EN 55024 AND EN 61000-3-2, EN 61000-3-3 COMPLIANCE

Test Report

for

AAEON TECHNOLOGY INC.
5F, NO. 135, LANE 235, PAO CHIAO RD.,
HSIN-TIEN CITY, TAIPEI, TAIWAN, R. O. C.

Industrial PC

MODEL NO: SBC-659 (N)

PROJECT NO: 01I9420

ISSUE DATE: May 17, 2001

Prepared by
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COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4114
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN, R.O.C. TEL:(02)2217-0894/FAX:2217-1254

TEST RESULTS

EUT DESCRIPTION: INDUSTRIAL PC

MODEL: SBC-659 (N)
SERIAL NO: N/A

EN 55024				
SPEC. STANDARD	DATE	ENGINEER	MEETS SPEC. STANDARD	COMMENTS
IEC 61000-4-2	05/03/2001	Michael Hung	Yes	N/A
IEC 61000-4-3	05/03/2001	Michael Hung	Yes	N/A
IEC 61000-4-4	05/03/2001	Michael Hung	Yes	N/A
IEC 61000-4-5	05/03/2001	Michael Hung	Yes	N/A
IEC 61000-4-6	05/09/2001	Michael Hung	Yes	N/A
IEC 61000-4-8	05/04/2001	Michael Hung	Yes	N/A
IEC 61000-4-11	05/03/2001	Michael Hung	Yes	N/A

FAMILY PRODUCT STANDARDS				
SPEC. STANDARD	DATE	ENGINEER	MEETS SPEC. STANDARD	COMMENTS
EN 61000-3-2	05/03/2001	Michael Hung	Yes	N/A
EN 61000-3-3	05/03/2001	Michael Hung	Yes	N/A

Publication:

Nancy Fu

Nancy Fu

EMC Manager:

Rick Yeo

Rick Yeo

COMPLIANCE ENGINEERING SERVICES, INC.
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN, R.O.C.
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TEST RESULTS

EUT DESCRIPTION: INDUSTRIAL PC **MODEL: SBC-659 (N)**
SERIAL NO: N/A

EN 55024				
SPEC. STANDARD	DATE	ENGINEER	MEETS SPEC. STANDARD	COMMENTS
IEC 61000-4-2	05/03/2001	Michael Hung	Yes	N/A
IEC 61000-4-3	05/03/2001	Michael Hung	Yes	N/A
IEC 61000-4-4	05/03/2001	Michael Hung	Yes	N/A
IEC 61000-4-5	05/03/2001	Michael Hung	Yes	N/A
IEC 61000-4-6	05/09/2001	Michael Hung	Yes	N/A
IEC 61000-4-8	05/04/2001	Michael Hung	Yes	N/A
IEC 61000-4-11	05/03/2001	Michael Hung	Yes	N/A

FAMILY PRODUCT STANDARDS				
SPEC. STANDARD	DATE	ENGINEER	MEETS SPEC. STANDARD	COMMENTS
EN 61000-3-2	05/03/2001	Michael Hung	Yes	N/A
EN 61000-3-3	05/03/2001	Michael Hung	Yes	N/A

Publication:

_____
Nancy Fu

EMC Manager:

_____
Rick Yeo

MODE/CONFIGURATION DESCRIPTION

Mode(s)	Description	Tested
SBC-659 (N)	INDUSTRIAL PC	Yes

EN 55024 SPECIFICATION REQUIREMENTS

The test levels and performance criteria are as specified in EN 55024/1998 and family product standards EN61000-3-2, EN61000-3-3. The following table summarizes the tests performed on the INDUSTRIAL PC.

EN 55024/1998 Requirements

Product/Basic Standard	Test	Test Level	Performance Criteria
IEC 61000-4-2	Electrostatic Discharge	Air Discharge (2kV - 8kV) Direct Contact (2kV - 4kV)	**B**
IEC 61000-4-3	RF Radiated Susceptibility	3V/m 80% AM modulated (1 kHz) 80-1000 MHz	**A**
IEC 61000-4-4	Electrical Fast Transient/Burst	Power Supply (0.5kV - 1kV) I/O Cables (0.25kV - 5kV)	**B**
IEC 61000-4-5	Electrical Surge Susceptibility	Power Supply: 0.5kV-2kV I/O Cables (0.5kV - 1kV)	**B**
IEC 61000-4-6	Conducted Susceptibility	3 V/r.m.s. 80% modulated, 1kHz sinewave 0.15 - 80 MHz	**A**
IEC 61000-4-8	Power Frequency Magnetic Field	50Hz, 1A(rms)/m	**A**
IEC 61000-4-11	Voltage Dips Voltage Interruptions	>95% / 0.5 period 30% / 25 periods >95% / 250 periods	**B** **C** **C**

EN 61000-3-2	Harmonic Current Emission	Classification of Equipment: Class D	**N/A**
EN 61000-3-3	Voltage Fluctuations and Flicker	Maximum Relative Voltage Change: d_{max} <4 %	**N/A**

TEST SET-UP

The equipment under test (EUT) and the peripherals listed were set up in a configuration typical of normal use; refer to the block diagram in Appendix A and the cable setup pictures in Appendix C for the physical locations of devices during testing. Descriptions of the type of cables and I/O ports used are found in Appendix A. Notes following each test result summary explain any special test setup conditions.

ESD testing was conducted under the following conditions:

1. The EUT was placed on a wooden table 0.8 m high.
2. The table was placed on a reference ground plane (RGP) a minimum of 1 m^2 in area.
3. A horizontal coupling plane (HCP) measuring a minimum of 1.6 m x 0.8 m was on top of the table.
4. An insulating support 0.5 mm thick isolated the EUT and cables from the HCP.
5. A vertical coupling plane (VCP) was placed on the top of the HCP parallel to the EUT at a distance of 10 cm; the VCP measured 0.5 m x 0.5 m and was mounted on a wooden block.
6. The horizontal and vertical coupling planes were connected to the RGP with a cable less than 2 m long with 470k Ohm resistors at each end.
7. The discharge return cable of the ESD simulator was connected to the RGP by a cable less than 2 m long.

Per the IEC standards requirements the EUT was mounted on a non-conductive table 1 meter above a reference ground plane for ESD, Radiated E-field, Electrical Fast Transient and Surge immunity testing. The table dimensions are 1 meter wide by 1.5 meters long.

All cable attachments to the EUT were according to the product installation manual; this cable configuration is supplied in Appendix A. Excess cable length was bundled non-inductively off the RGP; the bundles were placed no closer than 0.2 meters to any other part of the test setup.

During testing, the EUT was connected to actual or simulated loads. All simulated loads mimicked load conditions typical of actual use.

The climatic conditions of the test lab were recorded on the test data sheets at the time of test (see Appendix A).

SUMMARIES OF TEST PROCEDURE

Electrostatic Discharge Test: The test was performed with the EUT placed on a table-top or standing on a floor as described in the previous section. The locations chosen for discharge are those that would normally be accessible to service or operating personnel. The EUT was subjected to every voltage level described in the test standard. During the tests, indirect discharge was performed using the HCP and VCP described in the test standard.

Radiated Susceptibility Test: A biconilog antenna was placed 3 m away from the EUT, as described in the EUT setup section. For the frequency range of 80 MHz to 1000 MHz, a 3 V/m E-field 80% amplitude-modulated by a 1kHz sine wave was established using the signal generators and amplifiers specified in the test equipment list. The 3 V/m field was generated at both horizontal and vertical polarization. At each of the above conditions the frequency range was swept at a rate of 1.5×10^{-3} decades/s. Sensitive frequencies or frequencies specified by the manufacturer were discretely analyzed.

Electrical Fast Transient / Burst Test: The selected test voltage was applied to the device under test as called for in the test standard. The EUT's AC line input was subjected to bursts of fast transient spikes at voltages up to 1kV at both positive and negative polarities. The capacitive clamp described in the standard was used to test the I/O cable.

Surge Test: As prescribed by the test standard the test voltage was applied to the device under test. Both positive and negative polarities of voltages up to 2kV were applied to the AC input lines . The coupling network defined in the standard was used.

Conducted Susceptibility Test: As prescribed by the test standard the selected test voltage was applied to the device under test. EUT was tested from 0.15 MHz to 80 MHz with 1kHz sinewave, 80% modulation with 3V/r.m.s.. CDN-T4 coupling and decoupling networks was used. During the tests, injection was applied to power line by using CDNs-6.2.2 method, and I/O lines was injected by using clamp injection-6.2.3. method.

Power Frequency Magnetic Field Test: As prescribed by the test standards, the selected test voltage was applied to the device under test. Test Level as described in EN 61000-4-8 titled "Table 1 - Test Levels for continuous field" was chosen. Single turn induction coil in 1m x 1m size was used to generated the magnetic field.

Voltage Dips, Short Interruptions and Voltage Variations Test: As prescribed by the test standards, if the voltage range does not exceed 20% of the lower specified for the rated voltage range, a single selected voltage from that range may be specified as a basis for test level specification. Test Level for Voltage Dips and Short Interruptions was used according to "Table 11 and 12 - Test Levels at input a.c. power ports" as defined in IEC 1547. Test Level for Voltage variations (if required) was used according to "Table 2 -timing of short-term supply voltage variations" as defined in EN 610000-4-11.

Harmonic Current Emission Test: As prescribed by the test standard the selected test voltage was applied to the device under test. EUT was tested according to Table 3- Limits for Class D equipment; test circuit and supply source were setup according to Annex A and test condition was setup according to Annex C.10.

Voltage Fluctuations and Flicker emission test: As prescribed by the test standard, the rated voltage of the equipment was applied to the device under test. The test to prove the compliance of the equipment with the limits is selected using the test circuit as described in Annex A. Observation period for short-term flicker value is T_p=10 min, and long-term flicker value is T_p=2 hours. Direct measurement method for evaluating P_{sts} is used for all voltage fluctuations where U(t) is defined .

ELECTROSTATIC DISCHARGE TEST DATA

EUT Model: SBC-659 (N)
Approved by: MILO WANG/Client
Date Tested: 05/03/2001

Mode: Normal Mode
Engineer: Michael Hung

MANUFACTURER	MODEL	SERIAL NO.	CALIBRATION DUE
EMV	SESD 2000	812006	12/07/2001

AIR DISCHARGE TO EUT

POSITIVE VOLTAGE					NEGATIVE VOLTAGE				
Level Voltage	**1 2kV**	**2 4kV**	**3 8kV**	**4 15kV**	**Level Voltage**	1 2kV	2 4kV	3 8kV	4 15kV
Front	☐	☐	☐	☐	**Front**	☐	☐	☐	☐
Back	☐	☐	☐	☐	**Back**	☐	☐	☐	☐
Right	☐	☐	☐	☐	**Right**	☐	☐	☐	☐
Left	☐	☐	☐	☐	**Left**	☐	☐	☐	☐
Top	☐	☐	☐	☐	**Top**	☐	☐	☐	☐
Bottom	☐	☐	☐	☐	**Bottom**	☐	☐	☐	☐

DIRECT DISCHARGE TO EUT

POSITIVE VOLTAGE					NEGATIVE VOLTAGE				
Level Voltage	**1 2kV**	**2 4kV**	**3 6kV**	**4 8kV**	Level Voltage	1 2kV	2 4kV	3 6kV	4 8kV
Front	☒	☒	☐	☐	Front	☒	☒	☐	☐
Back	☒	☒	☐	☐	Back	☒	☒	☐	☐
Right	☒	☒	☐	☐	Right	☒	☒	☐	☐
Left	☒	☒	☐	☐	Left	☒	☒	☐	☐
Top	☒	☒	☐	☐	Top	☒	☒	☐	☐
Bottom	☒	☒	☐	☐	Bottom	☒	☒	☐	☐

DIRECT DISCHARGE TO HCP

POSITIVE VOLTAGE					NEGATIVE VOLTAGE				
Level Voltage	**1 2kV**	**2 4kV**	**3 6kV**	**4 8kV**	Level Voltage	1 2kV	2 4kV	3 6kV	4 8kV
Front	☒	☒	☐	☐	Front	☒	☒	☐	☐
Back	☒	☒	☐	☐	Back	☒	☒	☐	☐
Right	☒	☒	☐	☐	Right	☒	☒	☐	☐
Left	☒	☒	☐	☐	Left	☒	☒	☐	☐

DIRECT DISCHARGE TO VCP

POSITIVE VOLTAGE					NEGATIVE VOLTAGE				
Level Voltage	**1 2kV**	**2 4kV**	**3 6kV**	**4 8kV**	Level Voltage	1 2kV	2 4kV	3 6kV	4 8kV
Front	☒	☒	☐	☐	Front	☒	☒	☐	☐
Back	☒	☒	☐	☐	Back	☒	☒	☐	☐
Right	☒	☒	☐	☐	Right	☒	☒	☐	☐
Left	☒	☒	☐	☐	Left	☒	☒	☐	☐

Comments: No complications.

RADIATED SUSCEPTIBILITY TEST DATA

EUT Model: SBC-659 (N) Mode: Normal Mode
Approved by: MILO WANG/Client Engineer: Michael Hung
Date Tested: 05/09/2001

Manufacturer	Model #	Serial #	Calibration Due
☒ **Maconi**	2022D	119246/003	08/20/2001
☒ **M2S**	A00181/1000	9801-112	No calibration is required
☒ **M2S**	AC8113/800/250A	9801-179	No calibration is required
☒ **Wandel & Goltormann**	EMR-30	L-0013	02/24/2002
☒ **EMCOPower Antenna**	93141	9712-1083	No calibration is required

MODULATION: ☒ AMPLITUDE, 80%, 1KHz. SINEWAVE, Field Strength 3 V/m

FREQ/MHz	FRONT SIDE	BACK SIDE	LEFT SIDE	RIGHT SIDE
80-1000MHz	9420H-3F	9420H-3B	9420H-3L	9420H-3R
	9420V-3F	9420V-3B	9420V-3L	9420V-3R
	PASS	PASS	PASS	PASS

50% DUTY CYCLE, 200 Hz **Field Strength 3 V/m**

VERTICAL/HORIZONTAL POLARIZATION				
FREQ/MHz	FRONT SIDE	BACK SIDE	LEFT SIDE	RIGHT SIDE
900 MHz ± 5				

Comments: No complications.

ELECTRICAL FAST TRANSIENT/BURST TEST DATA

EUT Model: SBC-659 (N) Mode: Normal Mode
Approved by: MILO WANG/Client Engineer: Michael Hung
Date Tested: 05/03/2001

PATS Software for Windows			
Manufacturer	**Model #**	**Serial #**	**Calibration Due**
☒ **EFT Generator KeyTek Instruments**	E421	9502326	10/30/2001
☒ **Capacitive Clamp KeyTek Instruments**	CCL-4	9503290	NO CALIBRATION REQUIRED

Power Supply Test File Name 9420P4.LOG

Level	Voltage	Pol	PASS	FAIL
1	**0.5kV**	±	☒	☐
2	**1 kV**	±	☒	☐
3	**2 kV**	±	☐	☐
4	**4 kV**	±	☐	☐

I/O Circuits and Lines Test File Name 9420I4.LOG

Level	Voltage	Pol	PASS	FAIL	1	2	3	4	5	6	7	8	9	10
1	**0.25kV**	±	☒	☐	√									
2	**0.5 kV**	±	☒	☐	√									
3	**1 kV**	±	☐	☐										
4	**2 kV**	±	☐	☐										

I/O Circuits and Lines List	
1. Lan Port (RJ 45)	**2.**

Comments: No complications.

SURGE/EUT POWER SUPPLY TEST DATA

EUT Model #: SBC-659 (N) Mode: Normal Mode
Approved by: MILO WANG/Client Engineer: Michael Hung
Date Tested: 05/03/2001

Manufacturer	Model #	Serial #	Calibration Due
☒ **Surger Generator KeyTek Instruments**	E501	9502324	07/11/2001

Surge – Power Supply Test Test File Name: 9420P5.LOG

TEST LEVEL	CHARGE VOLTAGE	PHASE ANGLE	AC PWR Path Location	DC PWR Path Location	PASS	FAIL
1	± 0.5 kV	☒ 0° , ☒ 90° ☒ 180° , ☒ 270°	☒ Line to Line ☒ Line to Earth	☐ Line to Line ☐ Line to Earth	☒	☐
2	± 1 kV	☒ 0° , ☒ 90° ☒ 180° , ☒ 270°	☒ Line to Line ☒ Line to Earth	☐ Line to Line ☐ Line to Earth	☒	☐
3	± 2 kV	☒ 0° , ☒ 90° ☒ 180° , ☒ 270°	☐ Line to Line ☒ Line to Earth	☐ Line to Line ☐ Line to Earth	☒	☐

Surge - I/O Cable(s) Test Test File Name: N/A

TEST LEVEL	CHARGE VOLTAGE	SURGE POLARITY	SHIELD I/O LINE(S)	UN-SHIELD I/O LINE(S)	PASS	FAIL
1	0.5KV	Pos/Neg	SEE LEGEND BELOW	SEE LEGEND BELOW	☒	☐
2	1 kV	Pos/Neg	SEE LEGEND BELOW	SEE LEGEND BELOW	☒	☐
3	2 kV	Pos/Neg	SEE LEGEND BELOW	SEE LEGEND BELOW	☐	☐
4	4 kV	Pos/Neg	SEE LEGEND BELOW	SEE LEGEND BELOW	☐	☐

LEGEND I/O Line(s) Under Test			
1.Lan Port	**3.**	**5.**	**7.**
2.	**4.**	**6.**	**8.**

Comments: No complications.

CONDUCTED SUSCEPTIBILITY TEST DATA

EUT Model: SBC-659 (N) Mode: Normal Mode
Approved by: MILO WANG/Client Engineer: Michael Hung
Date Tested: 05/09/2001

Modulation: Amplitude, 80%, 1KHz sinewave **Severity Level:** 3 Vrms

Manufacturer	Model #	Serial #	Calibration Due
☒ **Maconi**	2022D	119246/003	08/20/2001
☒ **MEB**	M3	3683	09/10/2001
☒ **C. D. N**	CDN-M2	A3002010	08/08/2001
☒ **M2S**	A00181/1000	9801-112	No calibration is required

Power Supply			
File No.	9420P6		
Frequency 0.15-80 MHz	PASS		

I/O Circuits and Lines			
File No.	9420I6		
Frequency 0.15-80 MHz	PASS		

Comments: No complications.

POWER FREQUENCY MAGNETIC FIELD TEST DATA

EUT Model: SBC-659 (N)
Approved by: MILO WANG/Client
Date Tested: 05/04/2001

Mode: Normal Mode
Engineer: Michael Hung

Manufacturer	Model #	Serial #	Calibration Due
☒ Haefely	MAG 100.1	081436-02	09/28/2000
☒ Extech Electronics	CFC-105	810390	No Calibration Required
☒ BelMERIT	DA 435	5A6 003019	10/11/2000

SEVERITY TEST LEVELS	
Levels	**Magnetic Field Strength A/m**
1	1
2	3
3	10
4	30
5	100
X	**Special**

FREQUENCY: 50 Hz

Levels	X (Vertical)	Y (Special Side)	Z (Horizontal)
1	1 A/m	1 A/m	1 A/m
2			
3			
4			
5			
X			

Comments: No complications.

VOLTAGE DIPS / INTERRUPTIONS TEST DATA

EUT Model: SBC-659 (N)
Approved by: MILO WANG/Client
Date Tested: 05/03/2001

Mode: Normal Mode
Engineer: Michael Hung

Manufacturer	Model #	Serial #	Calibration Due
☒ Haefely	PLINE 1610	081568-06	09/16/2001
☒ FLUKE	79-II	66400869	05/31/2001

Levels	Test Specs.	Units	Pass	Fail
1	30% reduction	25 periods	☒	☐
2	>95% reduction	0.5 period	☒	☐
3	>95% reduction	250 periods	☒	☐

Comments: No complications.

HARMONIC CURRENT EMISSION TEST DATA

EUT Model: SBC-659(N) Mode: Normal Mode
Approved by: MILO WANG/Client Engineer: Michael Hung
Date Tested: 05/03/2001

Approved by: _____

Signature:_____ Date:_____

Final Test Result: PASS

Settings and Test Conditions Compliant to the Standard: Yes

Test Equipment Used:

HP 6842A Harmonic/Flicker Test System with serial number:
HFTS Software Version: A.05.01
Date Last Calibrated:

Test Equipment Settings:

Line Voltage: 230.00 V	Current Measurement Range: High
Line Frequency: 50 Hz	Measurement Window Type: Rectangular
Device Class: D	Measurement Delay: 10 seconds
RMS Current Limit: 13.1 A	Quasi-stationary Test Duration: 30.00 minutes
Peak Current Limit: 80.8 A	Class Determination Pre-test Duration: 10.00 seconds
Number of Records: 5625	

Overrides:

Test Limit Source (Power Measurements/Statistics): Maximum
Power Overrides: None
Test Limit Overrides: None

Pre-test Results for Class Determination:

Percent in Envelope: 100.0% Voltage THD Out-of-Specification?: No
Class D Equipment?: Yes Fundamental Current: 0.255 A

RMS Voltage: 229.8 V	RMS Current: 0.5 A	Real Power: 58.0 W
Frequency: 50.0 Hz	Peak Current: 2.1 A	Apparent Power: 125.3 VA
Voltage THD: 0.04%	Current THD: 87.62%	Power Factor: 0.463
Maximum Power: 58.0 W	Mean Power: 56.3 W	

Active Power Statistics:

100th Percentile: 58.0 W	99th Percentile: 56.7 W	95th Percentile: 56.7
90th Percentile: 56.6 W	50th Percentile: 56.2 W	

Total Number of Failures:	Total Number of Errors:
None	None

HARMONIC CURRENT EMISSION TEST DATA

Harmonic Number	Limit (%)	Limit (Volts)	Max (%)	Max (Volts)
Fund.			100.0	229.849
2	0.20	0.460	0.005	0.010
3	0.90	2.069	0.009	0.020
4	0.20	0.460	0.004	0.010
5	0.40	0.919	0.014	0.033
6	0.20	0.460	0.003	0.007
7	0.30	0.690	0.010	0.024
8	0.20	0.460	0.001	0.003
9	0.20	0.460	0.016	0.036
10	0.20	0.460	0.003	0.007
11	0.10	0.230	0.014	0.033
12	0.10	0.230	0.003	0.007
13	0.10	0.230	0.014	0.031
14	0.10	0.230	0.001	0.003
15	0.10	0.230	0.009	0.021
16	0.10	0.230	0.002	0.004
17	0.10	0.230	0.011	0.025
18	0.10	0.230	0.003	0.006
19	0.10	0.230	0.007	0.016
20	0.10	0.230	0.003	0.006
21	0.10	0.230	0.006	0.014
22	0.10	0.230	0.004	0.009
23	0.10	0.230	0.005	0.011
24	0.10	0.230	0.002	0.005
25	0.10	0.230	0.004	0.008
26	0.10	0.230	0.001	0.003
27	0.10	0.230	0.008	0.019
28	0.10	0.230	0.001	0.001
29	0.10	0.230	0.004	0.008
30	0.10	0.230	0.001	0.001
31	0.10	0.230	0.007	0.015
32	0.10	0.230	0.001	0.002
33	0.10	0.230	0.004	0.009
34	0.10	0.230	0.001	0.002
35	0.10	0.230	0.004	0.010
36	0.10	0.230	0.001	0.003
37	0.10	0.230	0.004	0.010
38	0.10	0.230	0.002	0.004
39	0.10	0.230	0.002	0.006
40	0.10	0.230	0.001	0.002

HARMONIC CURRENT EMISSION TEST DATA

Final Test Data:

Harmonic Number	Standard Limit (A rms)	Maximum Value (A rms)	Maximum Value (% Limit)	Mean Value (A rms)	Mean Value (% Limit)	Standard Deviation (A rms)	Standard Deviation (% Limit)	Pass (P) or Fail (F)
Fund.		0.2637		0.2536		0.0014		
2		0.0017		0.0003		0.0002		
3	2.3000	0.2426	10.5	0.2330	10.1	0.0013	0.1	P
4		0.0033		0.0016		0.0002		
5	1.1400	0.2263	19.9	0.2182	19.1	0.0012	0.1	P
6		0.0021		0.0006		0.0002		
7	0.7700	0.2039	26.5	0.1974	25.6	0.0010	0.1	P
8		0.0017		0.0003		0.0001		
9	0.4000	0.1773	44.3	0.1721	43.0	0.0008	0.2	P
10		0.0017		0.0004		0.0002		
11	0.3300	0.1479	44.8	0.1442	43.7	0.0007	0.2	P
12		0.0018		0.0005		0.0002		
13	0.2100	0.1176	56.0	0.1151	54.8	0.0007	0.3	P
14		0.0018		0.0007		0.0002		
15	0.1500	0.0881	58.7	0.0867	57.8	0.0008	0.5	P
16		0.0014		0.0005		0.0002		
17	0.1324	0.0619	46.8	0.0606	45.8	0.0008	0.6	P
18		0.0012		0.0003		0.0001		
19	0.1184	0.0395	33.4	0.0383	32.4	0.0008	0.7	P
20		0.0011		0.0003		0.0001		
21	0.1071	0.0227	21.2	0.0219	20.4	0.0006	0.5	P
22		0.0013		0.0005		0.0002		
23	0.0978	0.0162	16.5	0.0152	15.6	0.0002	0.2	P
24		0.0014		0.0007		0.0002		
25	0.0900	0.0196	21.8	0.0176	19.5	0.0003	0.4	P
26		0.0015		0.0008		0.0002		
27	0.0833	0.0223	26.8	0.0208	24.9	0.0003	0.3	P
28		0.0015		0.0008		0.0002		
29	0.0776	0.0224	28.8	0.0215	27.7	0.0002	0.2	P
30		0.0013		0.0007		0.0002		
31	0.0726	0.0202	27.8	0.0197	27.1	0.0002	0.3	P
32		0.0012		0.0005		0.0002		
33	0.0682	0.0166	24.3	0.0160	23.4	0.0003	0.4	P
34		0.0009		0.0004		0.0002		
35	0.0643	0.0120	18.6	0.0113	17.6	0.0004	0.6	P
36		0.0009		0.0003		0.0002		
37	0.0608	0.0073	12.0	0.0067	11.0	0.0003	0.6	P
38		0.0009		0.0003		0.0002		
39	0.0577	0.0044	7.6	0.0039	6.8	0.0001	0.2	P
40		0.0008		0.0003		0.0002		

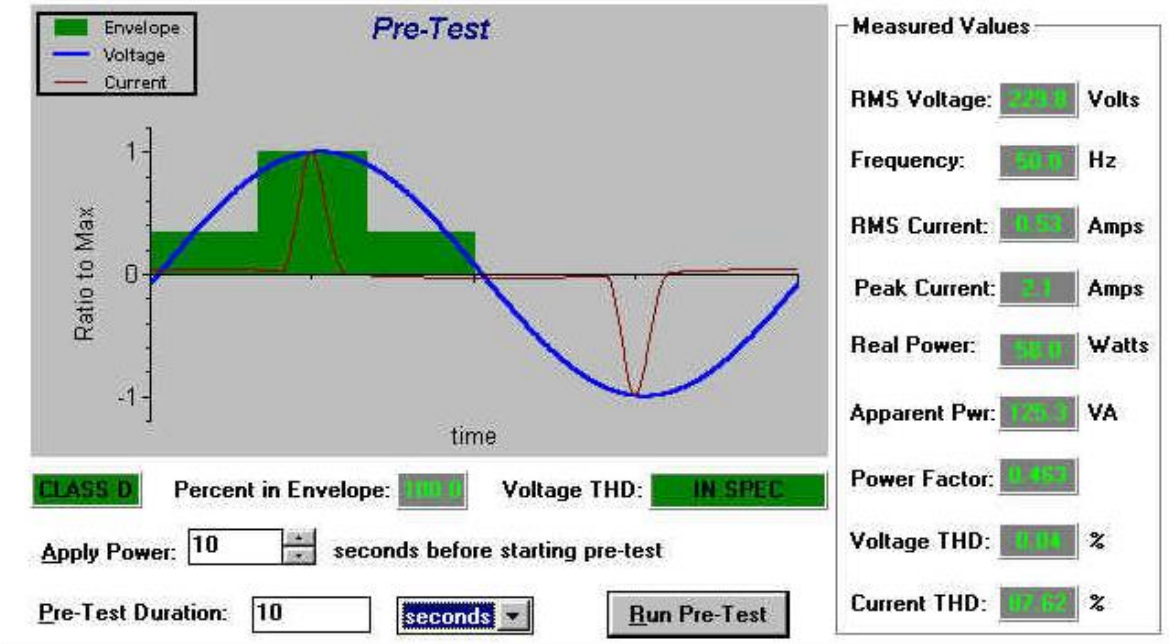
HARMONIC CURRENT EMISSION TEST DATA

Final Test Statistics:

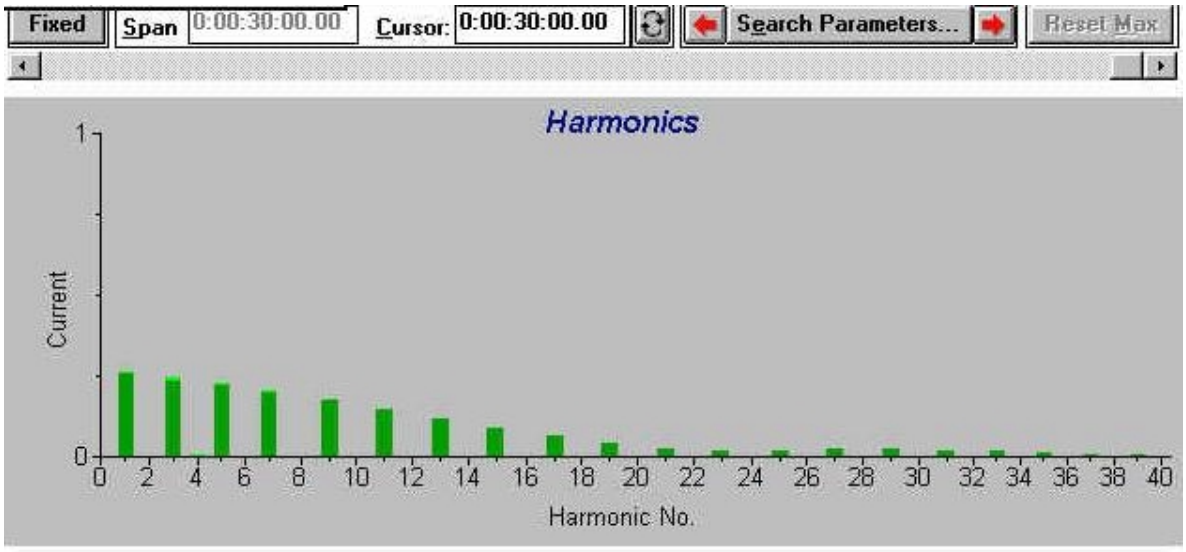
Harmonic Number	Standard Limit (A rms)	Maximum Value (A rms)	Maximum Value (% Limit)	>50% of Limit (Count)	>75% of Limit (Count)	>90% of Limit (Count)	>95% of Limit (Count)	>100% of Limit (Count)	F F
Fund.		0.2637							
2		0.0017		0	0	0	0	0	
3	2.3000	0.2426	10.5	0	0	0	0	0	
4		0.0033		0	0	0	0	0	
5	1.1400	0.2263	19.9	0	0	0	0	0	
6		0.0021		0	0	0	0	0	
7	0.7700	0.2039	26.5	0	0	0	0	0	
8		0.0017		0	0	0	0	0	
9	0.4000	0.1773	44.3	0	0	0	0	0	
10		0.0017		0	0	0	0	0	
11	0.3300	0.1479	44.8	0	0	0	0	0	
12		0.0018		0	0	0	0	0	
13	0.2100	0.1176	56.0	5625	0	0	0	0	
14		0.0018		0	0	0	0	0	
15	0.1500	0.0881	58.7	5625	0	0	0	0	
16		0.0014		0	0	0	0	0	
17	0.1324	0.0619	46.8	0	0	0	0	0	
18		0.0012		0	0	0	0	0	
19	0.1184	0.0395	33.4	0	0	0	0	0	
20		0.0011		0	0	0	0	0	
21	0.1071	0.0227	21.2	0	0	0	0	0	
22		0.0013		0	0	0	0	0	
23	0.0978	0.0162	16.5	0	0	0	0	0	
24		0.0014		0	0	0	0	0	
25	0.0900	0.0196	21.8	0	0	0	0	0	
26		0.0015		0	0	0	0	0	
27	0.0833	0.0223	26.8	0	0	0	0	0	
28		0.0015		0	0	0	0	0	
29	0.0776	0.0224	28.8	0	0	0	0	0	
30		0.0013		0	0	0	0	0	
31	0.0726	0.0202	27.8	0	0	0	0	0	
32		0.0012		0	0	0	0	0	
33	0.0682	0.0166	24.3	0	0	0	0	0	
34		0.0009		0	0	0	0	0	
35	0.0643	0.0120	18.6	0	0	0	0	0	
36		0.0009		0	0	0	0	0	
37	0.0608	0.0073	12.0	0	0	0	0	0	
38		0.0009		0	0	0	0	0	
39	0.0577	0.0044	7.6	0	0	0	0	0	
40		0.0008		0	0	0	0	0	

Remarks

HARMONIC CURRENT EMISSION TEST DATA



HARMONIC CURRENT EMISSION TEST DATA



VOLTAGE FLUCTUATION TEST DATA

EUT Model: SBC-659 (N)
Approved by: MILO WANG/Client
Date Tested: 05/03/01

Mode: Normal Mode
Engineer: Michael Hung

Approved by: _____

Signature:_____ Date:_____

Final Test Result: PASS

Settings and Test Conditions Compliant to the Standard: Yes

Test Equipment Used:

HP 6842A Harmonic/Flicker Test System with serial number:
HFTS Software Version: A.05.01
Date Last Calibrated:

Test Equipment Settings:

Line Voltage: 230.00 V	Pst Integration Time: 10 minutes
Line Frequency: 50 Hz	Pst Integration Periods: 3
Measurement Delay: 10.0 seconds	Test Duration: 00:30:00
RMS Current Limit: 13.1 A	Peak Current Limit: 80.8 A

Overrides:

Pst/Plt Test Limit Overrides: None
RMS Test Limit Overrides: None

Equipment Under Test Pre-test Results:

RMS Voltage: 229.8 V	RMS Current: 0.5 A	Real Power: 55.9 W
Frequency: 50.0 Hz	Peak Current: 2.1 A	Apparent Power: 122.6 VA
Voltage THD: 0.04%	Current THD: 87.85%	Power Factor: 0.456

Total Number of Failures:

Pst: 0	Dc: 0	
Plt: 0	Dmax: 0	
	Dt: 0	

Total Number of Errors:

None

VOLTAGE FLUCTUATION TEST DATA

Final Test Summary:

Dmax:	0.0	Pst:	0.07	P_0.1:	0.01
Dc:	0.0	Plt:	0.07	P_1s:	0.01
Dt:	0.00	Plt Threshold:	0.65	P_3s:	0.01
				P_10s:	0.01
				P_50s:	0.01

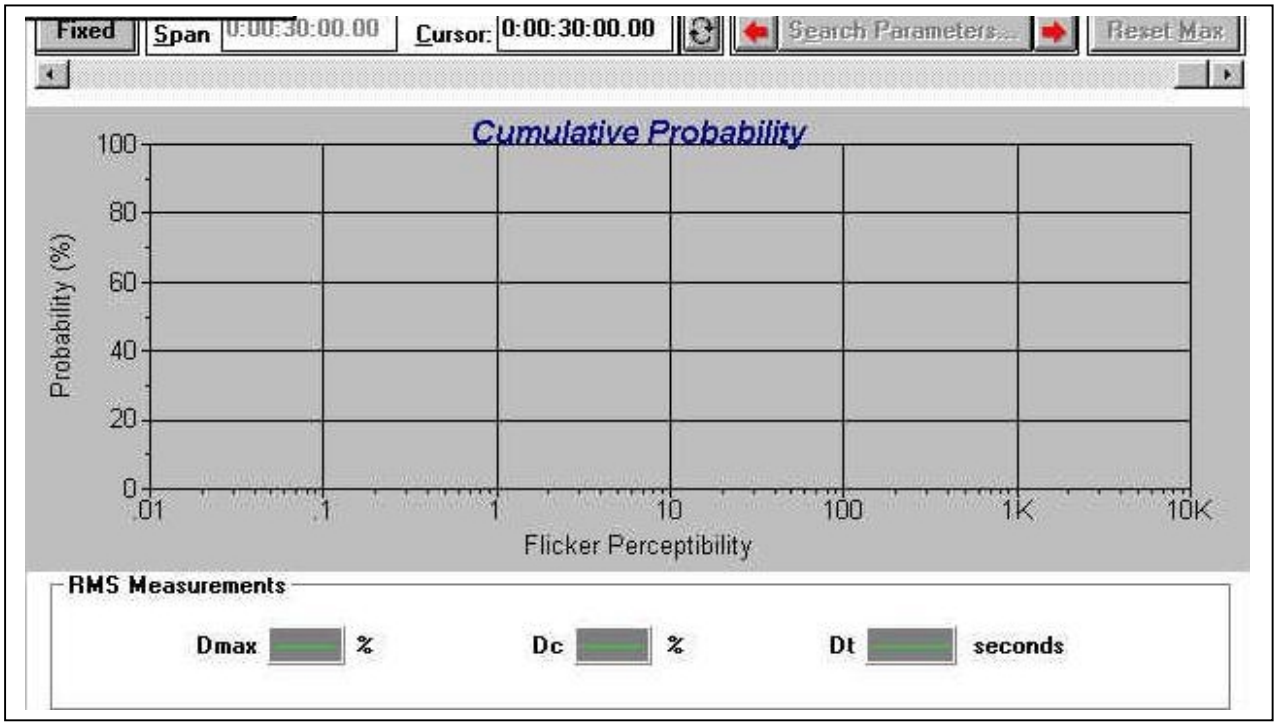
Final Test Data by Integration Period:

Number of Integration Periods: 3

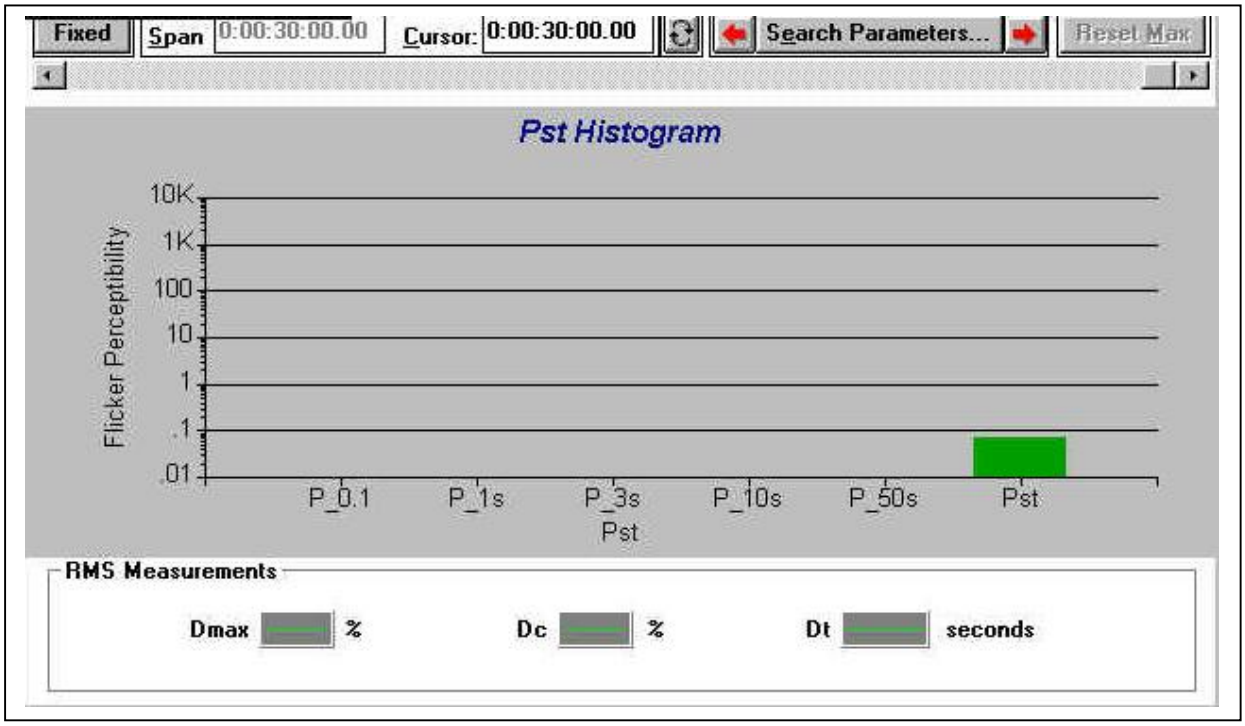
Integration Periods	Pst (P.U.)	P_0.1 (P.U.)	P_1.0s (P.U.)	P_3.0s (P.U.)	P_10s (P.U.)	P_50s (P.U.)	Dc (%)	Dmax (%)	Dt (seconds)	Pa Fa
1	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	
2	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	
3	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	

Remarks

VOLTAGE FLUCTUATION TEST DATA



VOLTAGE FLUCTUATION TEST DATA



APPENDIX A

EQUIPMENT UNDER TEST

EUT CONFIGURATION INFORMATION

EUT Description

CHASSIS TYPE	**Metal**
OPERATING ENVIRONMENT	**Residential , Commercial and Light Industrial as defined in EN55024.**

EUT Power Configuration

AC or DC Supply Voltage Rating	**AC 230V, DC 3.3/5/12V**
Power Supply Manufacturer(s) and Part Number(s)	**ENP / 1815**
AC Line Filter Manufacturer(s) and Part Number(s)	**N/A**

Support Equipment Configuration

Description	Model Number	I/O Ports Description
Speaker	**S-A3**	**Phone-Jack**
Microphone	**DM-514P**	**Phone-Jack**
Recording	**RQ-L309**	**Phone-Jack**
USB Keyboard	**E75282**	**USB**
PS/2 Mouse	**E75282**	**Mini Din-6Pin**
USB Mouse X 3	**M-BB48**	**USB**
Notebook	**31012396J**	**RJ 45**
Printer	**GE5253A**	**DB 25**
Modem	**231AA**	**DB 9**
Modem	**1414**	**DB 9**
Monitor	**HG15LS**	**DB 15**

EUT Software Information

SOFTWARE USED DURING THE TESTS	
Operating System	WINDOWS 98
File Name	EMITEST.EXE
Program Sequence	1. WINDOWS 98 BOOTS SYSTEM 2. RUN EMITEST TO ACTIVATE ALL PERIPHERALS AND DISPLAY "H" PATTERN ON MONITOR SCREEN.

EUT Printed Circuit Board Information

Function/Name/Location	Crystals/Clocks
Main Board	25MHz; 14.318MHz; 24.576MHz

EUT EXTERNAL I/O PORT CONSTRUCTION INFORMATION

Number of I/O port of this type: **1**	
I/O PORT : **Monitor**	Connector Type: **DB 15**
Capture Style: **Screw-In**	Type of Cable to be used: **Shielded**
Cable Connector type: **Molded**	Cable length: **1.8M**
Special Information: **Two Ferrite core on the cable of Ends.**	

Number of I/O port of this type: **2**	
I/O PORT : **Modem**	Connector Type: **DB 9**
Capture Style: **Screw-In**	Type of Cable to be used: **Shielded**
Cable Connector type: **Metal**	Cable length: **1.2M / 1.3M**
Special Information: **N/A**	

Number of I/O port of this type: **1**	
I/O PORT : **Printer**	Connector Type: **DB 25**
Capture Style: **Screw-In**	Type of Cable to be used: **Shielded**
Cable Connector type: **Metal**	Cable length: **1.8M**
Special Information: **N/A**	

Number of I/O port of this type: **1**	
I/O PORT : **Keyboard**	Connector Type: **USB**
Capture Style: **Snap-In**	Type of Cable to be used: **Shielded**
Cable Connector type: **Molded**	Cable length: **1.8M**
Special Information: **N/A**	

Number of I/O port of this type: **3**	
I/O PORT : **USB Mouse**	Connector Type: **USB**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **1.8M**
Special Information: **N/A**	

Number of I/O port of this type: **1**	
I/O PORT : **Mouse**	Connector Type: **Mini-Din 6Pin**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **1.8M**
Special Information: **N/A**	

Number of I/O port of this type: **1**	
I/O PORT : **Lan Connect**	Connector Type: **RJ 45**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **30M**
Special Information: **N/A**	

Number of I/O port of this type: **1**	
I/O PORT : **Microphone**	Connector Type: **Phone-Jack**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **2.8M**
Special Information: **N/A**	

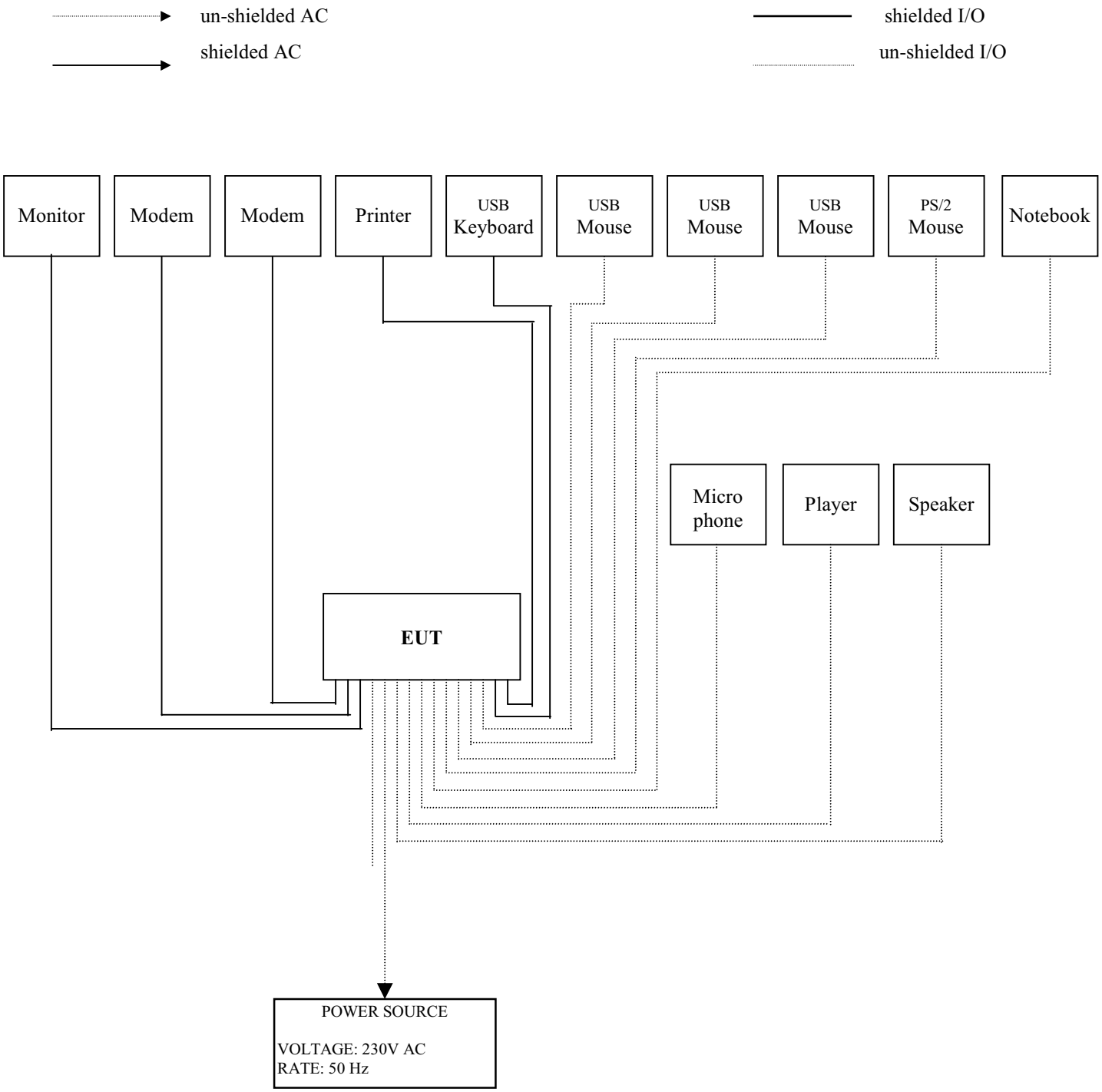
Number of I/O port of this type: **1**	
I/O PORT : **Player**	Connector Type: **Phone-Jack**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **1.5M**
Special Information: **N/A**	

Number of I/O port of this type: **1**	
I/O PORT : **Speaker**	Connector Type: **Phone-Jack**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **1.5M**
Special Information: **N/A**	

Number of I/O port of this type: **1**	
I/O PORT : **Lan Cable Load**	Connector Type: **RJ 45**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **1M**
Special Information: **N/A**	

Number of I/O port of this type: **1**	
I/O PORT : **AC Power Cord**	Connector Type: **AC Inlet**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **1.8M**
Special Information: **N/A**	

EUT SET-UP CONFIGURATION DIAGRAM



LAB MEASUREMENT CONDITIONS

EUT Model #: SBC-659 (N) **EUT S/N #:N/A**

MEASUREMENT EQUIPMENT		
Model	**Serial No.**	**Calibration Due Date**
Fluke 79 series II	66400869	05/31/2001

DAILY ENVIRONMENTAL MEASUREMENTS				
Spec.	**Temperature: (℃)**	**Humidity: (%)**	**Pressure: (mbar)**	**Ground Bond Resistance: (Ω)**
ESD (-2)	**18 °C**	**60 %**	**1017 mbar**	**0.1 Ohms**
RADIATED (-3)	**19 °C**	**65 %**	**1018 mbar**	**0.1 Ohms**
EFT/BUST (-4)	**18 °C**	**64 %**	**1017 mbar**	**0.1 Ohms**
SURGE (-5)	**18 °C**	**64 %**	**1017 mbar**	**0.1 Ohms**
CONDUCTED(-6)	**19 °C**	**65 %**	**1018 mbar**	**0.1 Ohms**
POWER(-8)	**19°C**	**65 %**	**1017 mbar**	**0.2 Ohms**
VOLTAGE(-11)	**19 °C**	**64 %**	**1017 mbar**	**0.1 Ohms**
HARMONIC	**19 °C**	**64 %**	**1017 mbar**	**0.1 Ohms**
FLICKER	**19 °C**	**64 %**	**1017 mbar**	**0.1 Ohms**

EUT POWER MEASUREMENTS

EUT Model #: SBC-659 (N) **EUT S/N #: N/A**

MEASUREMENT EQUIPMENT		
Model	**Serial No.**	**Calibration Due Date**
Fluke 79 series II	66400869	05/31/2001

Date: 05/03/2001 Specification: EN 61000-4-2	Date: 05/09/2001 Specification: EN 61000-4-3
Voltage Measurement: ☒AC ☐DC ☒50 Hz ☐60 Hz Line to Neutral: **229V** Line to Ground: **228V** Neutral to Ground: **0.027mV** **Secondary Power:** **DC 3.3/5/12V**	**Voltage Measurement:** ☒AC ☐DC ☒50 Hz ☐60 Hz Line to Neutral: **230V** Line to Ground: **229V** Neutral to Ground: **0.7mV** **Secondary Power:** **DC 3.3/5/12V**
Date: 05/03/2001 Specification: EN 61000-4-4	Date: 05/03/2001 Specification: EN 61000-4-5
Voltage Measurement: ☒AC ☐DC ☒50 Hz ☐60 Hz Line to Neutral: **230V** Line to Ground: **227V** Neutral to Ground: **0.7mV** **Secondary Power:** **DC 3.3/5/12V**	**Voltage Measurement:** ☒AC ☐DC ☒50 Hz ☐60 Hz Line to Neutral: **230V** Line to Ground: **227V** Neutral to Ground: **0.7mV** **Secondary Power:** **DC 3.3/5/12V**

Date: 05/09/2001 Specification: EN 61000-4-6	Date: 05/04/2001 Specification: EN 61000-4-8
Voltage Measurement: ☒AC ☐DC ☒50 Hz ☐60 Hz Line to Neutral: **230V** Line to Ground: **229V** Neutral to Ground: **0.7mV** **Secondary Power:** **DC 3.3/5/12V**	**Voltage Measurement: ☒AC ☐DC ☒50 Hz ☐60 Hz** Line to Neutral: **229V** Line to Ground: **228V** Neutral to Ground: **0.8mV** **Secondary Power:** **DC 3.3/5/12V**
Date: 05/03/2001 Specification: EN 61000-4-11	Date: 05/03/2001 Specification: EN 61000-3-2 & EN 61000-3-3
Voltage Measurement: ☒AC ☐DC ☒50 Hz ☐60 Hz Line to Neutral: **230V** Line to Ground: **227V** Neutral to Ground: **0.7mV** **Secondary Power:** **DC 3.3/5/12V**	**Voltage Measurement: ☒AC ☐DC ☒50 Hz ☐60 Hz** Line to Neutral: **230V** Line to Ground: **227V** Neutral to Ground: **0.7mV** **Secondary Power:** **DC 3.3/5/12V**

APPENDIX B

TEST OBSERVATIONS & PERFORMANCE CRITERIA

TEST OBSERVATIONS

SPECIFICATION	OBSERVATIONS
IEC 61000-4-2	No complications.
IEC 61000-4-3	No complications.
IEC 61000-4-4	No complications.
IEC 61000-4-5	No complications.
IEC 61000-4-6	No complications.
IEC 61000-4-8	No complications.
IEC 61000-4-11	No complications.
IEC 61000-3-2	No complications.
IEC 61000-3-3	No complications.

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4114
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN, R.O.C. TEL:(02)2217-0894/FAX:2217-1254

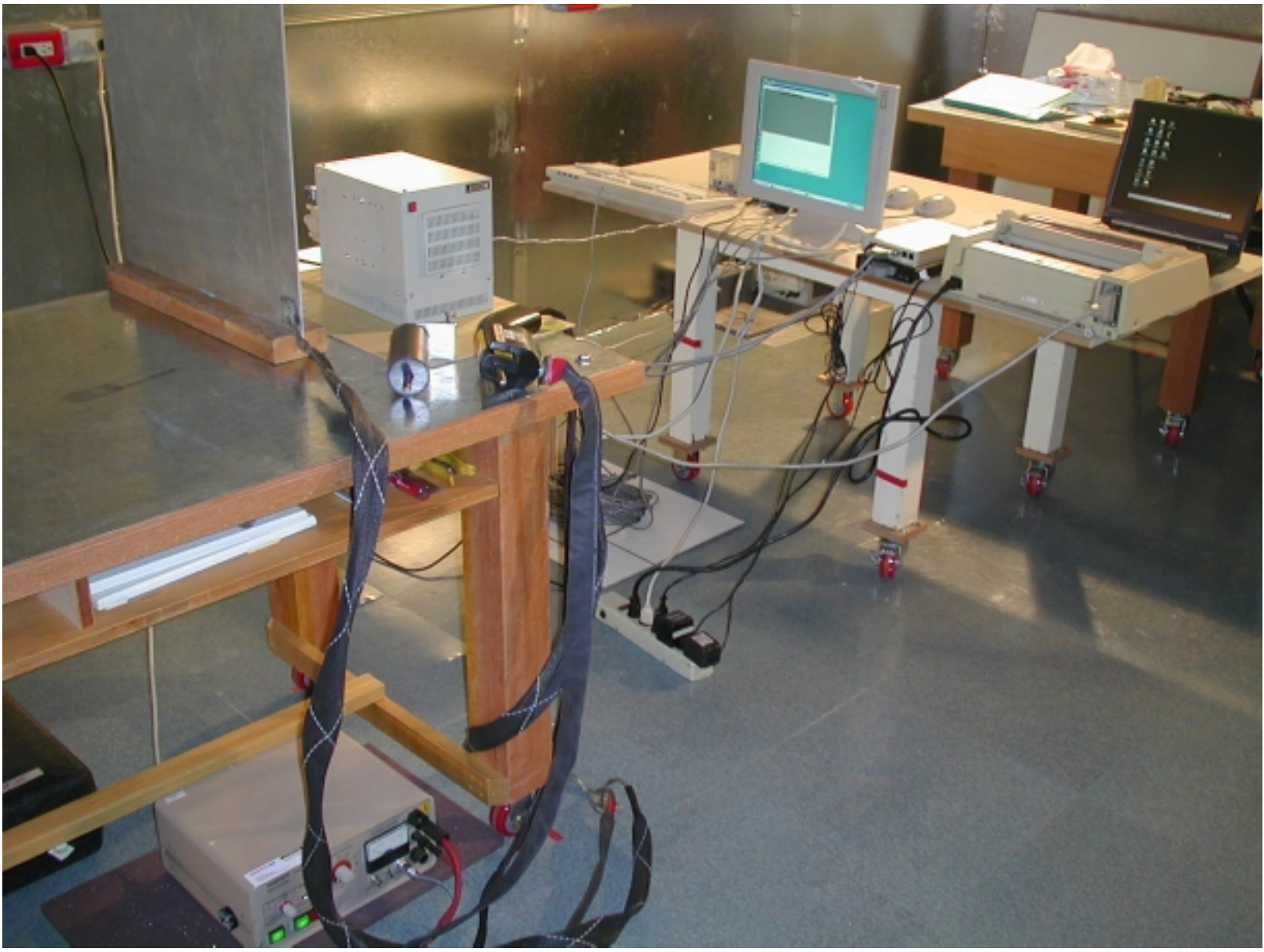
PERFORMANCE CRITERIA

CRITERIA A	The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible lose of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus intended use.
CRITERIA B	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the product when used as intended.
CRITERIA C	Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

APPENDIX C

SET-UP PHOTOGRAPHS

01I9420 (IEC 61000-4-2)



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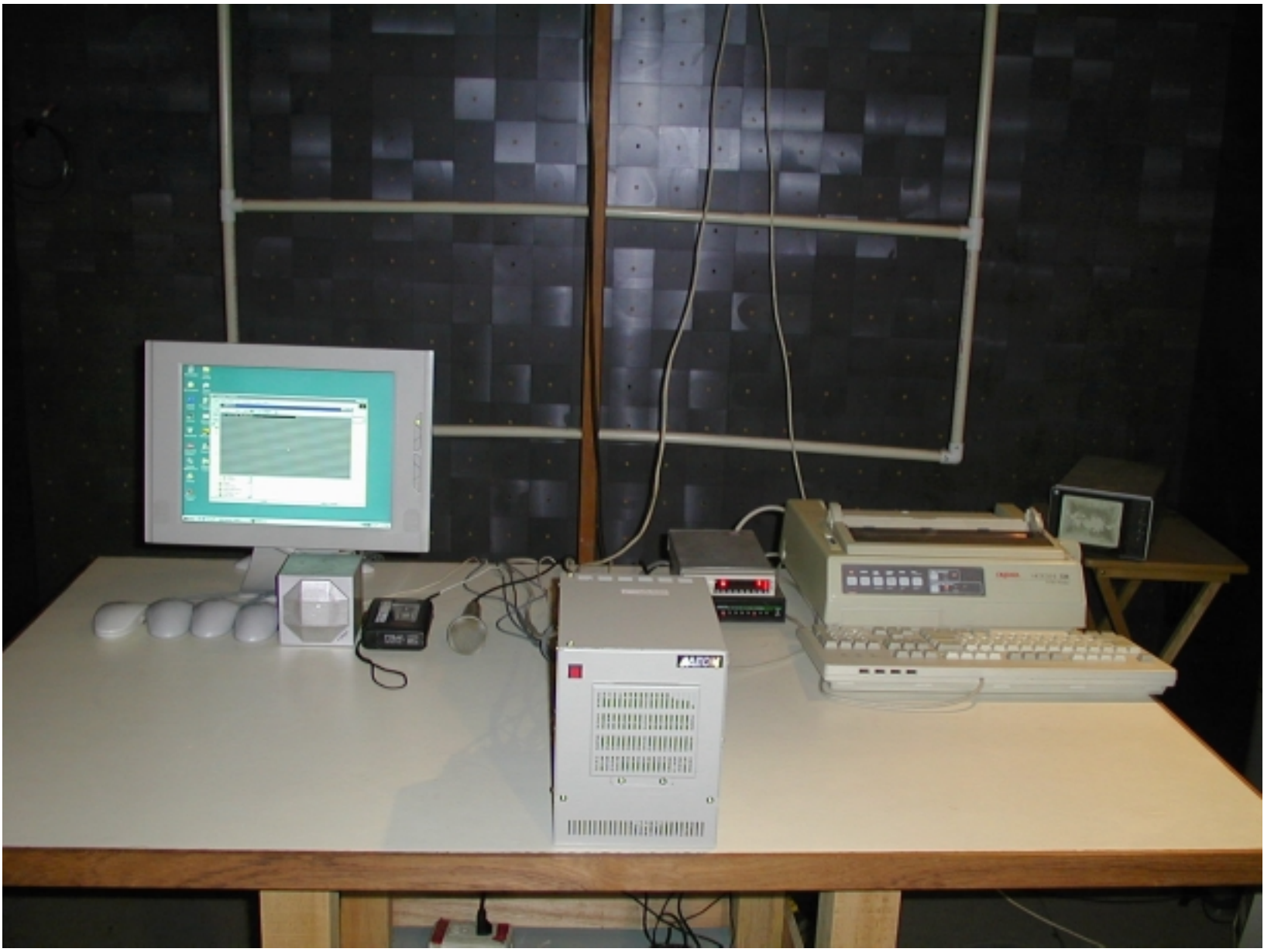
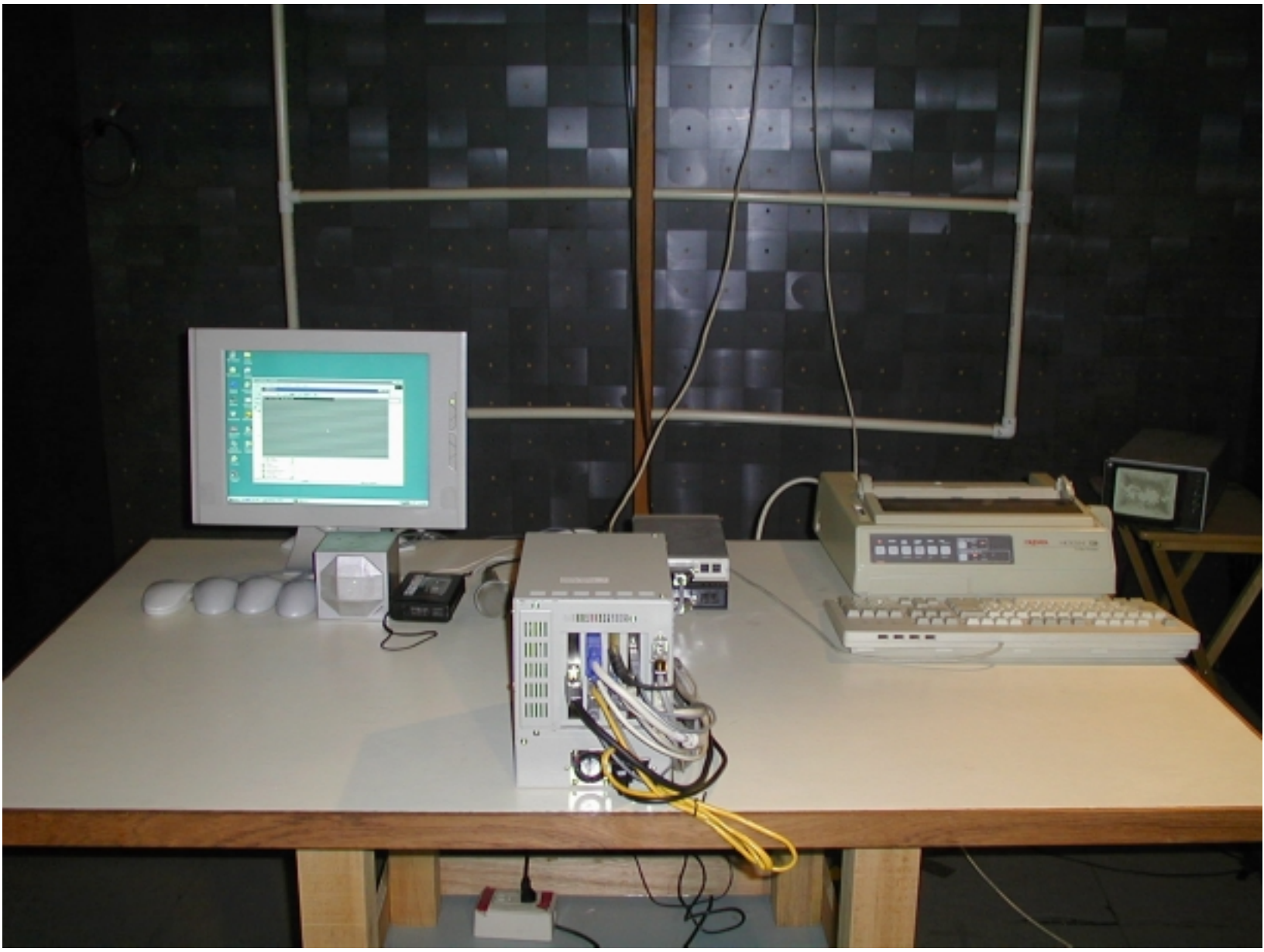


01I9420 (IEC 61000-4-3 Back)



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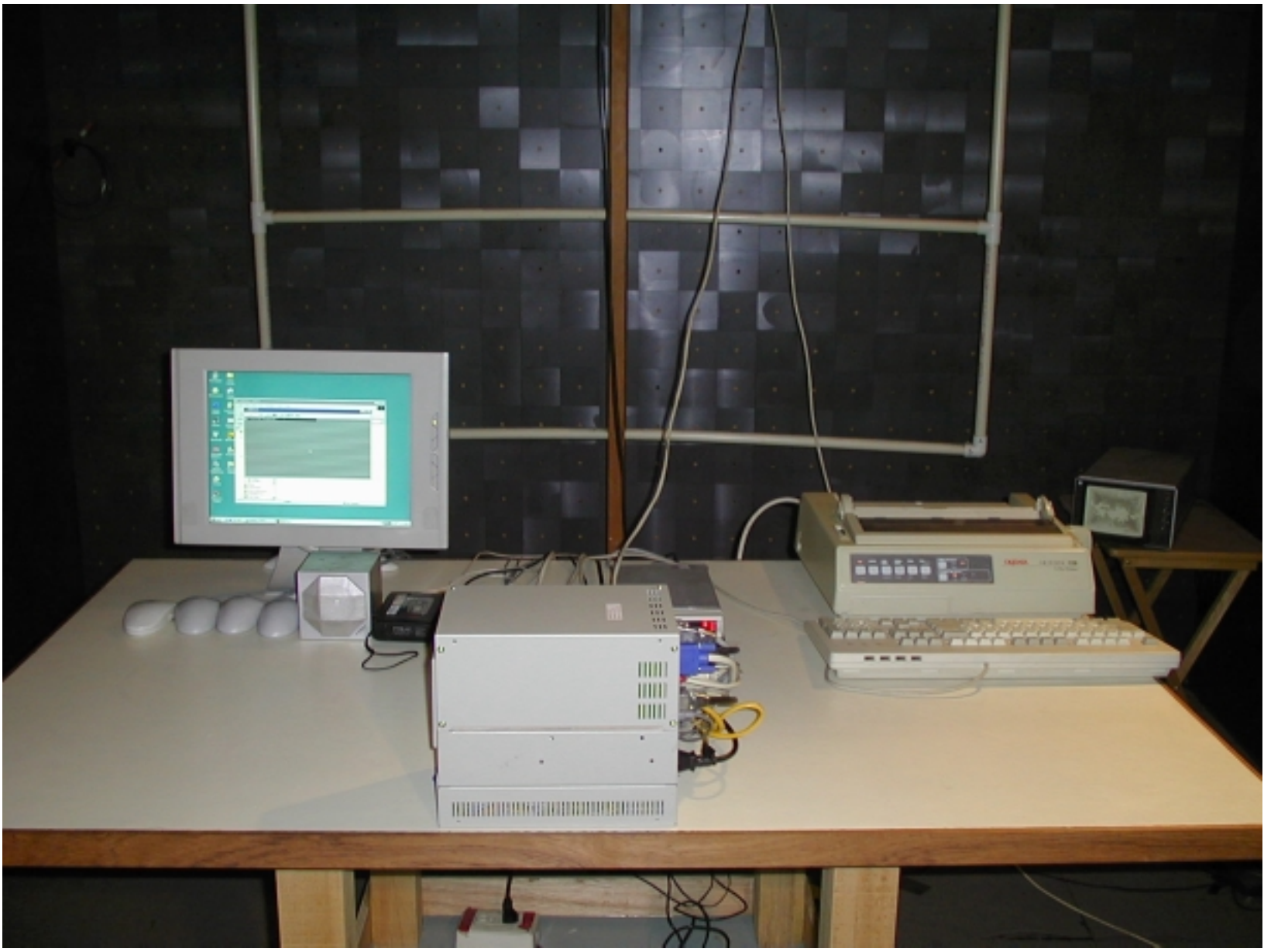

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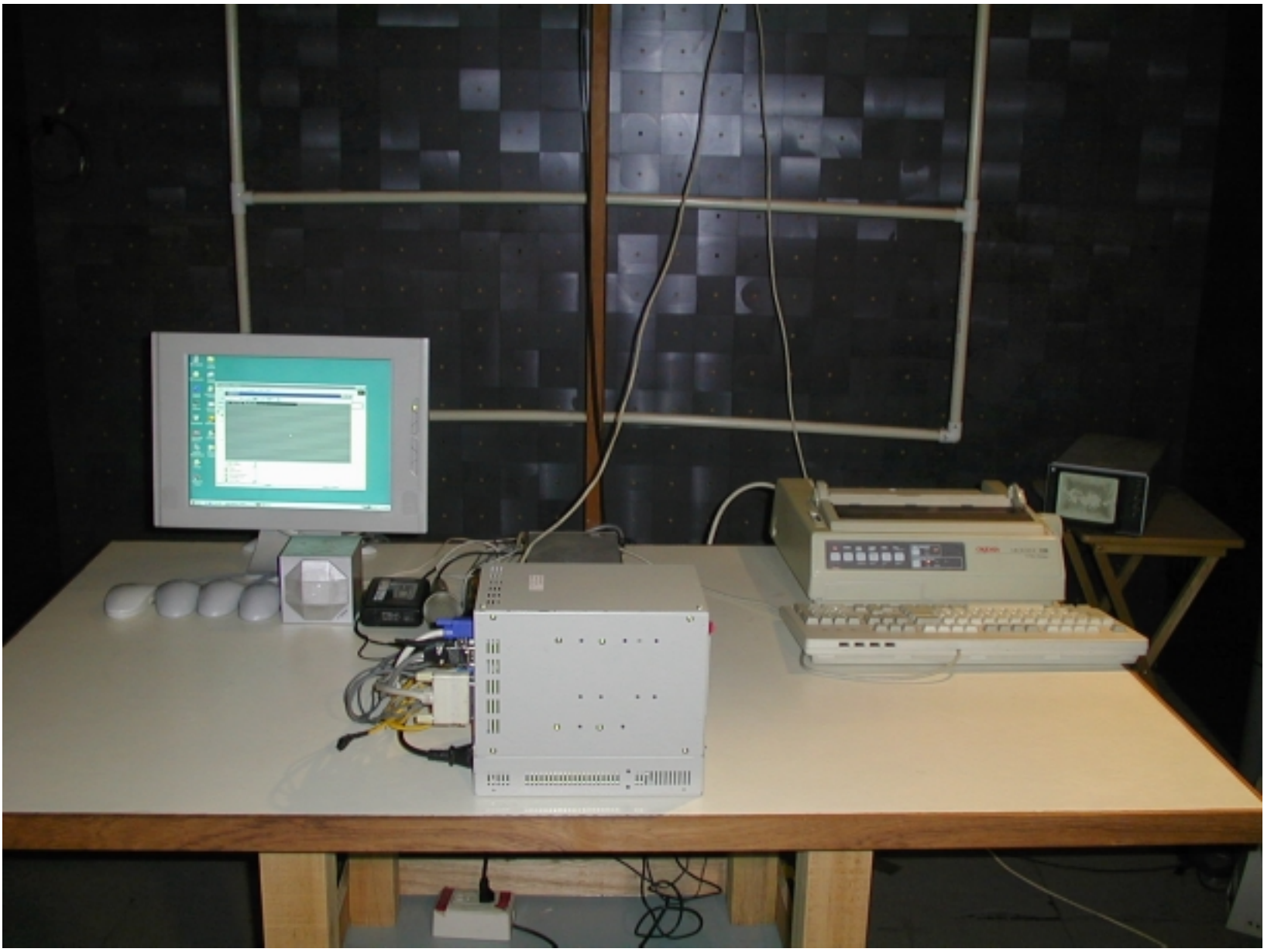
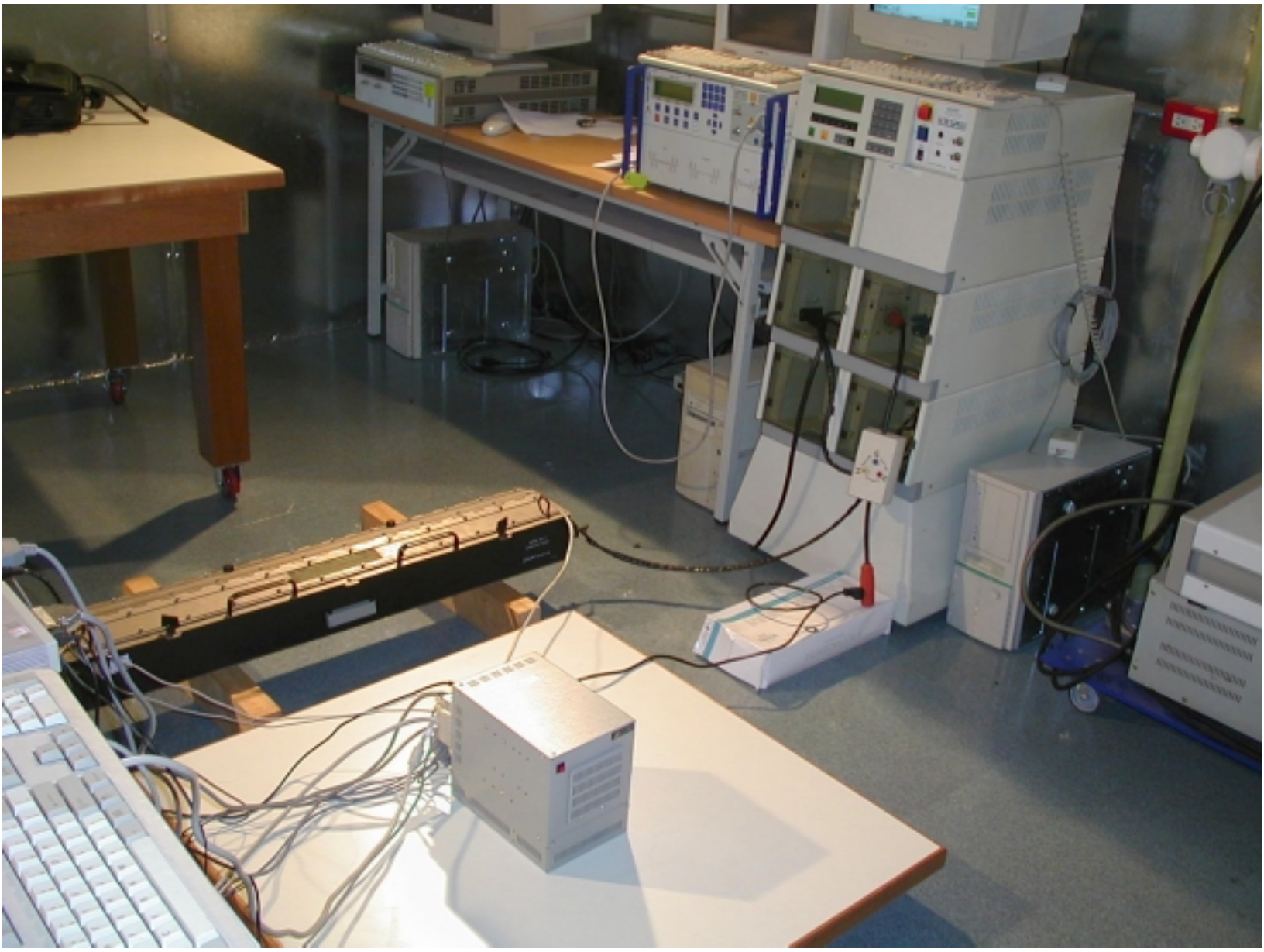
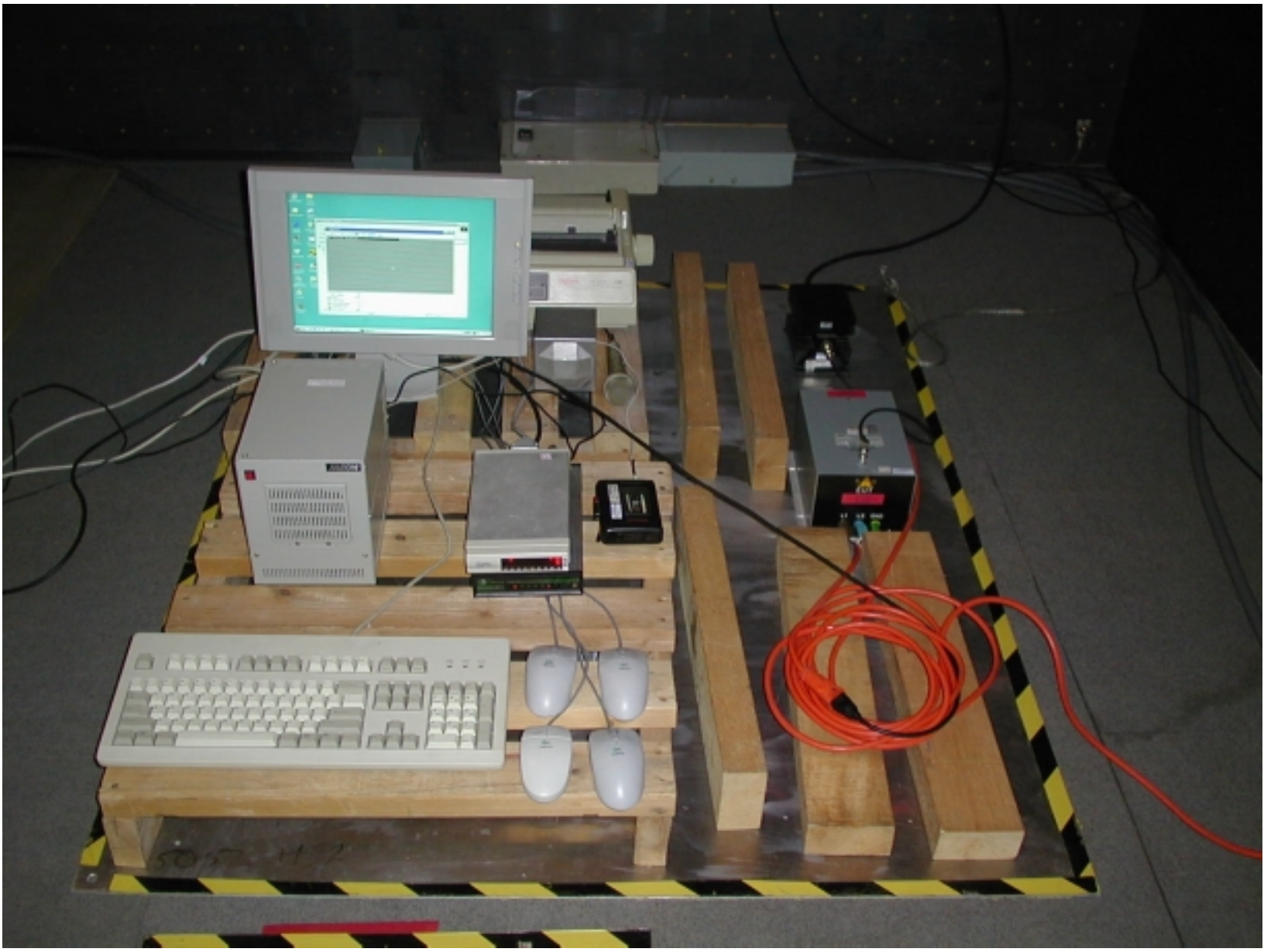


01I9420 (IEC 61000-4-4/5 Power)

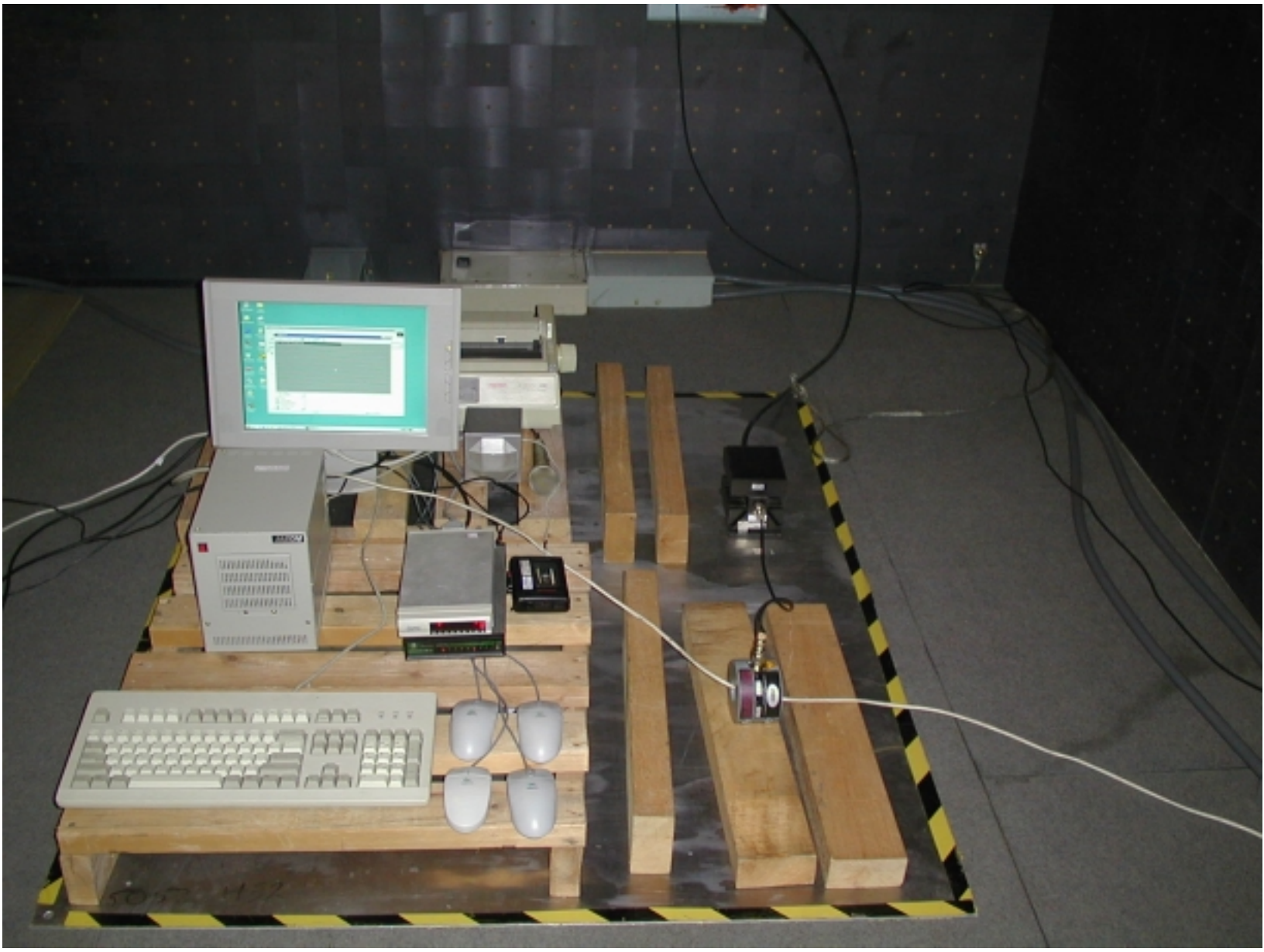
01I9420 (IEC 61000-4-4/5 I/O)



01I9420 (IEC 61000-4-6 Power)



01I9420 (IEC 61000-4-6 I/O)



01I9420 (IEC 61000-4-8 X)

01I9420 (IEC 61000-4-8 Y)

01I9420 (IEC 61000-4-8 Z)

01I9420 (IEC 61000-4-11)

01I9420 (EN 61000-3-2/3)