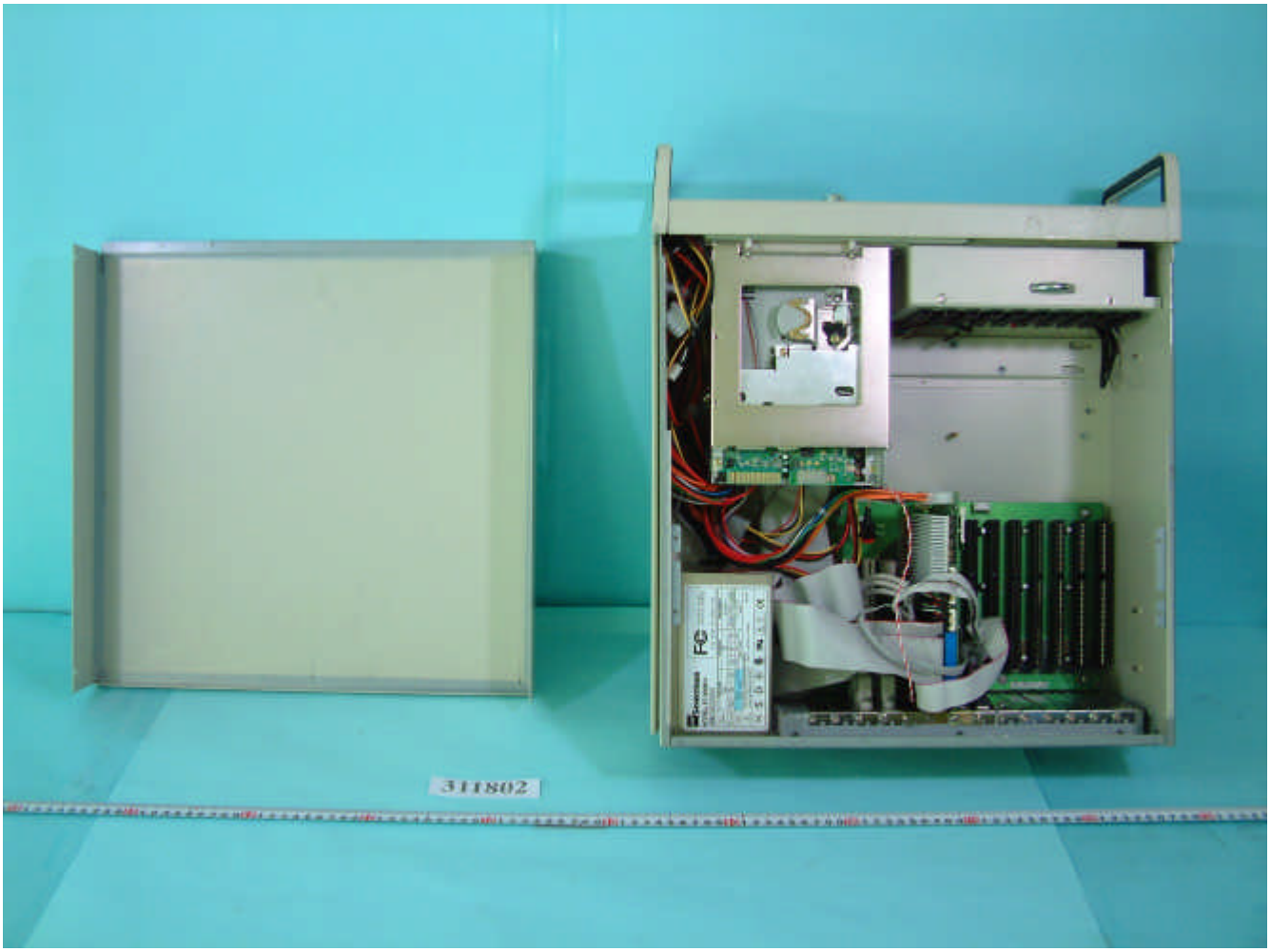

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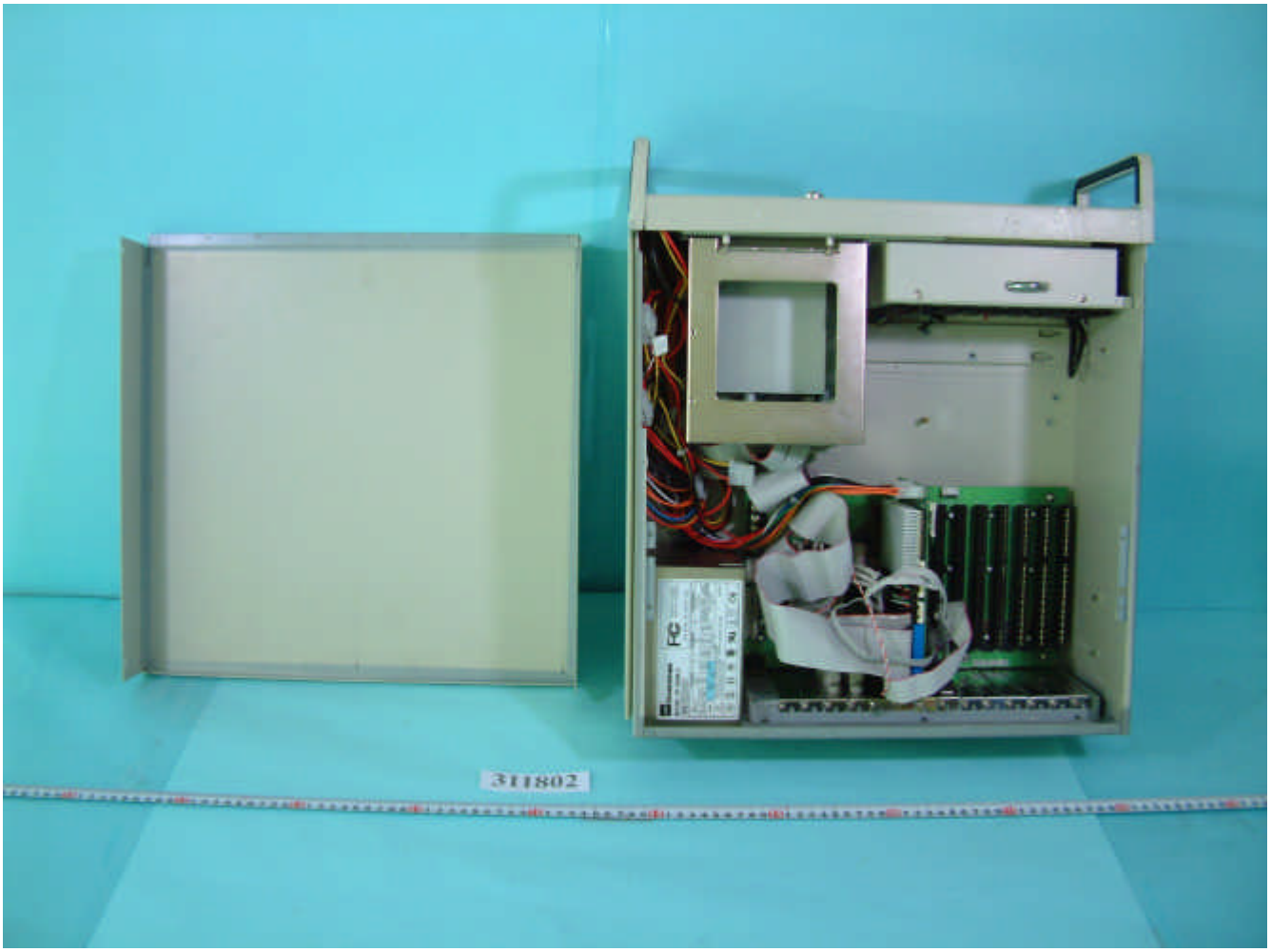

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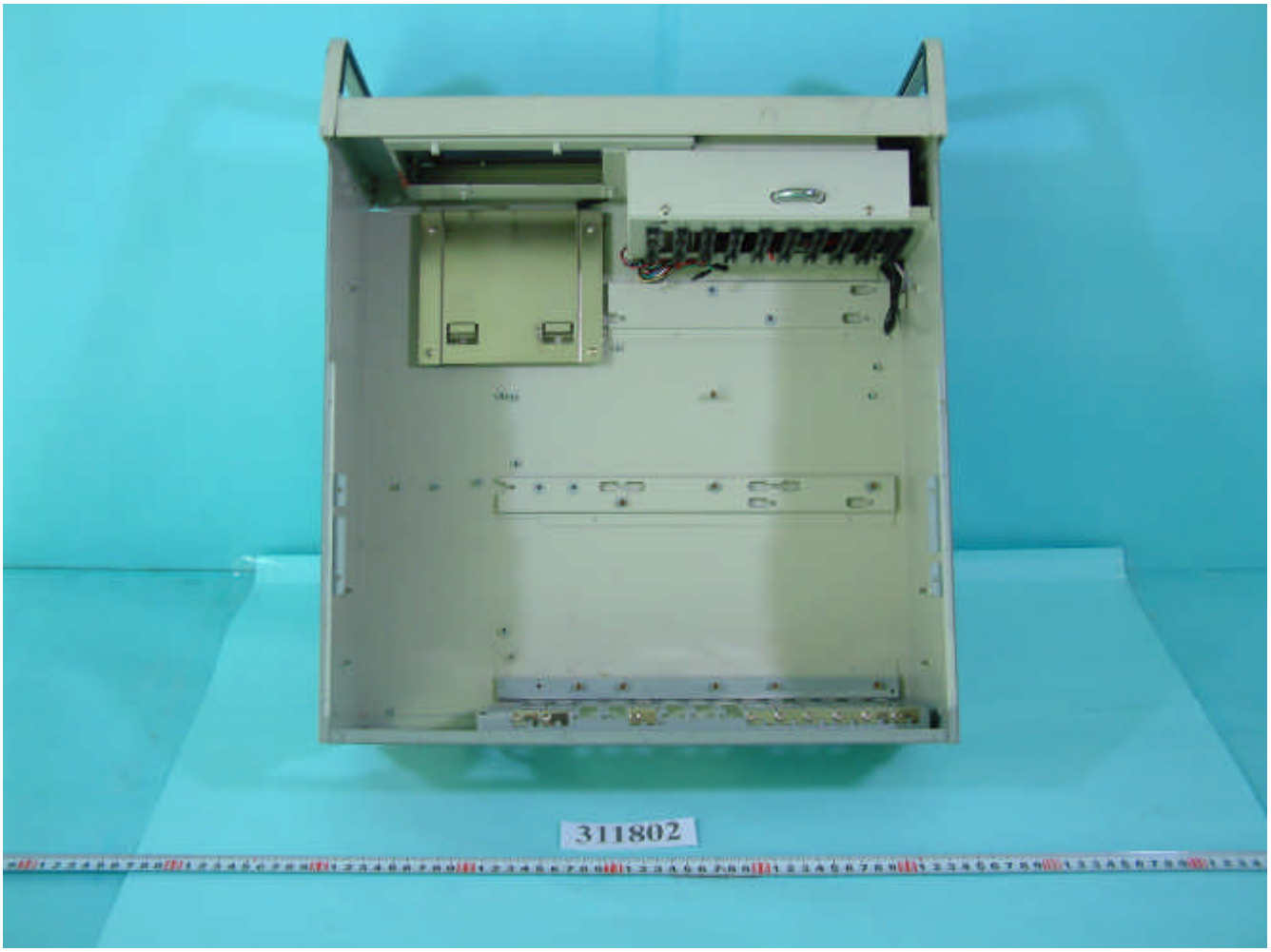

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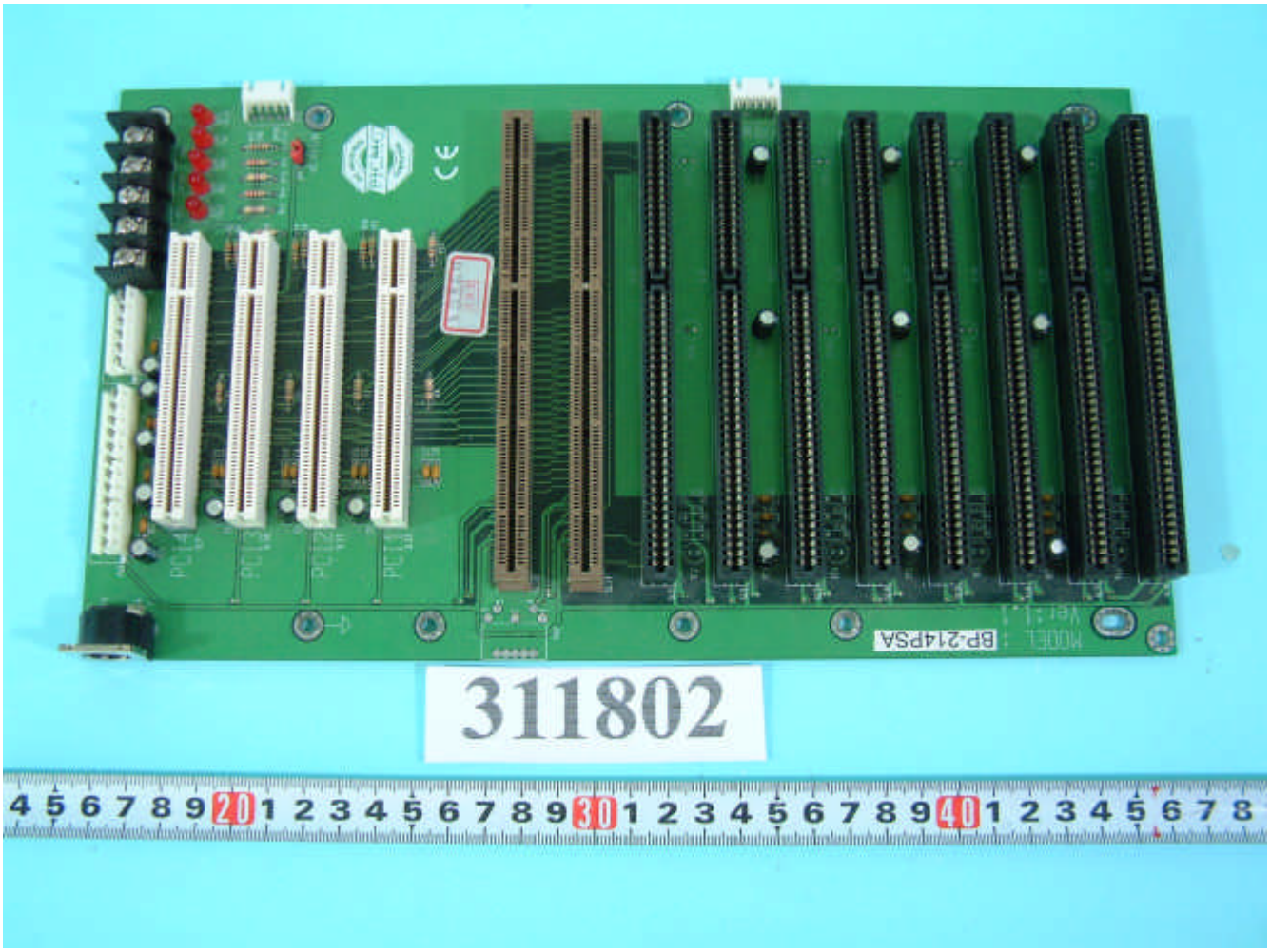

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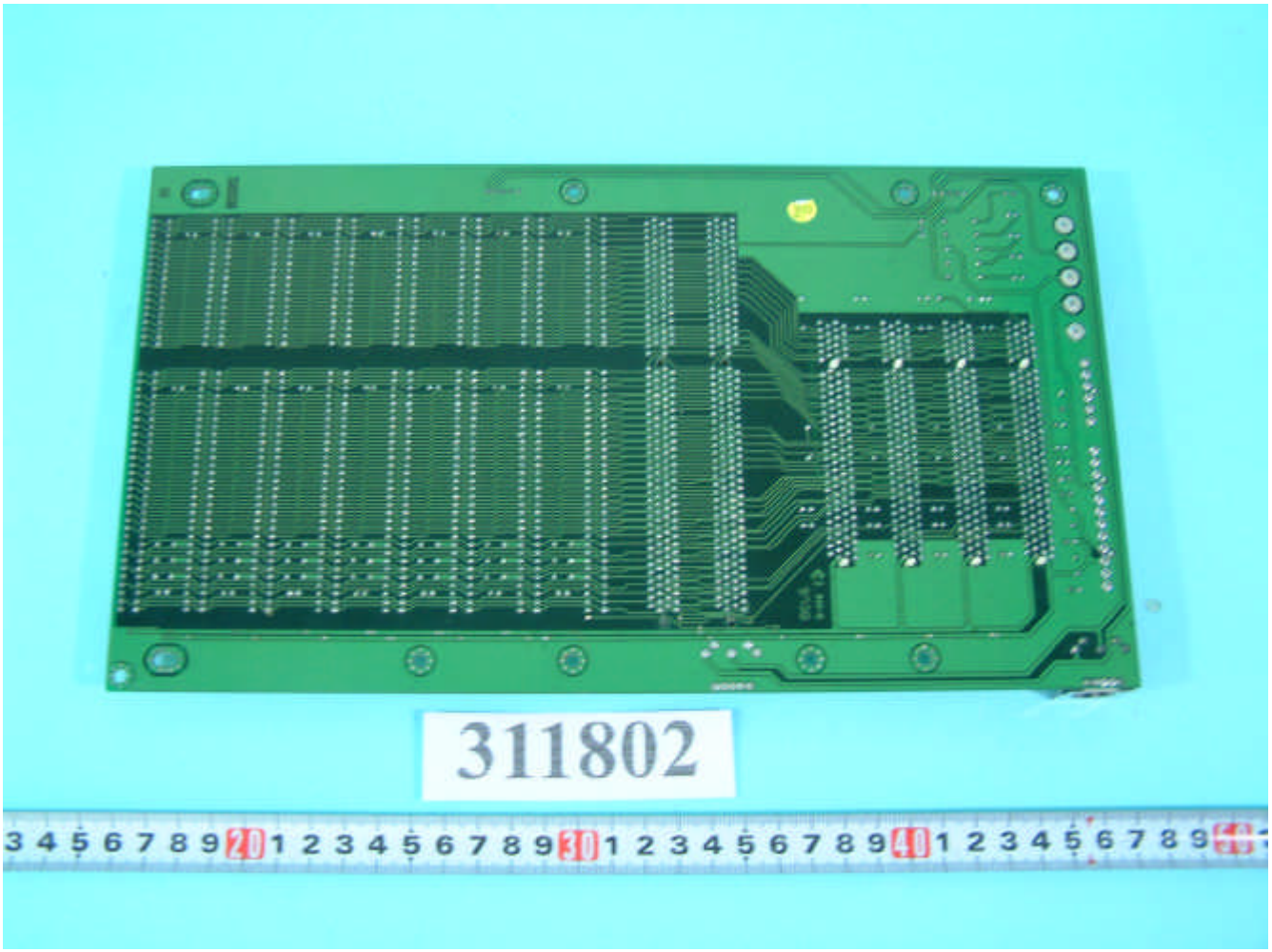

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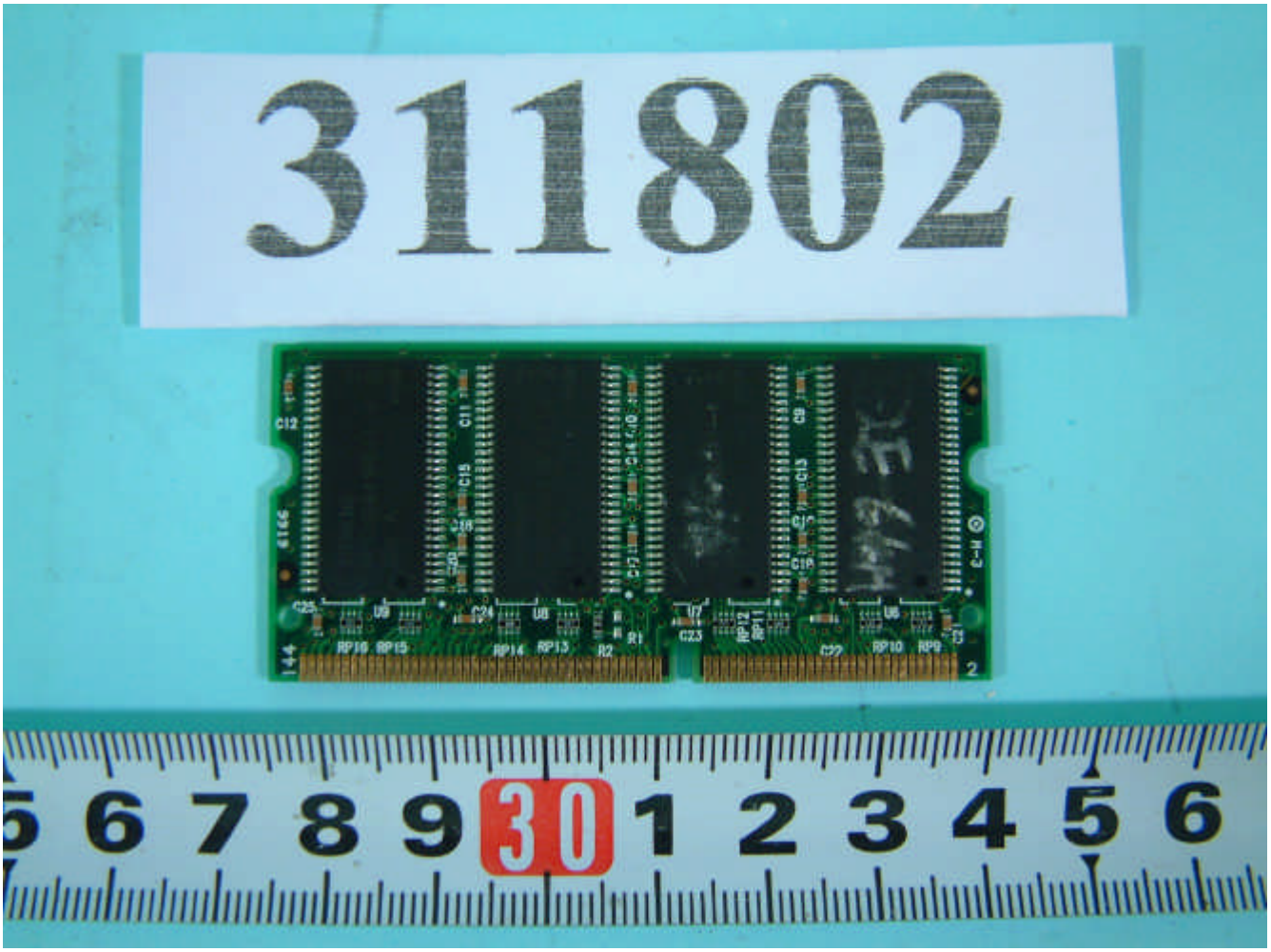

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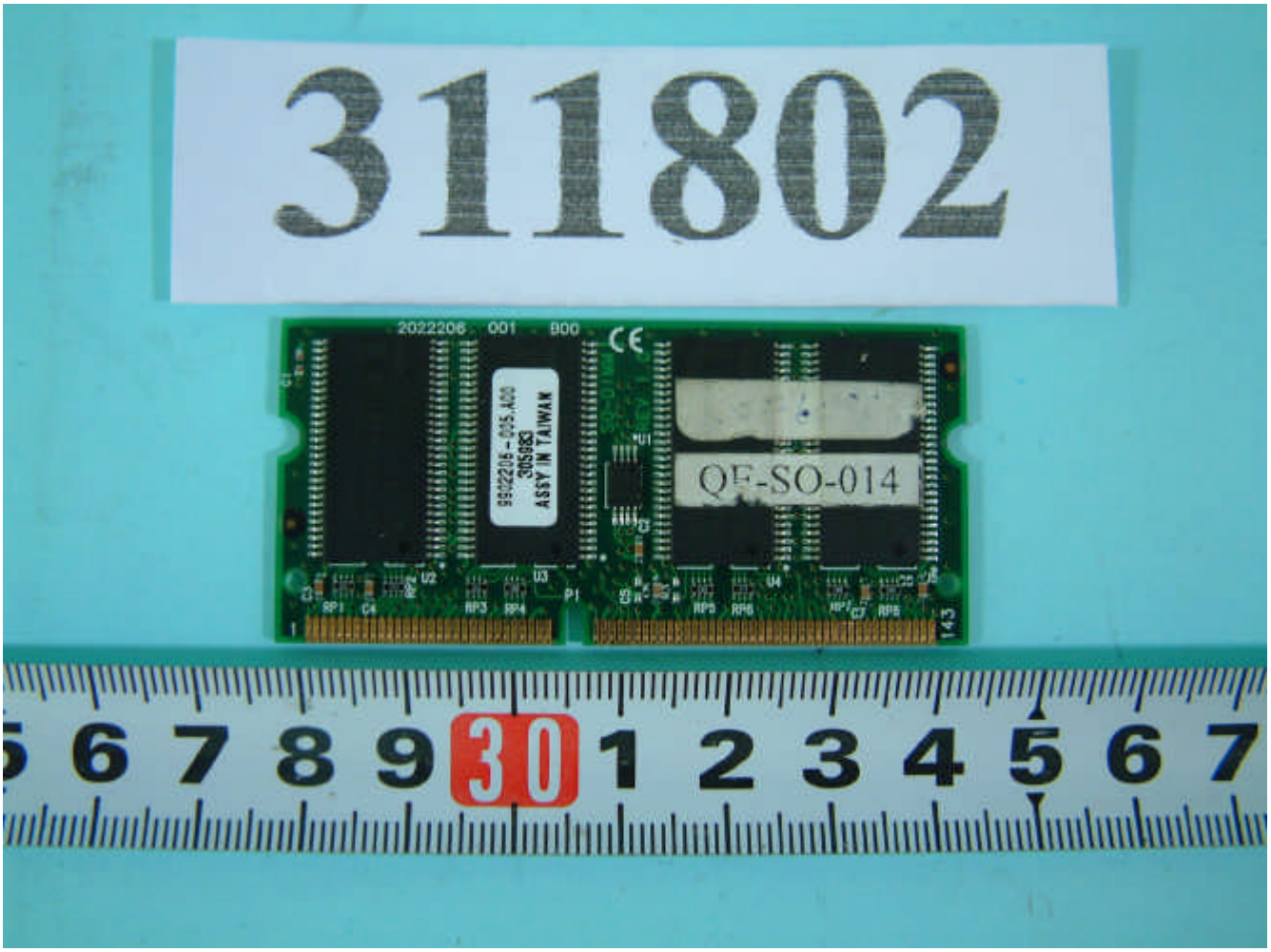

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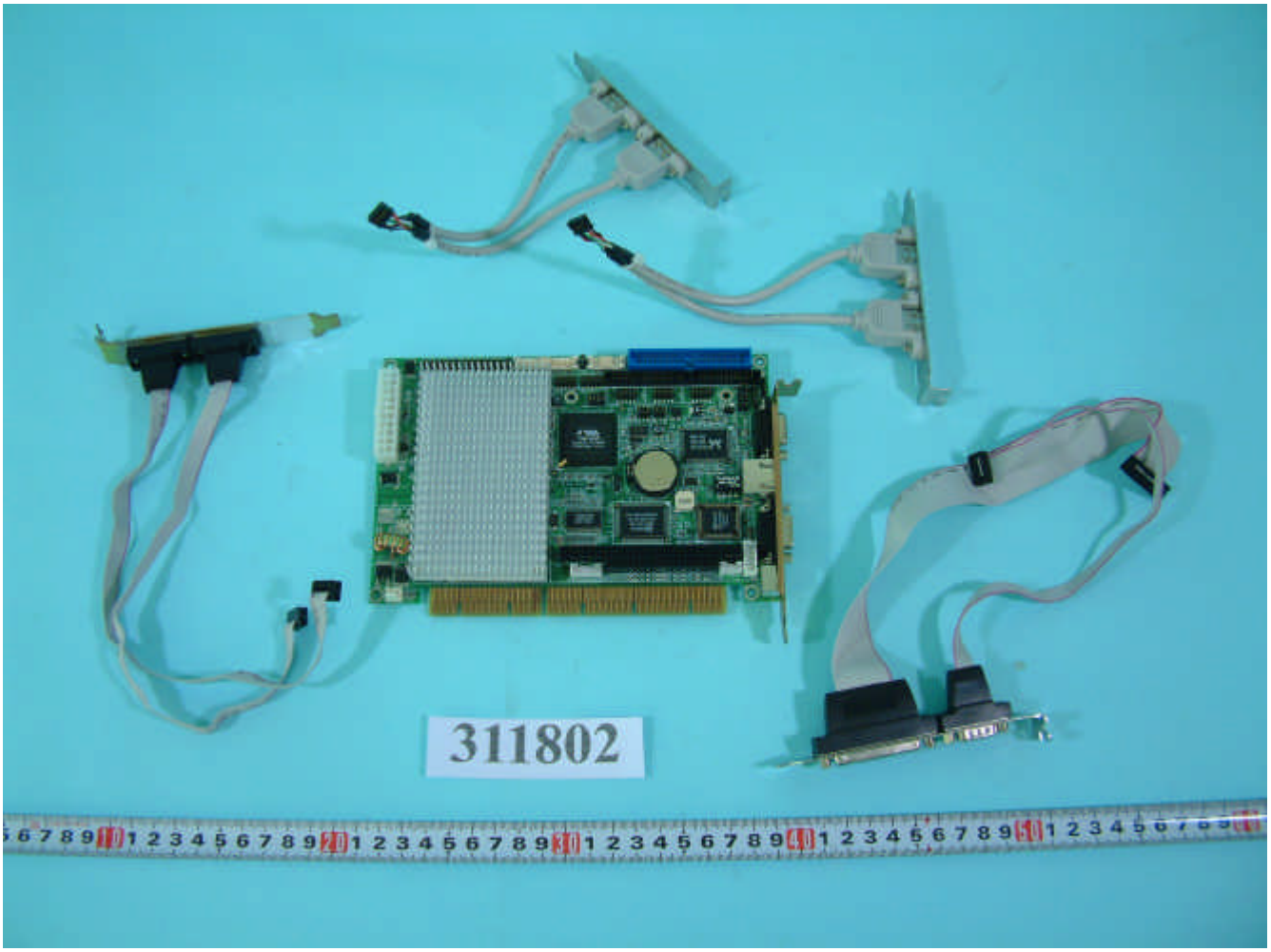

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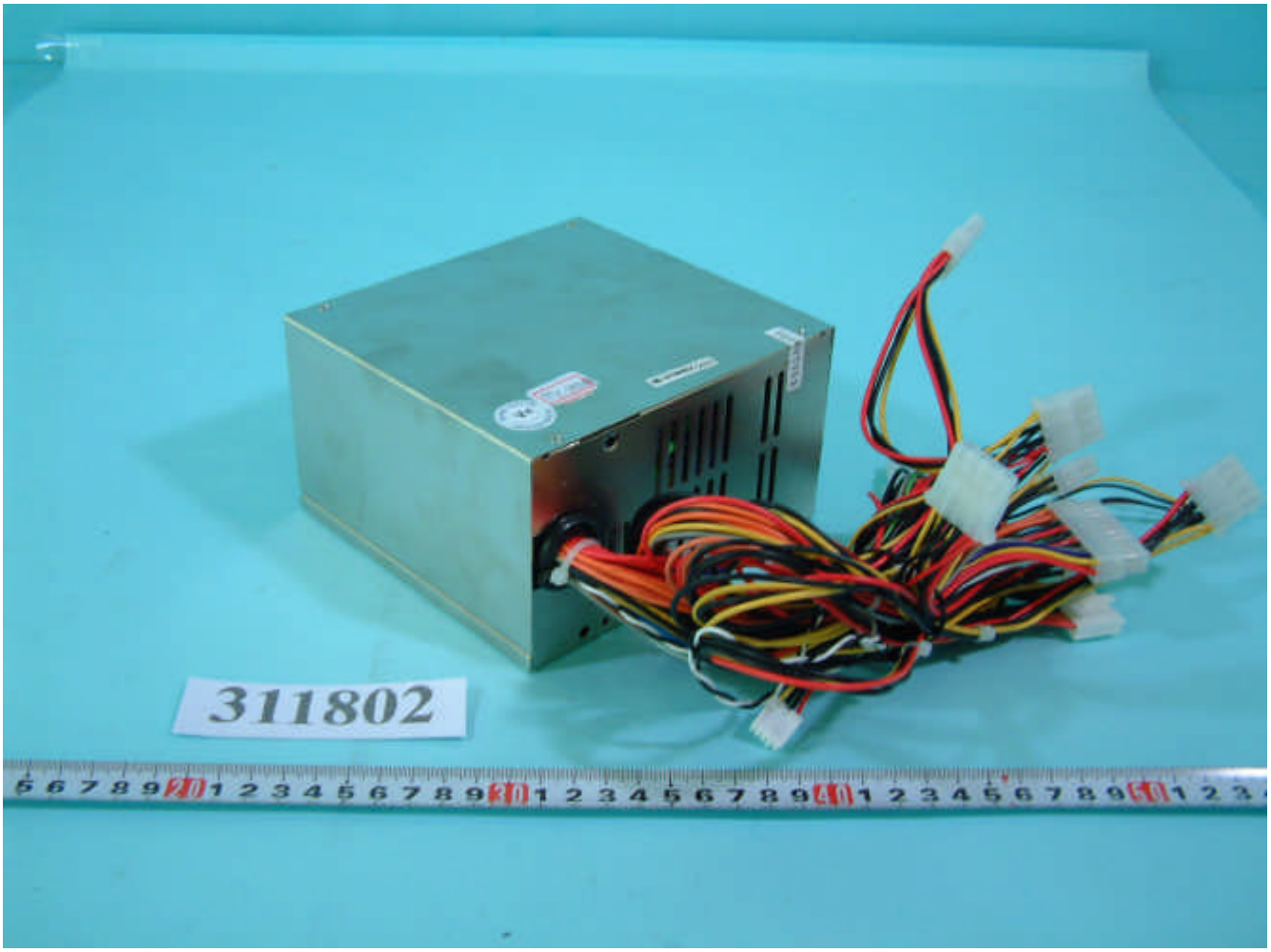

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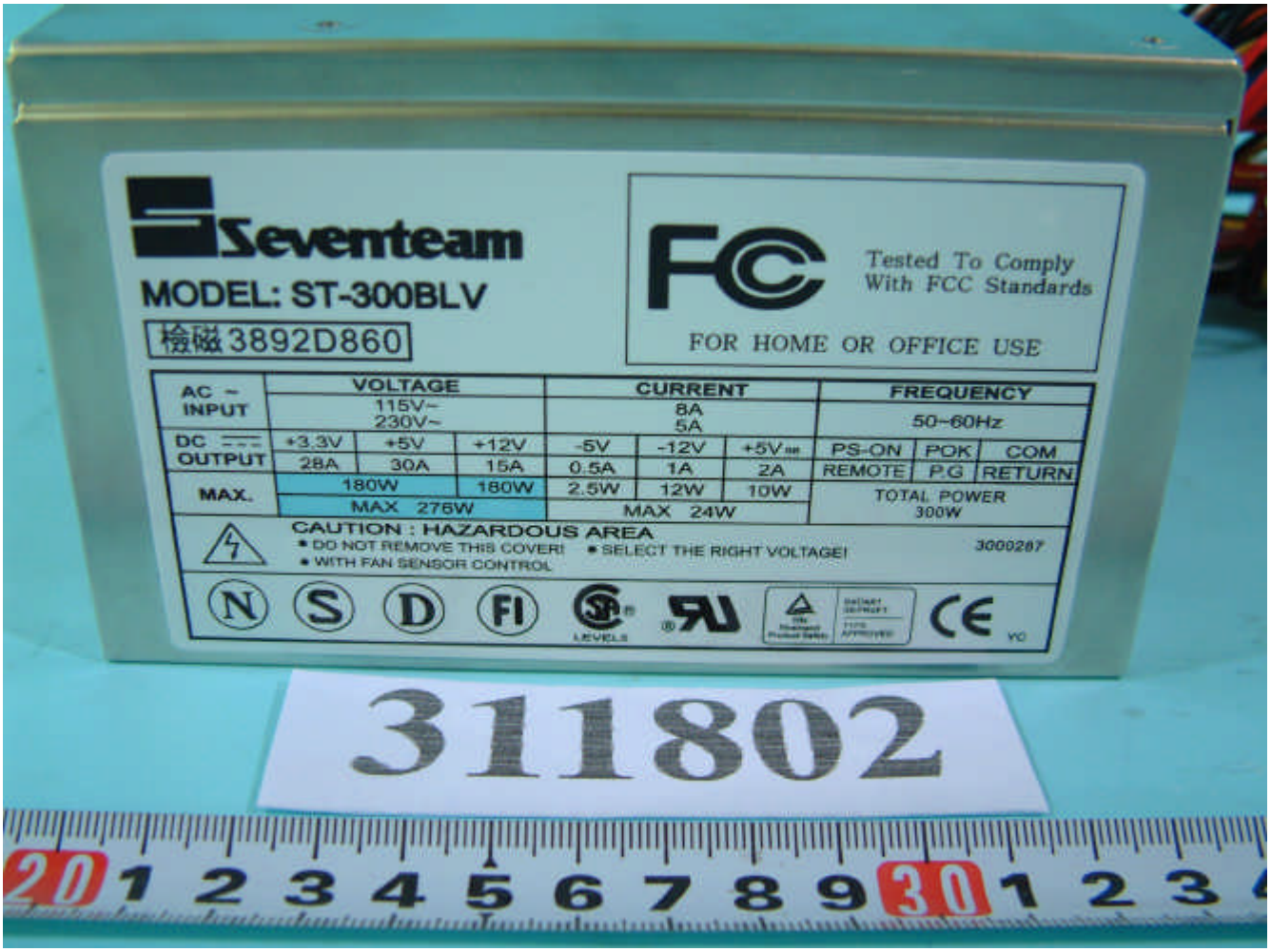

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