CE

CISPR 22 :1997 / EN 55022:1998

TEST REPORT

FOR

Industrial PC

MODEL: SBC-659 (N)

REPORT NUMBER: 01E9417

ISSUE DATE: April 27, 2001

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

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

NVLAP®

COMPLIANCE
Engineering Services, Inc.

FCC, VCCI, CISPR, CE
UL, CSA, TÜV, VDE

U.S.A. : P.O.BOX 612650, SAN JOSE, CA 95161-2650
TAIPEI : P.O.BOX 17-82, HSIN TIEN, TAIWAN, R.O.C.

TABLE OF CONTENTS **PAGE**

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

1. VERIFICATION OF COMPLIANCE

NVLAP LAB CODE: 200065-0

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

CONTACT PERSON: MILO WANG / R & D DIVISION

TELEPHONE NO: +886-2-8919-1234

MODEL NO/NAME: SBC-659 (N)

SERIAL NUMBER: N/A

DATE TESTED: April 27 and May 8, 2001

TYPE OF EQUIPMENT:	INFORMATION TECHNOLOGY EQUIPMENT (ITE)
MEASUREMENT DISTANCE:	( ) 3 METER (X) 10 METER
TECHNICAL LIMIT:	CLASS A
STANDARD:	EN 55022:1998 / CISPR 22:1997
MODIFICATIONS MADE ON EUT	☐ YES ☒ NO
DEVIATIONS FROM MEASUREMENT STANDARD	☐ YES (refer to section 21 for comments) ☒ NO
RADIATED EMISSION TEST RESULT	-2.05 dB @ 166.171MHz / HORIZONTAL
CONDUCTED EMISSION TEST RESULT	-33.97 dB @ 22.063MHz
CONDUCTED EMISSION TEST RESULT	-18.60 dB @ 13.479MHz / ISN-LAN

The above equipment was tested by Compliance Engineering Services, Inc. for compliance with the requirements set forth in the European Standard EN 55022:1998/CISPR 22:1997. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved By

Rick Yeo

RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES

Acknowledged By

MILO WANG / R & D DIVISION
AAEON TECHNOLOGY INC.

2. PRODUCT DESCRIPTION

CHASSIS TYPE	METAL
LIST OF EACH OSC. OR XTAL. FREQ. (FREQ.>=1 MHz)	Y1=25MHz; Y2=14.318MHz Y3=25MHz; Y5=14.318MHz
CPU SPEEDS TESTED	PENTIUM-III 933MHz (133MHz X 7)
POWER REQUIREMENTS	INPUT: 100-127V; 5A; 60Hz OUTPUT: 3.3/5/12V
POWER SUPPLY/NAME/MODEL/S.N.	ENHANCE / ENP-1815

3. TESTED SYSTEM DETAILS

The Model names for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Host Computer (EUT)

Device Type	Manufacturer	Model Number	Serial Number	FCC ID / DoC
HDD	QUANTUM	FIREBALL	N/A	N/A
USB CARD	N/A	N/A	N/A	N/A
USB + AUDIO CARD	N/A	PCM-3533	1907353300	N/A
RAM	NEC	SD-64M	N/A	N/A
MAIN-BOARD	UNIC	94V-0	N/A	N/A
CPU	INTEL	PENTIUM-III	N/A	N/A
BACK PLANE	N/A	BP-204SS-P4C	N/A	N/A
CHASSIS	N/A	AEC-204	N/A	N/A

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

External Peripheral Devices

Device Type	**Manufacturer**	**Model Number**	**Serial No.**	**FCC ID / DoC**
SPEAKER	SINGVOX	SP-362	N/A	N/A
PLAYER	PANASONIC	RQ-L309GT	N/A	N/A
MICROPHONE	KOKA	DM-510	N/A	N/A
PRINTER	PANASONIC	KX-P1080i	N/A	ACJ5ZL6KX-PI080I
KEYBOARD	CHERRY	MY3000	000659	DoC
USB MOUSE	LOGITECH	M-BB48	LZE93851294	DoC
USB MOUSE	LOGITECH	M-BB48	LZA00354416	DoC
USB MOUSE	LOGITECH	M-BB48	LZA00354333	DoC
PS/2 MOUSE	LOGITECH	M-S34	LZE92901135	DZL211029
MODEM	ACEEX	1414	N/A	IFAXDM1414
MODEM	HAYES	231AA	N/A	DoC
SERVER PC	TOSHIBA	PS253L	31012396J	N/A
MONITOR	SAMSUNG	77BDF	N/A	DoC

4. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at No. 199, Chung Sheng Road, Hsin Tien City, Taipei, Taiwan R.O.C. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests were accredited by National Voluntary Laboratory Accreditation Program for the specific scope CISPR 22 of accreditation under Lab Code SL2-IN-E-0005. No part of this report may be used to claim or imply product endorsement by BSMI or any other agency of the U.S. Government. In addition, these test facilities are listed with the Federal Communications Commission (reference no:31040/SIT(1300F2)).

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

6. MEASUREMENT INSTRUMENTATION

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide, liner horn. EMI receivers were used for line conducted readings; spectrum analyzers with pre-selectors and quasi-peak detectors were used to perform radiated measurements. Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specifications for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements

7. MEASURING INSTRUMENT CALIBRATION

The measuring equipment which was utilized in performing the tests documented herein has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment which is traceable to recognized national standards.

8. UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the spectrum analyzer were converted to dB(uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

The field strength is calculated by adding the Antenna Factor and Cable Factors, then by subtracting the Amplifier Gain from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

WhereFS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/m. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBuV/m

Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

9. ANTENNAS

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 10 meters from the leading edge of the turn table.

10. CLASSIFICATION OF ITE

Class B is a category for an apparatus which satisfies the Class B ITE disturbance limits. Class B ITE is intended primarily for use in the domestic environment and may include:

- equipment with no fixed place of use; for example, portable equipment powered by built-in batteries;
- telecommunication terminal equipment powered by a telecommunication network;
- personal computers and auxiliary connected equipment.

Note - The domestic environment is an environment where the use of broadcast radio and television receivers may be expected within a distance of 10 m of the apparatus concerned.

Class A is a category for all other ITE which satifies 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.

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

11. LIMITS FOR CONDUCTED DISTURBANCE

☒ **Table 1**
Limits for conducted disturbance at the mains ports of Class A ITE

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	**Average**
0.15 to 0.50	**79**	**66**
0.5 to 30	**73**	**60**
Note- The lower limit shall apply at the transition frequency.		

☐ **Table 2**
Limits of Conducted disturbance at the mains ports of Class B ITE

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	**Average**
0.15 to 0.50	**66 to 56**	**56 to 46**
0.50 to 5	**56**	**46**
5 to 30	**60**	**50**
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

☒ **Table 3**
Limits of common mode conducted emission at telecommunication ports for Class A equipment

Frequency range MHz	Voltage Limits dB(uV)		Current Limits dB(uV)	
	Quasi-peak	**Average**	**Quasi-peak**	**Average**
0.15 to 0.50	**97 to 87**	**84 to 74**	**53 to 43**	**40 to 30**
5 to 30	**87**	**74**	**43**	**30**
Note 1.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. 2.The current and voltage disturbance limits are derived for use with an impedance stabillzation network (ISN) which presents a common mode (asym metric mode) impedance of 150Ω to the telecommunication port under test (conversion factor is 20log 150/1 = 44 dB).				

☐ **Table 4**
Limits of common mode conducted emission
at telecommunication ports for Class B equipment

Frequency range	Voltage Limits dB(uV)		Current Limits dB(uV)	
MHz	**Quasi-peak**	**Average**	**Quasi-peak**	**Average**
0.15 to 0.50	**84 to 74**	**74 to 64**	**40 to 30**	**30 to 20**
5 to 30	**74**	**64**	**30**	**20**

Note
1.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
2.The current and voltage disturbance limits are derived for use with an impedance stabillzation network (ISN) which presents a common mode (asymmetric mode) impedance of 150Ω to the telecommunication port under test (conversion factor is 20log 150/1 = 44 dB).
3.Provisionally a relaxation of 10dB over the frequency range of 6MHz to 30MHz is allowed for high-speed services having significant spectral density in this band. However, this relaxation is restricted to the common mode disturbance converted by the cable from the wanted signal. The provisional relaxation of 10dB will be reviewed no later than three years after the date of withdrawal based on the results and interference cases seen in this period. Wherever possible it is recommended to comply with the limits without the provisional relaxation.

12. LIMITS FOR RADIATED DISTURBANCE

☒ **Table 5**
Limits for radiated disturbance of Class A ITE at
measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(uV/m)
30 to 230	**40**
230 to 1000	**47**

NOTES
1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

☐ **Table 6**
Limits for radiated disturbance of Class B ITE at
measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(uV/m)
30 to 230	**30**
230 to 1000	**37**

NOTES
1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

13. MAINS PORTS CONDUCTED EMISSION TEST PROCEDURE

The EUT is located so that the distance between the boundary of the EUT and the closest surface to the LISN is 0.8m.

The supplied power cord shall be 1 meter long, but if it is longer, the excess cable shall be folded back and forth as far as possible to form a bundle not exceeding 0.4 meter in length.
Conducted disturbance shall be measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.15 - 30 MHz shall be investigated.

Set the EMI receiver to PEAK detector setting and sweep continuously over the frequency range to be investigated. Set resolution bandwidth to 9kHz minimum. Connect EMI receiver input cable to LINE 1 RF measurement connection on the LISN. Connect a 50ohm terminator to the unused RF connection on the LISN. For each mode of EUT operation, maximize emissions readings by manipulating cable and wire positions. Record the configuration for each EUT power cord which produces emissions closest to the limit. Repeat the same procedure for LINE 2 of each EUT power cord.

If PEAK readings are less than the QUASI-PEAK and AVERAGE limits within a 2dB or more margin, the EUT passes the test. If the PEAK readings are closer than 2dB to the QUASI-PEAK limits, set EMI receiver detector mode to QUASI-PEAK. If the emissions so measured are below the published QUASI-PEAK and AVERAGE limts, the EUT passes the test. For those emissions that passed QUASI-PEAK limits when measured with QUASI-PEAK detector but did not pass AVERAGE limits, set the EMI receiver detector mode to AVERAGE. If emissions now are all below published AVERAGE limit, the EUT passes the test.

14. COMMON MODE CONDUCTED EMISSION MEASUREMENT PROCEDURE

1) Selecting ISN for unscreened cable or a current probe for screened cable to take measurement.

2) The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.

3) Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

4) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

5) In case of measuring on the screened cable, the current limit shall be applied, otherwise the voltage limit should be applied.

6) The test data of the worst case condition(s) was reported on the Summary Data page.

15. RADIATED EMISSION TEST PROCEDURE

The EUT and all other support equipment are placed on a wooden table 80 cm above the ground screen. Antenna to EUT distance is 10 meters. During the test, the table is rotated 360 degrees to maximize emissions, while the antenna is positioned between 1 to 4 meters above the ground screen to further maximize emissions. The antenna is polarized in both vertical and horizontal positions.

Monitor the frequency range of interest at a fixed antenna height and EUT azimuth. Frequency span should be small enough to easily differentiate between broadcast stations and intermittent ambients. Rotate the EUT 360 degrees to maximize emissions received from EUT. If emission increases by more than 1 dB, or if another emission appears that is greater by 1 dB, return to azimuth where maximum measurement occurred and perform additional cable manipulation to further maximize received emissions.

Move antenna up and down to further maximize suspected highest amplitude signal. If emission increased by 1 dB or more, or if another emission appears that is greater by 1dB or more, return to antenna height where maximum signal was observed and manipulate cables to produce highest emissions, noting frequency and amplitude.

16. AMBIENT CONDITIONS

The ambient conditions at the time of final tests were as follows:

	Radiated Emission	Conducted (Mains Ports)	Conducted (Common Mode)
Temperature	**22** ℃	**21** ℃	**21** ℃
Humidity	**85** %	**84** %	**84** %

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

17. SYSTEM TEST CONFIGURATION

The equipment under test was configured and operated in a manner which tended to maximize its emission characteristics in a typical application. Power and signal distribution, ground, interconnecting cabling and physical placement of equipment simulated the typical application and usage insofar as practicable.

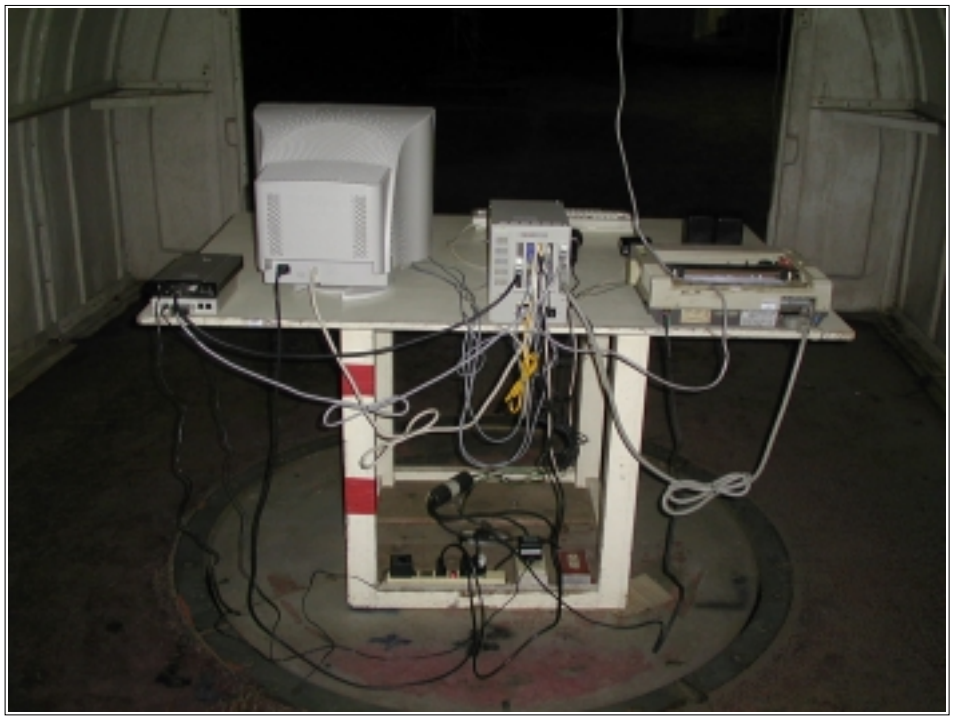
SOFTWARE USED DURING THE TESTS	
Operating System	WINDOWS 98
File Name	EMITEST.EXE
Program Sequence	1. WINDOWS 98 BOOTS SYSTEM. 2. RUN EMITEST.EXE TO ACTIVATE ALL PERIPHERALS AND DISPLAY "H" PATTERN ON MONITOR SCREEN.

18. EQUIPMENT MODIFICATIONS

To achieve compliance to CLASS A levels, the following change(s) were made during compliance testing:

NOT APPLICABLE

19. EUT SETUP PHOTOS



Radiated Emission Setup Photos (Worst Emission Position)

Conducted Emission Setup Photos (Mains Ports)

Conducted Emission Setup Photos (ISN FOR Lan Port)

20. TEST EQUIPMENT LIST

Equipment	Manuf.	Model No.	Serial No.	Site	Cal Date	Due Date
EMI TEST DISPLAY	**ROHDE & SCHWARZ**	**DSAI-D 804.8932.52**	**827832/001**	**D**	**11/00**	**11/01**
EMI TEST RF UNIT	**ROHDE & SCHWARZ**	**ESBI-RF/1005.4300.52**	**827832/003**	**D**	**11/00**	**11/01**
AMPLIFIER	**T.E.C.**	**PA-102**	**43685**	**D**	**05/00**	**05/01**
ANTENNA	**EMCO**	**3142**	**1310**	**D**	**06/00**	**06/01**
LISN	**FISHER CUSTOM**	**FCC-LISN-50/250-25-2**	**107**	**D**	**07/00**	**07/01**
LISN(EUT)	**EMCO**	**3825/2**	**1435**	**D**	**01/01**	**01/02**
CABLE	**TIME MICROWAVE**	**LMR-400**	**N-TYPE02**	**D**	**12/00**	**12/01**
SPECTRUM ANALYZER	**H.P.**	**8566B**	**2937A06102**	**E**	**12/00**	**12/01**
SPECTRUM DISPLAY	**H.P.**	**85662A**	**2848A18276**	**E**	**12/00**	**12/01**
QUASI-PEAK DETECTOR	**H.P.**	**85650A**	**2811A01439**	**E**	**12/00**	**12/01**
AMPLIFIER	**H.P.**	**8447D B**	**1644A02328**	**E**	**05/00**	**05/01**
ANTENNA	**EMCO**	**3142**	**1212**	**E**	**09/00**	**09/01**
TEST RECEIVER	**ROHDE & SCHWARZ**	**ESHS20**	**840455/006**	**E**	**03/01**	**03/02**
LISN	**SOLAR**	**8012-50-R-24-BNC**	**8305114**	**E**	**07/00**	**07/01**
LISN(EUT)	**EMCO**	**3825/2**	**1842**	**E**	**01/01**	**01/02**
CABLE	**TIME MICROWAVE**	**LMR-400**	**N-TYPE01**	**E**	**12/00**	**12/01**
ANTENNA (1-18GHz)	**EMCO**	**3115**	**5761**	**D/E**	**02/01**	**02/02**
AMPLIFIER (1-26GHz)	**MITEQ**	**NSP2600-44**	**646455**	**D/E**	**02/01**	**02/02**
CABLE (1-26.5G)	**FLEXCO**	**FC195**	**N/A**	**D/E**	**02/01**	**02/02**

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

21. CORRECTION FACTOR

OATS NO. E

	ANTENNA 3 METER			ANTENNA 10 METER			SITE E
FREQ (MHZ)	HORI.	VERT.	CABLE LOSS (dB)	HORI.	VERT.	CABLE LOSS (dB)	AMP GAIN (dB)
30	19.01	19.01	0.92	**17.9**	**17.9**	0.92	**27.41**
35	15.92	15.92	0.94	**14.6**	**14.6**	0.94	**27.42**
40	12.70	12.70	1.04	**12.0**	**12.0**	1.04	**27.36**
45	10.20	10.20	1.06	**9.9**	**9.9**	1.06	**27.36**
50	8.70	8.70	1.08	**8.5**	**8.5**	1.08	**27.39**
60	7.20	7.20	1.15	**7.4**	**7.4**	1.15	**27.36**
70	6.95	6.95	1.22	**5.9**	**5.9**	1.22	**27.34**
80	7.63	7.63	1.31	**4.6**	**4.6**	1.31	**27.34**
90	8.52	8.52	1.45	**5.8**	**5.8**	1.45	**27.28**
100	9.05	9.05	1.50	**8.5**	**8.5**	1.50	**27.42**
120	7.65	7.65	1.69	**7.3**	**7.3**	1.69	**27.26**
125	7.70	7.70	1.70	**6.9**	**6.9**	1.70	**27.31**
140	8.32	8.32	1.82	**6.9**	**6.9**	1.82	**27.21**
150	9.21	9.21	1.84	**8.6**	**8.6**	1.84	**27.24**
160	9.65	9.65	1.92	**9.9**	**9.9**	1.92	**27.08**
175	9.86	9.86	2.02	**11.1**	**11.1**	2.02	**27.00**
180	10.10	10.10	2.04	**11.3**	**11.3**	2.04	**27.04**
200	10.30	10.30	2.22	**11.0**	**11.0**	2.22	**26.93**
250	12.85	12.85	2.51	**12.3**	**12.3**	2.51	**26.94**
300	14.10	14.10	2.72	**13.1**	**13.1**	2.72	**26.85**
400	16.55	16.55	3.29	**15.5**	**15.5**	3.29	**27.26**
500	18.75	18.75	3.85	**18.1**	**18.1**	3.85	**27.34**
600	20.85	20.85	4.32	**20.4**	**20.4**	4.32	**27.23**
700	22.86	22.86	4.73	**21.6**	**21.6**	4.73	**26.83**
800	23.10	23.10	5.10	**21.9**	**21.9**	5.10	**26.58**
900	24.31	24.31	5.58	**23.2**	**23.2**	5.58	**26.55**
1000	25.01	25.01	5.74	**23.9**	**23.9**	5.74	**26.85**
1100	25.64	25.64		**25.0**	**25.0**		**27.82**
1200	26.56	26.56		**26.3**	**26.3**		**27.70**
1300	26.75	26.75		**26.3**	**26.3**		
1400	27.85	27.85		**27.4**	**27.4**		
1500	28.12	28.12		**27.6**	**27.6**		
1600	29.25	29.25		**28.7**	**28.7**		
1700	29.75	29.75		**28.3**	**28.3**		
1800	29.90	29.90		**29.7**	**29.7**		
1900	29.95	29.95		**29.0**	**29.0**		
2000	31.52	31.52		**30.8**	**30.8**		

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

22. TEST RESULT SUMMARY

Preliminary Radiated Emission Tests were performed at the 10 meter open area test site. The test procedure listed in EN55022:1998/CISPR22:1997 were used. The following preliminary tests were conducted to determine the worst mode of operation and configuration.

Preliminary Radiated Emission Test			
Frequency Range Investigated		30 MHz TO 5000 MHz	
Mode of operation	Date	Data Report No.	Worst Mode
NORMAL MODE	04/27/01	9417F# (12, 15)	☒

Final Radiated Emission Test was conducted by operating the worst mode as indicated above.

OATS No:	Data Report No.	Date	Tested By:
E / 10 M	**9417F# (12, 15)**	**04/27/01**	**MICHAEL HUNG**

Six Highest Radiated Emission Readings							
Frequency Range Investigated				30 MHz TO 5000 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB/m)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type P/Q/A	Pol. H/V
166.170	**47.20**	**-11.75**	**35.45**	**40.00**	**-4.55**	**Q**	**V**
186.830	**44.10**	**-10.68**	**33.42**	**40.00**	**-6.58**	**P**	**V**
199.997	**48.60**	**-10.69**	**37.91**	**40.00**	**-2.09**	**Q**	**V**
232.690	**50.70**	**-9.76**	**40.94**	**47.00**	**-6.06**	**P**	**V**
166.171	**49.70**	**-11.75**	**37.95**	**40.00**	**-2.05**	**P**	**H**
224.990	**43.50**	**-10.00**	**33.51**	**40.00**	**-6.49**	**P**	**H**

C.F.(Correction Factor)=Antenna Factor + Cable Loss + Attenuator(3dB) - Amplifier Gain
Corrected Reading = Metering Reading + C.F.
Margin=Corrected Reading - Limits
P=Peak Reading H=Horizontal Polarization/Antenna
Q=Quasi-peak V=Vertical Polarization/Antenna
A=Average Reading

Comments: **N/A**

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

Preliminary Conducted Emission Tests for Mains Ports were performed according to EN55022:1998 /CISPR22:1997. The following preliminary tests were conducted to determine the worst mode of operation.

Preliminary Conducted Emission Test			
Frequency Range Investigated		150 kHz TO 30 MHz	
Mode of operation	Date	Data Report No.	Worst Mode
NORMAL MODE	04/27/01	9417E# (24, 32)	☒

Final Conducted Emission Test was conducted by operating the worst mode as indicated above.

Conducted Room	Plot No **9417E# (24, 32)**	Date **04/27/01**	Tested By: **MICHAEL HUNG**

Six Highest Conducted Emission Readings							
Frequency Range Investigated				150 kHz TO 30 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type (P/Q/A)	Line (L1/L2)
21.035	**38.00**	**0.49**	**38.49**	**73.00**	**-34.51**	**P**	**L1**
13.479	**38.06**	**0.36**	**38.42**	**73.00**	**-34.58**	**P**	**L2**
20.924	**38.27**	**0.49**	**38.76**	**73.00**	**-34.24**	**P**	**L2**
22.063	**38.54**	**0.49**	**39.03**	**73.00**	**-33.97**	**P**	**L2**
22.775	**37.99**	**0.50**	**38.49**	**73.00**	**-34.51**	**P**	**L2**
24.015	**37.81**	**0.50**	**38.31**	**73.00**	**-34.69**	**P**	**L2**

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

Comments: **N/A**

Preliminary Conducted Emission Tests for Common Mode were performed according to EN55022:1998 /CISPR22:1997. The following preliminary tests were conducted to determine the worst mode of operation.

Preliminary Conducted Emission Test			
Frequency Range Investigated		150 kHz TO 30 MHz	
Mode of operation	Date	Data Report/Plot No.	Worst Mode
LAN PORT #1	05/18/01	9417E# (40)	☒
LAN PORT #2	05/18/01	9417E# (48)	☐

Final Conducted Emission Test was conducted by operating the worst mode as indicated above.

Conducted Room	Plot No **9417E# (40)**	Date **05/18/01**	Tested By: **MICHAEL HUNG**

Six Highest Conducted Emission Readings						
Frequency Range Investigated			150 kHz TO 30 MHz			
Freq (MHz)	Meter Reading (dBuV)	C.F. (dB)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading Type (P/Q/A)
10.072	**54.31**	**9.84**	**64.15**	**87.00**	**-22.85**	**P**
12.188	**56.25**	**9.87**	**66.12**	**87.00**	**-20.88**	**P**
13.479	**58.52**	**9.88**	**68.40**	**87.00**	**-18.60**	**P**
15.635	**56.61**	**9.91**	**66.52**	**87.00**	**-20.48**	**P**
16.928	**55.33**	**9.92**	**65.25**	**87.00**	**-21.75**	**P**
27.271	**54.33**	**10.02**	**64.35**	**87.00**	**-22.65**	**P**

C.F.(Correction Factor)=ISN Factor (9.5dB) + Cable Loss
Corrected Reading = Metering Reading + C.F.
Margin=Corrected Reading - Limits
P=Peak Reading
Q=Quasi-peak
A=Average Reading

Comments: **N/A**

APPENDICES

EXTERNAL I/O CABLE CONSTRUCTION DESCRIPTION

CONFIGURATION BLOCK DIAGRAM

CONDUCTED EMISSION PLOT

RADIATED EMISSION DATA

COMPLIANCE ENGINEERING SERVICES, INC. DOCUMENT NO:CCSTP4003C
NO.199, CHUNG SHENG ROAD, HSIN TIEN, TAIPEI, TAIWAN R.O.C. TEL:(02)2217-0894/FAX:2217-1254

External I/O Cable Construction Description

NO: **1**	CABLE Name: **9**	Number of I/O ports of this type: **1**
I/O Port: **PS/2 MOUSE**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.8 M**
Remarks: **N/A**		

NO: **2~4**	CABLE Name: **7, 5, 69**	Number of I/O ports of this type: **3**
I/O Port: **USB MOUSE**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.8 M**
Remarks: **N/A**		

NO: **5**	CABLE Name: **13**	Number of I/O ports of this type: **1**
I/O Port: **USB KEYBOARD**		Type of Cable used: **Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.8 M**
Remarks: **N/A**		

NO: **6**	CABLE Name: **27**	Number of I/O ports of this type: **1**
I/O Port: **MICROPHONE**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **Yes**		Cable Length: **2.8 M**
Remarks: **N/A**		

NO: **7**	CABLE Name: **24**	Number of I/O ports of this type: **1**
I/O Port: **PLAYER**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.5 M**
Remarks: **N/A**		

NO: **8**	CABLE Name: **42**	Number of I/O ports of this type: **1**
I/O Port: **SPEAKER**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1.1 M**
Remarks: **N/A**		

NO: **9**	CABLE Name: **50**	Number of I/O ports of this type: **1**
I/O Port: **SERIAL MODEM**		Type of Cable used: **Shielded**
Cable Connector Type: **Metal**		Data Traffic Generated: **Yes**
Bundled During Tests: **Yes**		Cable Length: **1.4 M**
Remarks: **N/A**		

NO: **10**	CABLE Name: **N/A**	Number of I/O ports of this type: **1**
I/O Port: **SERIAL MODEM**		Type of Cable used: **Shielded**
Cable Connector Type: **Metal**		Data Traffic Generated: **Yes**
Bundled During Tests: **No**		Cable Length: **1 M**
Remarks: **N/A**		

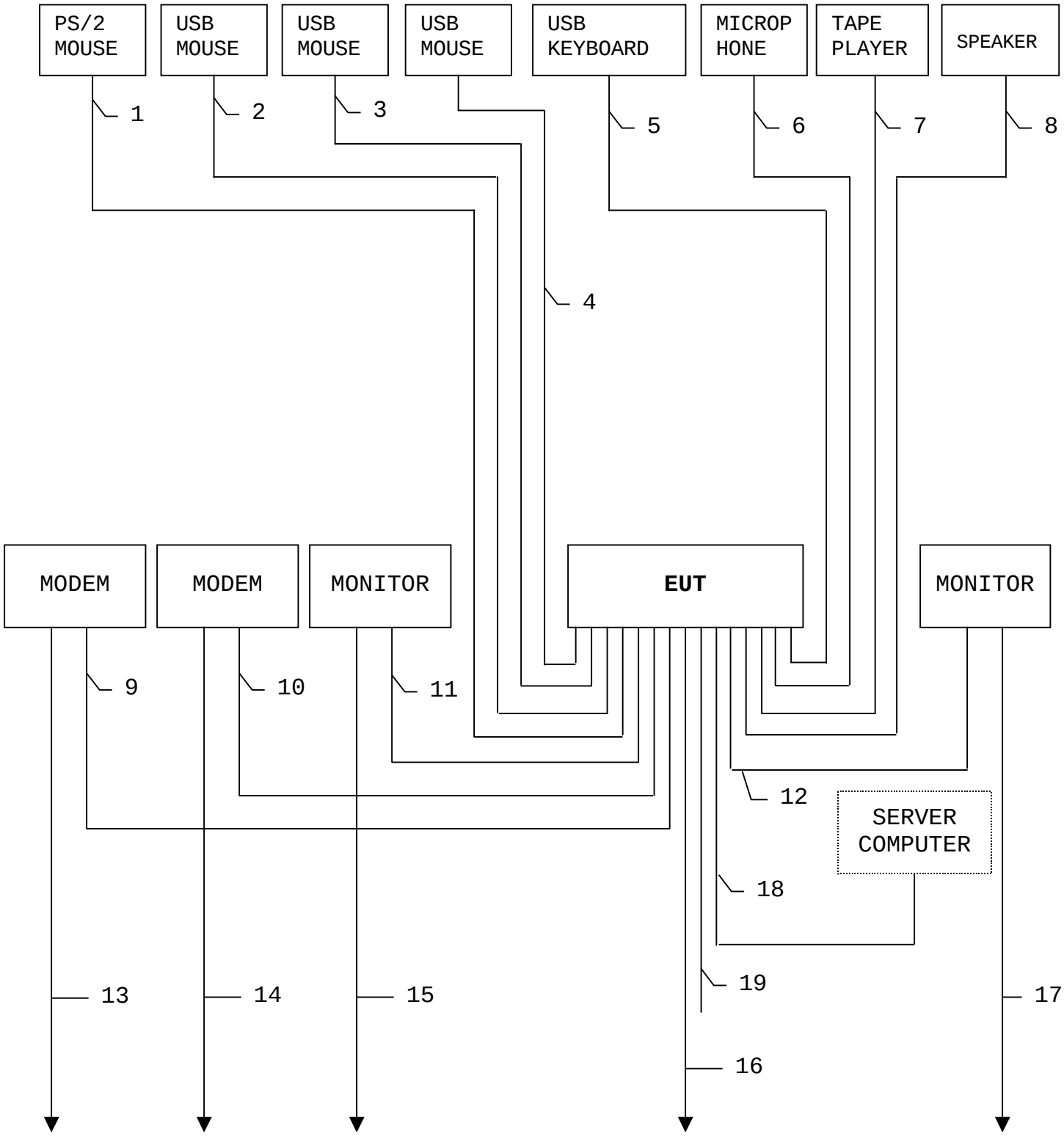
NO: **11**	CABLE Name: **N/A**	Number of I/O ports of this type: **1**
I/O Port: **MONITOR**		Type of Cable used: **Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **Yes**		Cable Length: **1.5 M**
Remarks: **A Ferrite bead on the cable of EUT end**		

NO: **12**	CABLE Name: **60**	Number of I/O ports of this type: **1**
I/O Port: **PARALLEL PRINTER**		Type of Cable used: **Shielded**
Cable Connector Type: **Molded**		Data Traffic Generated: **Yes**
Bundled During Tests: **Yes**		Cable Length: **1.9 M**
Remarks: **N/A**		

NO: **13~17**	CABLE Name: **N/A**	Number of I/O ports of this type: **5**
I/O Port: **AC Power Cord**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Cable Length: **1.8 M**
Bundled During Tests: **No (Radiation), Yes (Line Conduction)**		
Remarks: **N/A**		

NO: **18, 19**	CABLE Name: **N/A**	Number of I/O ports of this type: **2**
I/O Port: **LAN CABLE / CABLE LOAD**		Type of Cable used: **Un-Shielded**
Cable Connector Type: **Molded**		Cable Length: **30/1 M**
Bundled During Tests: **18: NO, 19: YES**		
Remarks: **N/A**		

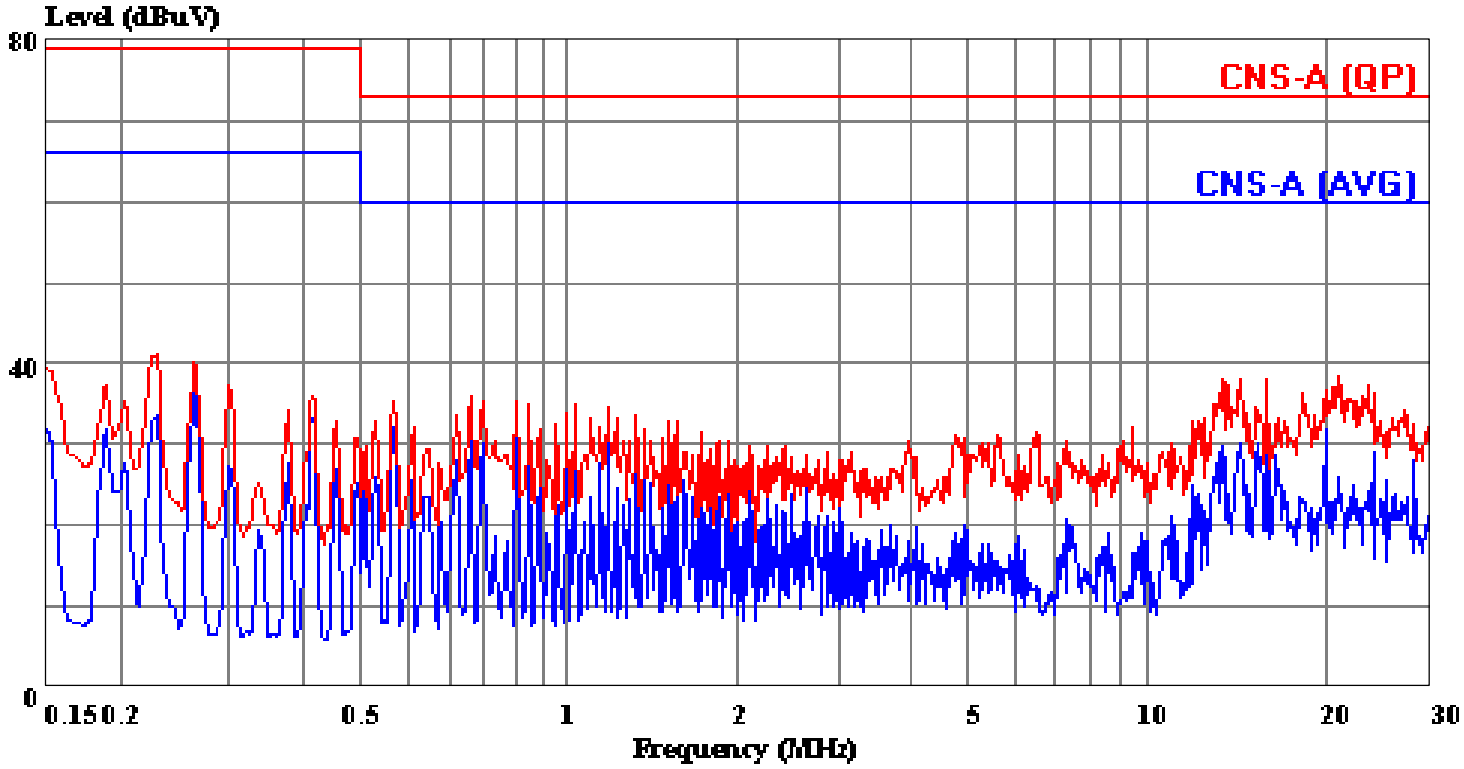
Configuration Block Diagram



COMPLIANCE
Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 24 File#: 9417e.emi Date: 04-27-2001 Time: 21:46:52



(CCS E-Site)

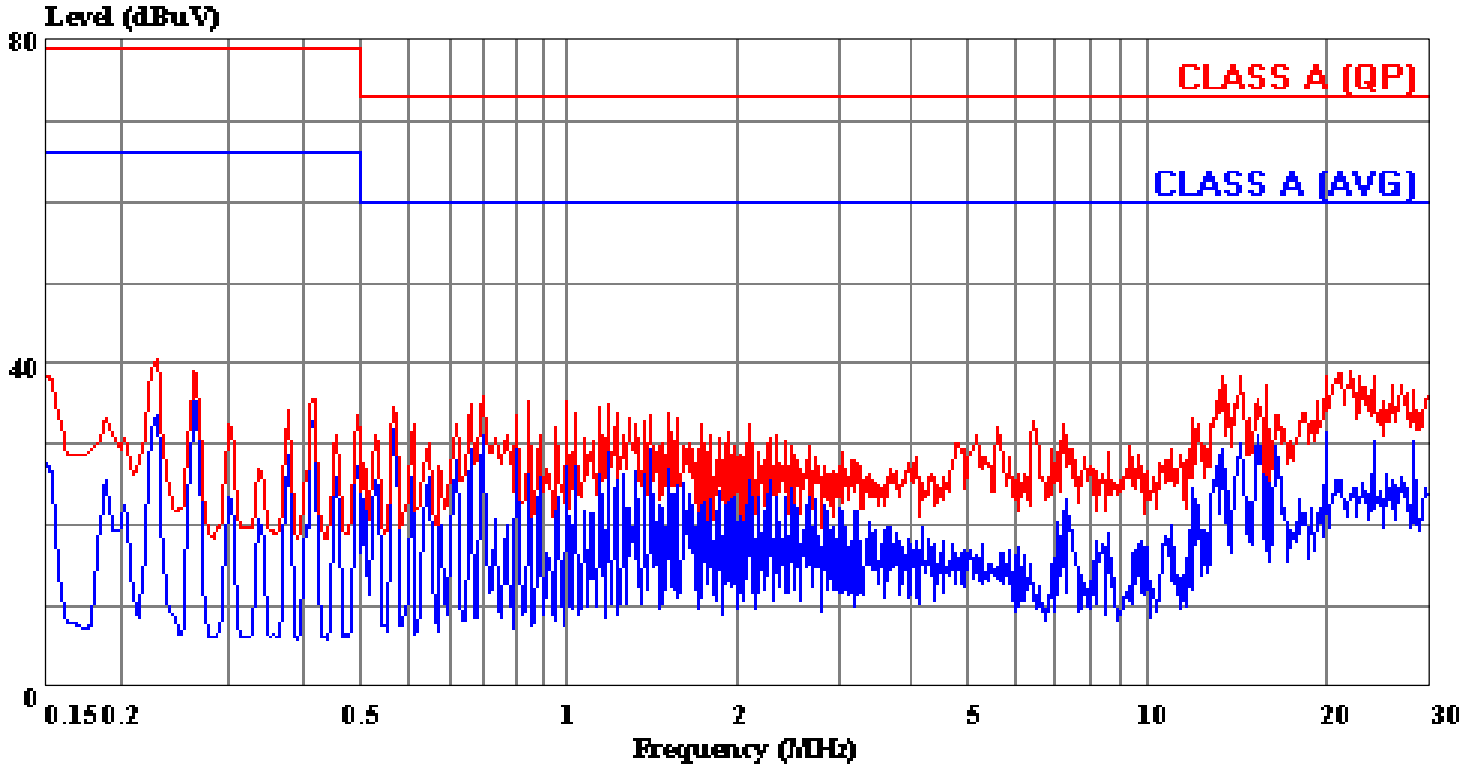
Trace: 23 Ref Trace:

Condition: LINE
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company   : AAEON TECHNOLOGY INC.
EUT   : SBC-659(N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : INTEL P-III 933MHZ/133MHZ

COMPLIANCE
Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 32 File#: 9417e.emi Date: 04-27-2001 Time: 21:53:32



(CCS E-Site)

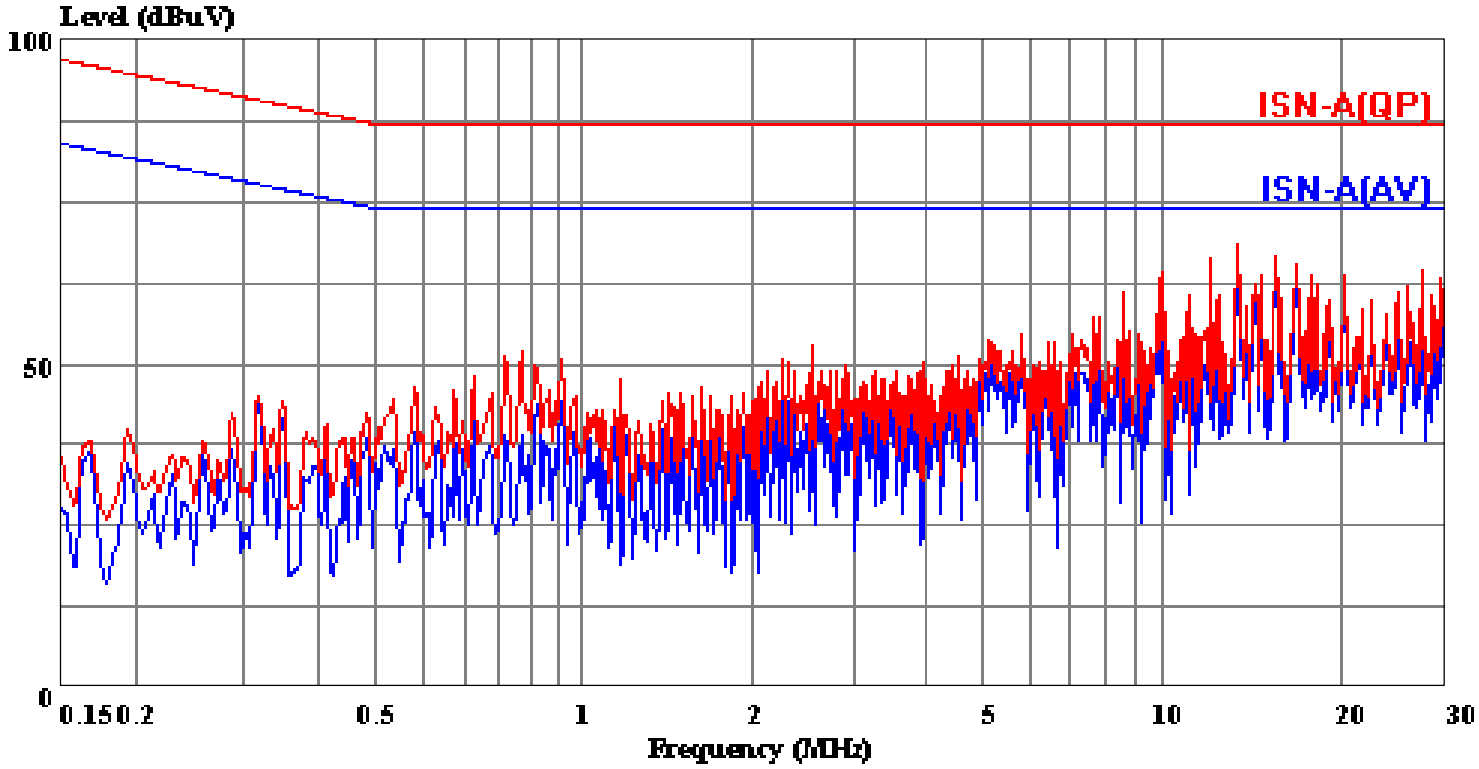
Trace: 31 Ref Trace:

Condition: NEUTRAL
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company   : AAEON TECHNOLOGY INC.
EUT   : SBC-659(N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : INTEL P-III 933MHZ/133MHZ

COMPLIANCE
Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 40 File#: 9417e.emi Date: 05-08-2001 Time: 17:19:02



(CCS E-Site)

Trace: 39 Ref Trace:

Condition: ISN
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company : AAEON TECHNOLOGY INC.
EUT : SBC-659(N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : LAN PORT #1

COMPLIANCE Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 12 File#: 9417f.emi Date: 2001-4-27 Time: 22:52:38
CCS E-Site

Condition: VERTICAL
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company   : AAEON TECHNOLOGY INC.
EUT   : SBC-659 (N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : INTEL P-III
            : CPU=933MHZ/133MHZ

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.460	36.50	-5.59	30.91	40.00	-9.09	Peak
2	37.600	39.80	-9.48	30.32	40.00	-9.68	Peak
3	49.550	44.20	-14.81	29.39	40.00	-10.61	Peak
4	61.260	43.00	-16.11	26.89	40.00	-13.11	Peak
5	77.680	49.70	-18.31	31.39	40.00	-8.61	Peak
6	110.590	43.30	-14.82	28.48	40.00	-11.52	Peak
7	132.944	43.10	-15.62	27.48	40.00	-12.52	Peak
8	150.020	47.10	-13.80	33.30	40.00	-6.70	Peak
9	166.170	47.20	-11.75	35.45	40.00	-4.55	QP
10	176.940	42.20	-10.84	31.36	40.00	-8.64	Peak
11	186.570	42.20	-10.68	31.52	40.00	-8.48	Peak
12	186.830	44.10	-10.68	33.42	40.00	-6.58	Peak
13	199.997	48.60	-10.69	37.91	40.00	-2.09	QP
14	211.290	43.50	-10.38	33.12	40.00	-6.88	Peak
15	232.690	50.70	-9.76	40.94	47.00	-6.06	Peak
16	249.990	45.90	-9.16	36.74	47.00	-10.26	Peak
17	287.510	40.80	-8.31	32.49	47.00	-14.51	Peak
18	300.000	46.40	-8.03	38.37	47.00	-8.63	Peak
19	325.060	37.10	-7.27	29.83	47.00	-17.17	Peak
20	332.340	42.00	-7.09	34.91	47.00	-12.09	Peak
21	350.100	41.90	-6.63	35.27	47.00	-11.73	Peak
22	399.997	32.90	-5.47	27.43	47.00	-19.57	Peak
23	498.527	39.30	-2.45	36.85	47.00	-10.15	Peak
24	565.006	37.70	-0.46	37.24	47.00	-9.76	Peak
25	664.718	35.00	1.86	36.86	47.00	-10.14	Peak
26	764.430	33.70	3.23	36.93	47.00	-10.07	Peak

COMPLIANCE Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

No. 199, Chung Sheng Road,
Hsin Tien City, Taipei,
Taiwan, R.O.C.
Tel:02-2217-0894 Fax:02-2217-1254

Data#: 15 File#: 9417f.emi Date: 2001-4-27 Time: 23:28:21
CCS E-Site

Condition: HORIZONTAL
Report No. : 01E9417
Test Engr. : MICHAEL HUNG
Company   : AAEON TECHNOLOGY INC.
EUT   : SBC-659 (N)
Test Config : EUT/ALL PERIPHERALS
Type of Test: EN55022 CLASS A
Mode of Op. : INTEL P-III
            : CPU=933MHZ/133MHZ

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	50.360	41.20	-14.81	26.39	40.00	-13.61	Peak
2	68.800	42.00	-17.11	24.89	40.00	-15.11	Peak
3	80.920	45.30	-18.19	27.11	40.00	-12.89	Peak
4	120.000	44.70	-15.24	29.46	40.00	-10.54	Peak
5	150.100	46.30	-13.80	32.50	40.00	-7.50	Peak
6	166.171	49.70	-11.75	37.95	40.00	-2.05	Peak
7	224.990	43.50	-10.00	33.51	40.00	-6.49	Peak
8	250.030	47.10	-9.16	37.94	47.00	-9.06	Peak
9	265.880	48.60	-8.77	39.83	47.00	-7.17	Peak
10	324.990	39.90	-7.27	32.63	47.00	-14.37	Peak
11	365.610	43.80	-6.36	37.44	47.00	-9.56	Peak
12	450.030	35.70	-3.60	32.11	47.00	-14.90	Peak
13	465.290	35.80	-3.23	32.57	47.00	-14.43	Peak
14	565.010	37.80	-0.46	37.34	47.00	-9.66	Peak
15	627.910	36.20	0.97	37.17	47.00	-9.83	Peak
16	830.891	34.50	3.78	38.28	47.00	-8.72	Peak

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
Compliance Engineering Services, Inc.
No. 199, Chung Sheng Road
Hsin Tien City, Taipei
Taiwan, R. O. C.

TEL: (02) 2217-0894
FAX: (02) 2217-1254

d.b.a.
Compliance Certification Services
1366 Bordeaux Drive
Sunnyvale, CA 94089

TABLE OF CONTENTS

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.
DOCUMENT NO:CCSTP4114
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

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 or Fail (P/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		

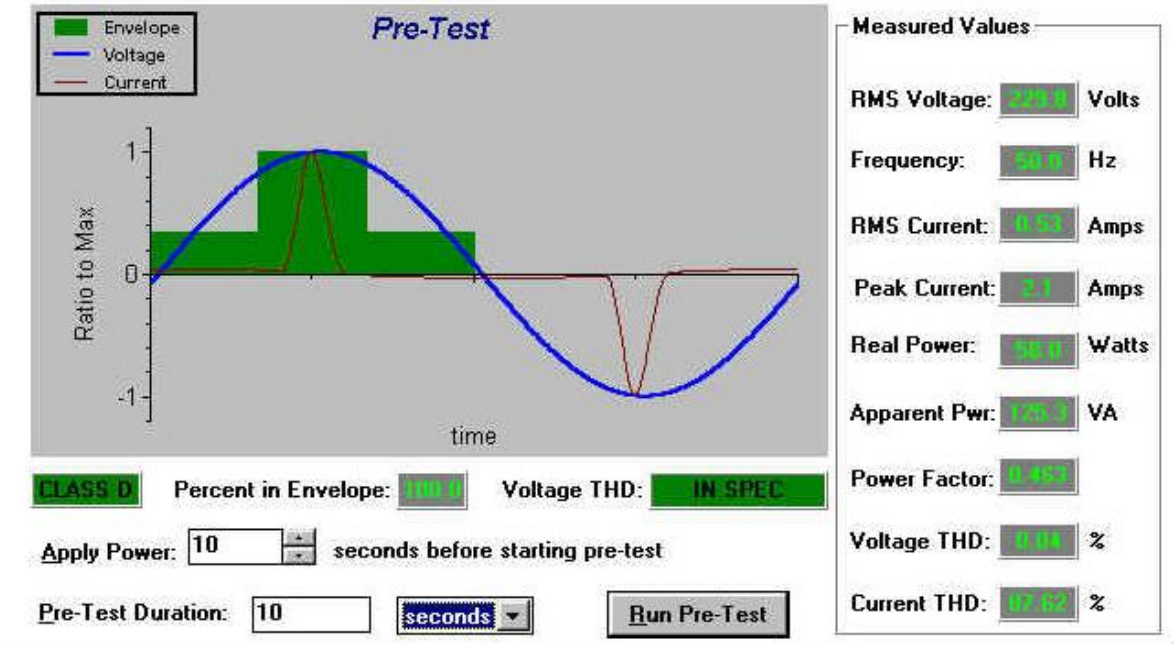
HARMONIC CURRENT EMISSION TEST DATA

Final Test Statistics:

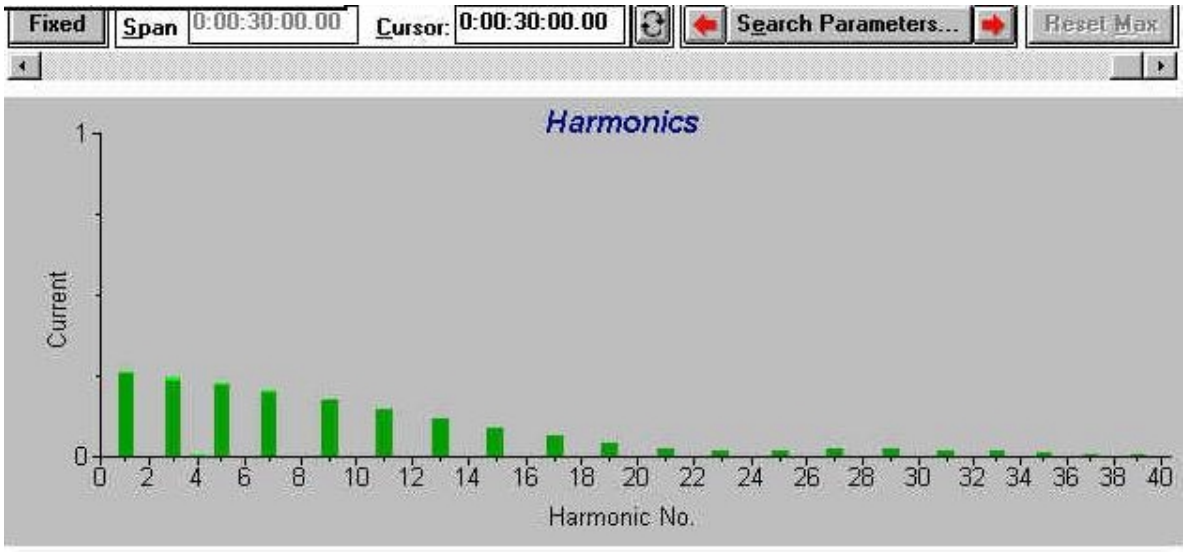
Harmonic Number	Standard Limit (A rms)	Maximum Value (A rms)	Maximum Value (% Limit)	>50% of Limit (Count)	>75% of Limit (Count)	>90% of Limit (Count)	>95% of Limit (Count)	>100% of Limit (Count)	F F
Fund.		0.2637							
2		0.0017		0	0	0	0	0	
3	2.3000	0.2426	10.5	0	0	0	0	0	
4		0.0033		0	0	0	0	0	
5	1.1400	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

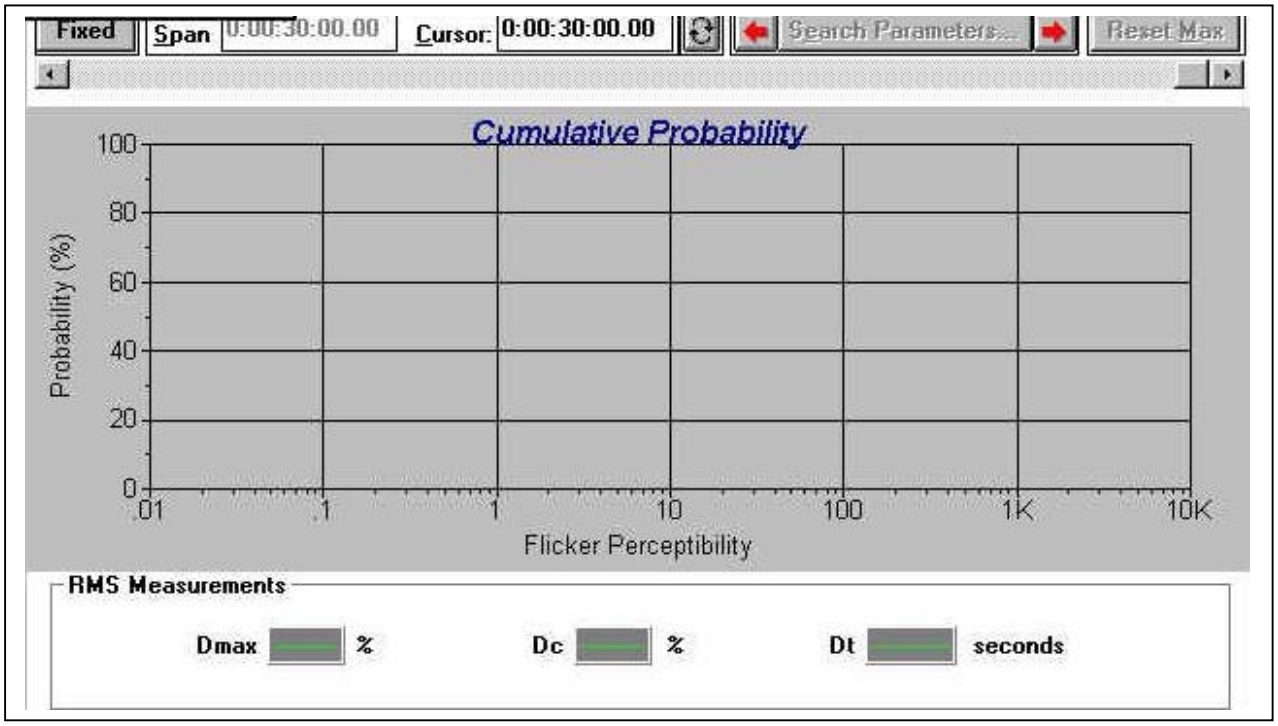
Final Test Data by Integration Period:

Number of Integration Periods: 3

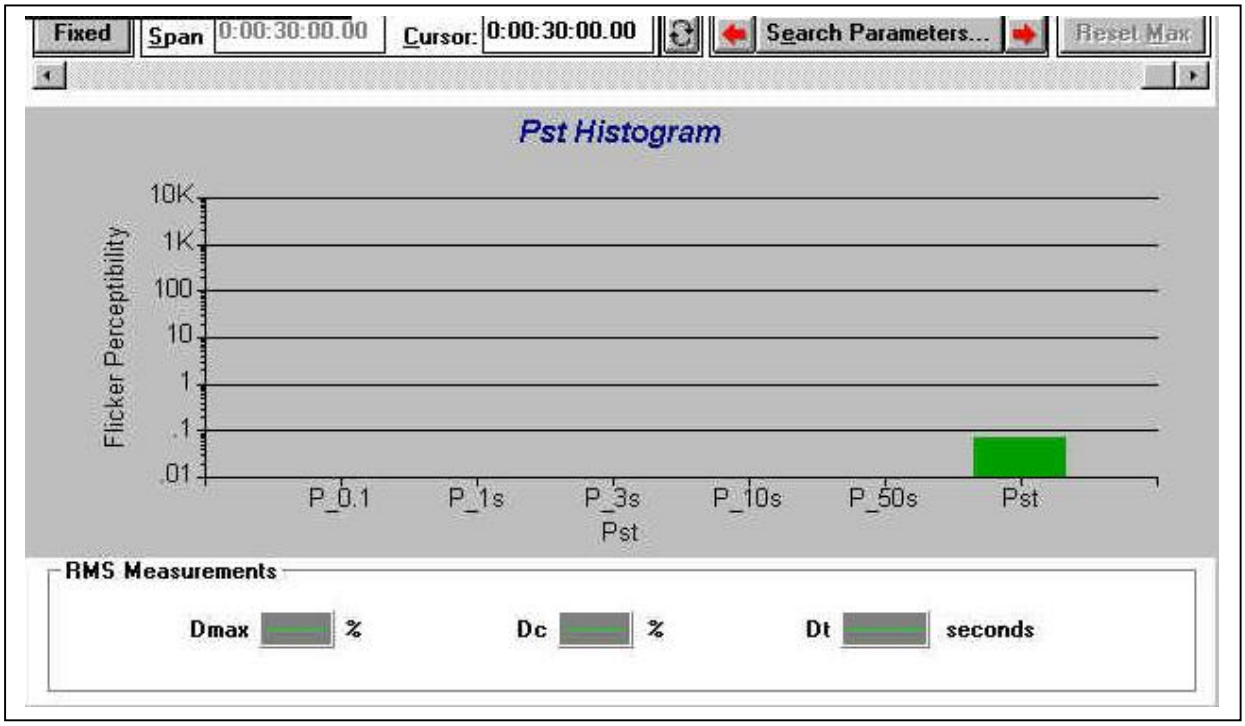
Integration Periods	Pst (P.U.)	P_0.1 (P.U.)	P_1.0s (P.U.)	P_3.0s (P.U.)	P_10s (P.U.)	P_50s (P.U.)	Dc (%)	Dmax (%)	Dt (seconds)	Pa Fa
1	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	
2	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	
3	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	

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**	

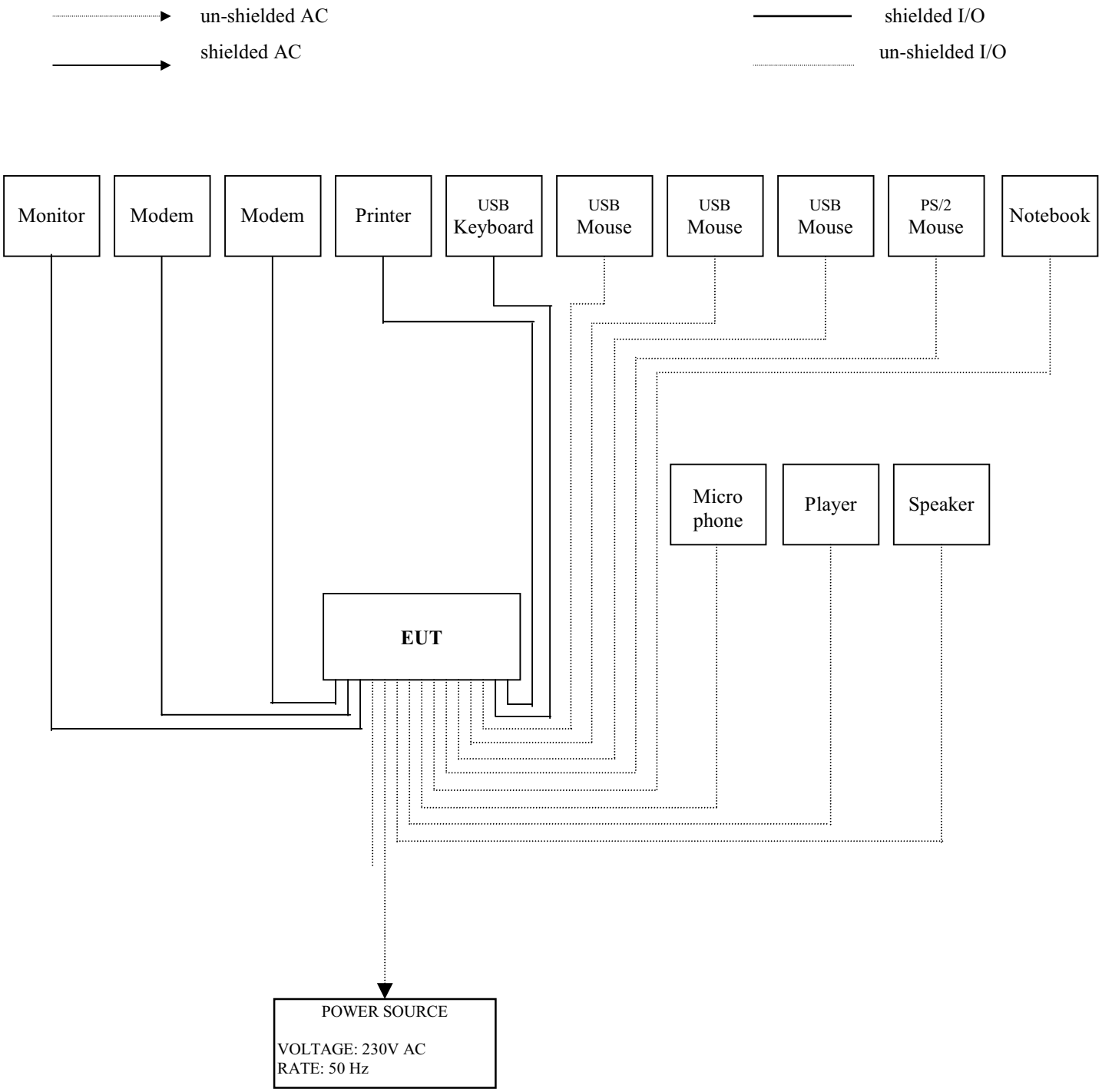
Number of I/O port of this type: **1**	
I/O PORT : **Player**	Connector Type: **Phone-Jack**
Capture Style: **Snap-In**	Type of Cable to be used: **Un-Shielded**
Cable Connector type: **Molded**	Cable length: **1.5M**
Special Information: **N/A**	

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	**Voltage Measurement:** ☒AC ☐DC ☒50 Hz ☐60 Hz
Line to Neutral: **229V**	Line to Neutral: **230V**
Line to Ground: **228V**	Line to Ground: **229V**
Neutral to Ground: **0.027mV**	Neutral to Ground: **0.7mV**
Secondary Power: **DC 3.3/5/12V**	**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	**Voltage Measurement:** ☒AC ☐DC ☒50 Hz ☐60 Hz
Line to Neutral: **230V**	Line to Neutral: **230V**
Line to Ground: **227V**	Line to Ground: **227V**
Neutral to Ground: **0.7mV**	Neutral to Ground: **0.7mV**
Secondary Power: **DC 3.3/5/12V**	**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.

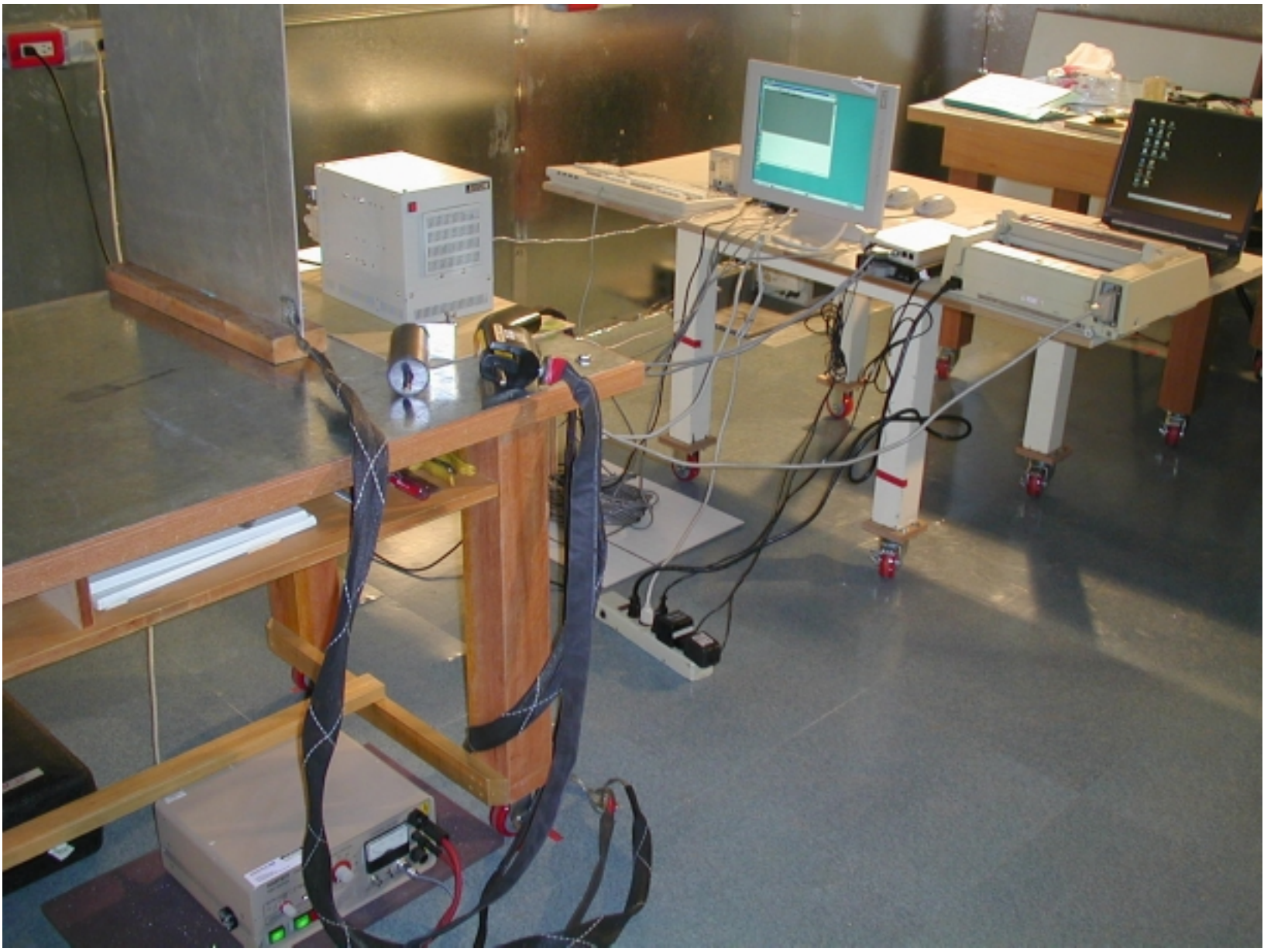
PERFORMANCE CRITERIA

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.

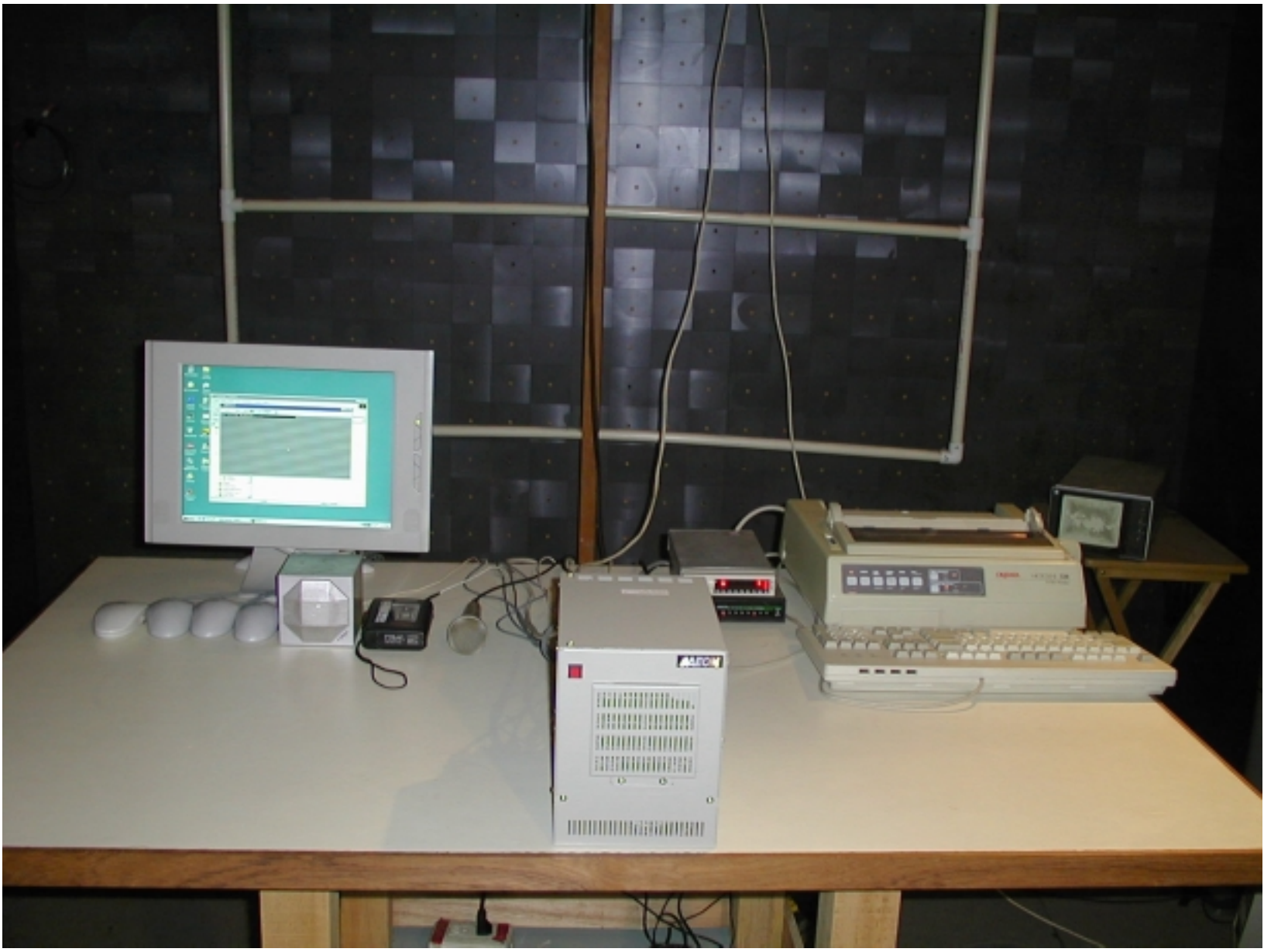
APPENDIX C

SET-UP PHOTOGRAPHS

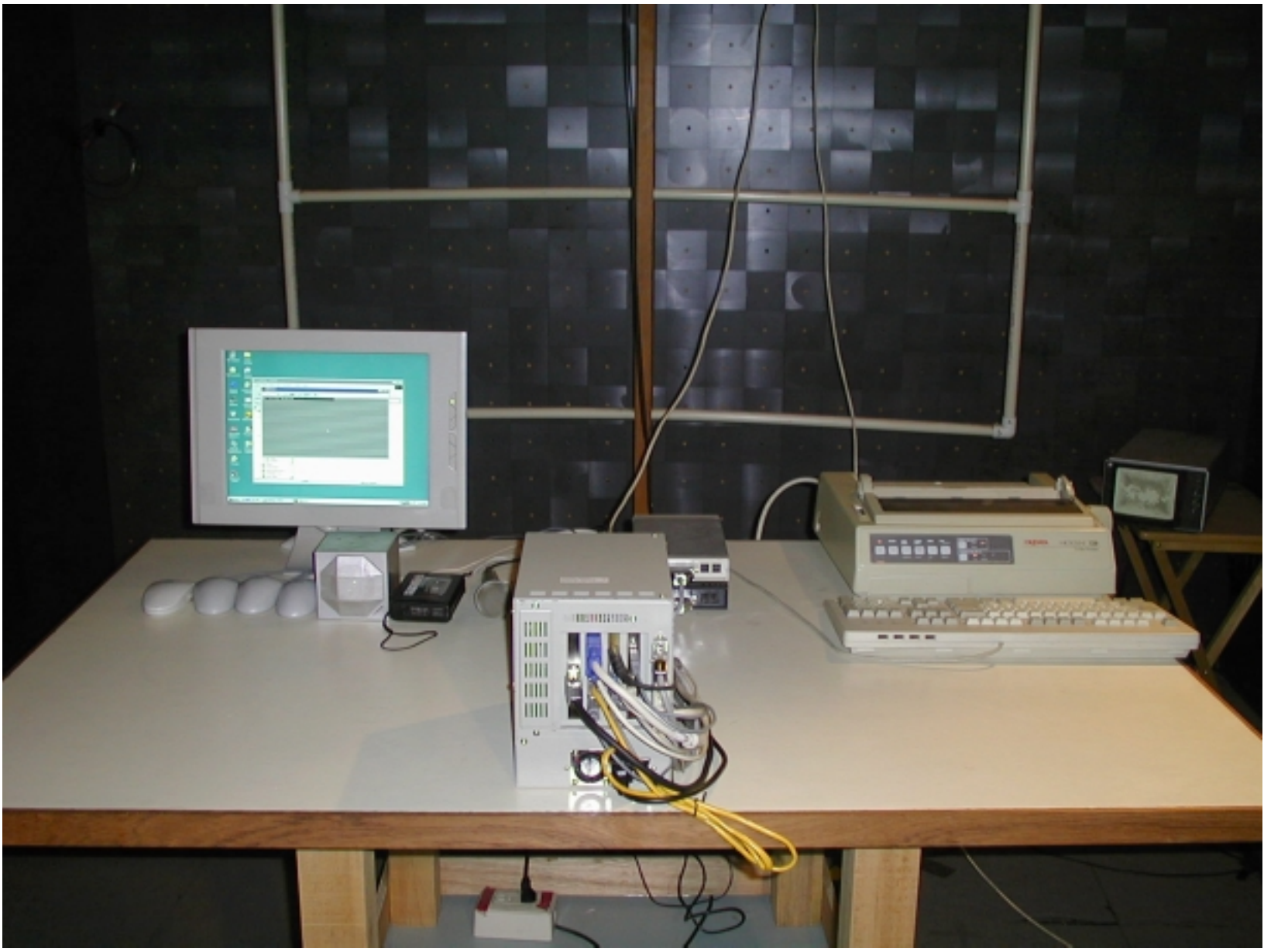
01I9420 (IEC 61000-4-2)



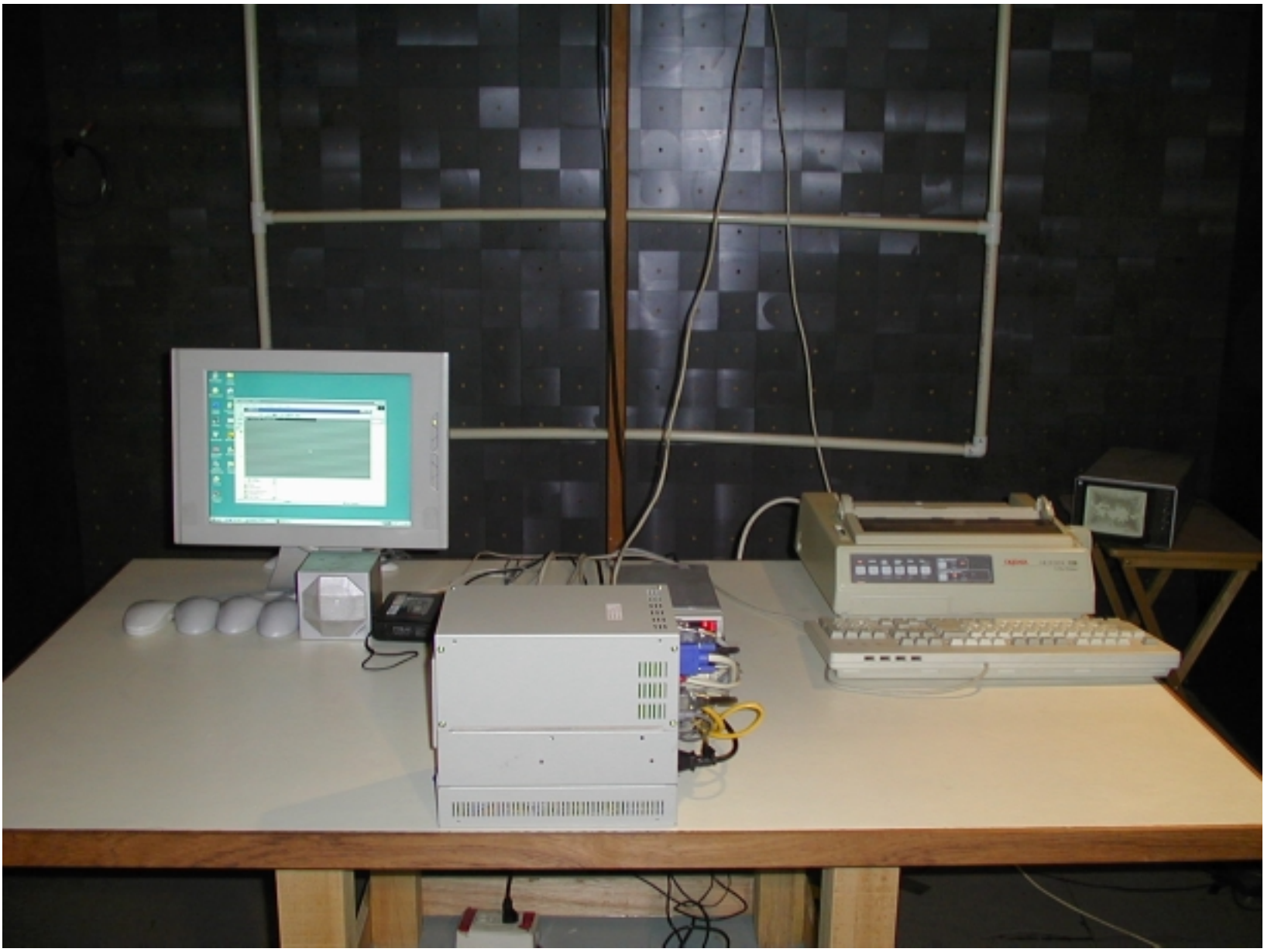
01I9420 (IEC 61000-4-3 Front)



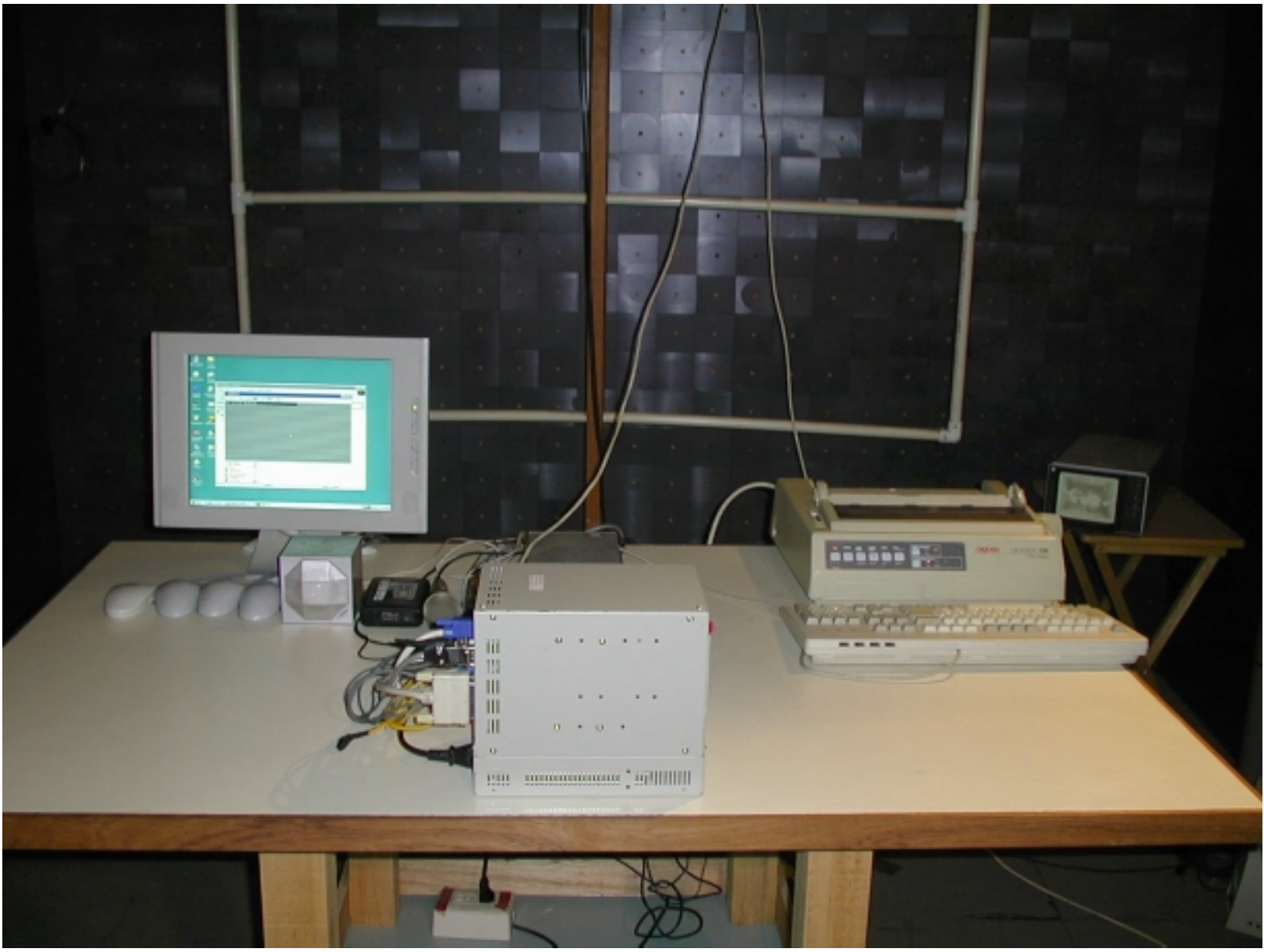
01I9420 (IEC 61000-4-3 Back)



01I9420 (IEC 61000-4-3 Left)

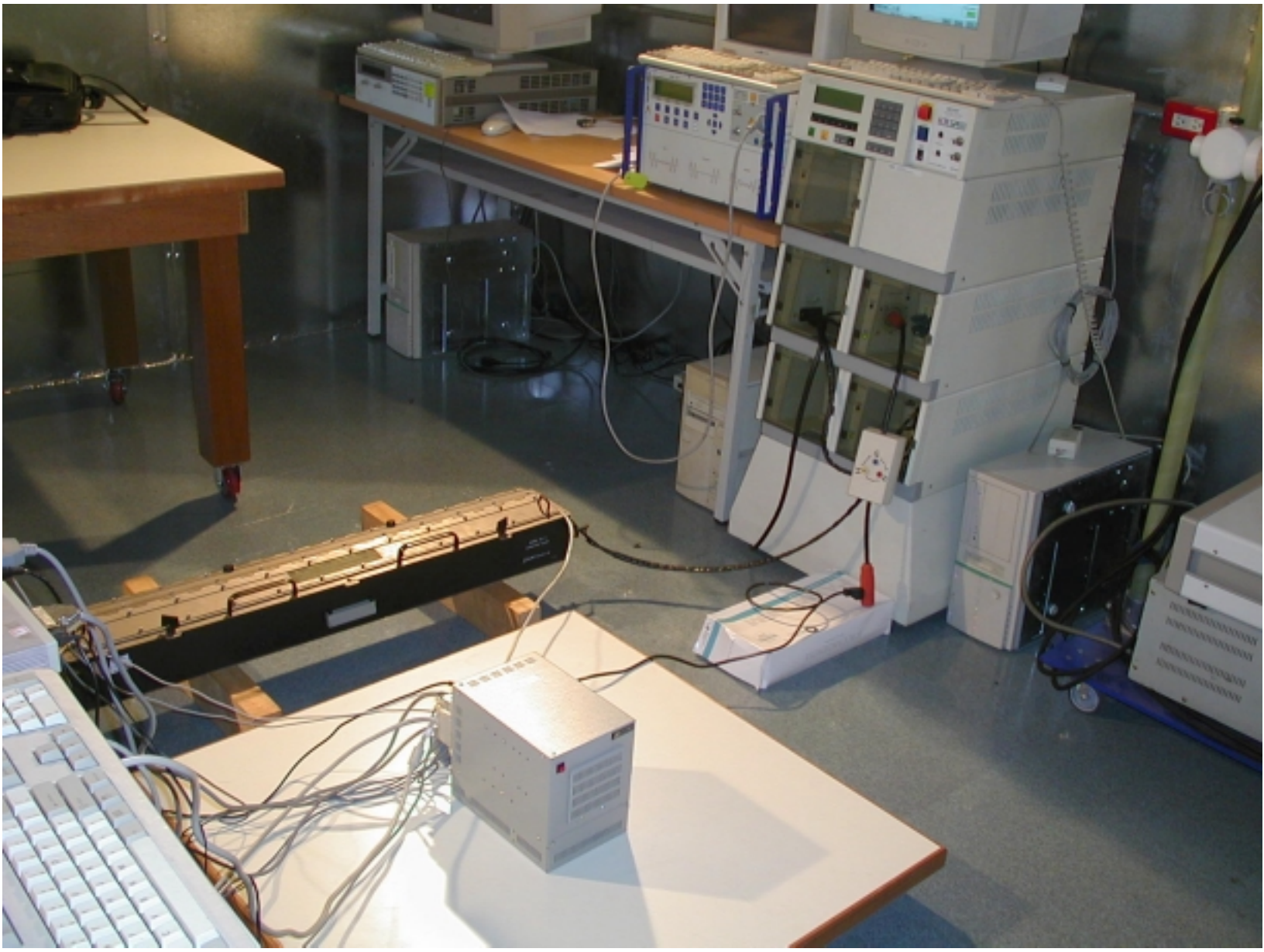


01I9420 (IEC 61000-4-3 Right)

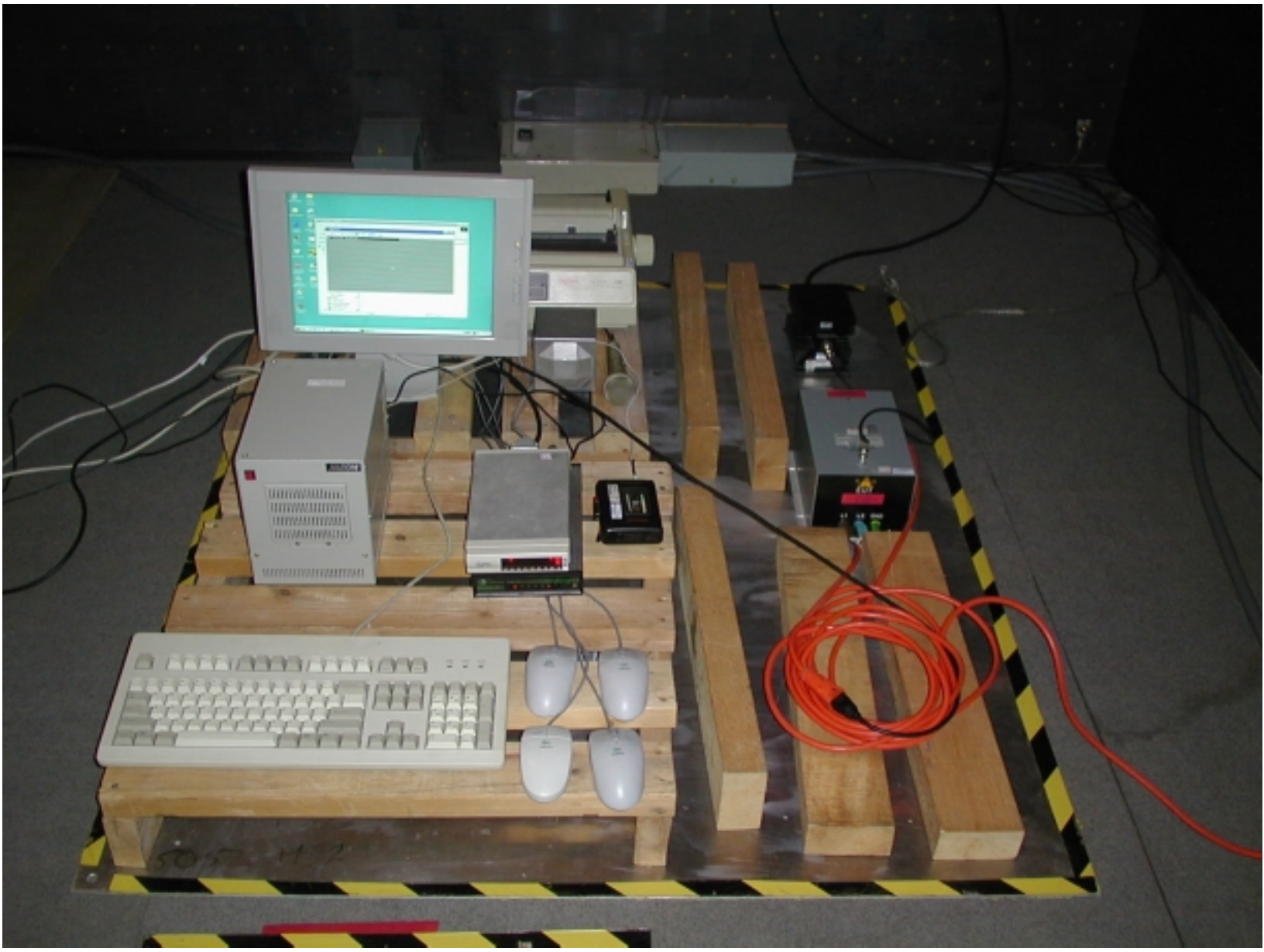


01I9420 (IEC 61000-4-4/5 Power)

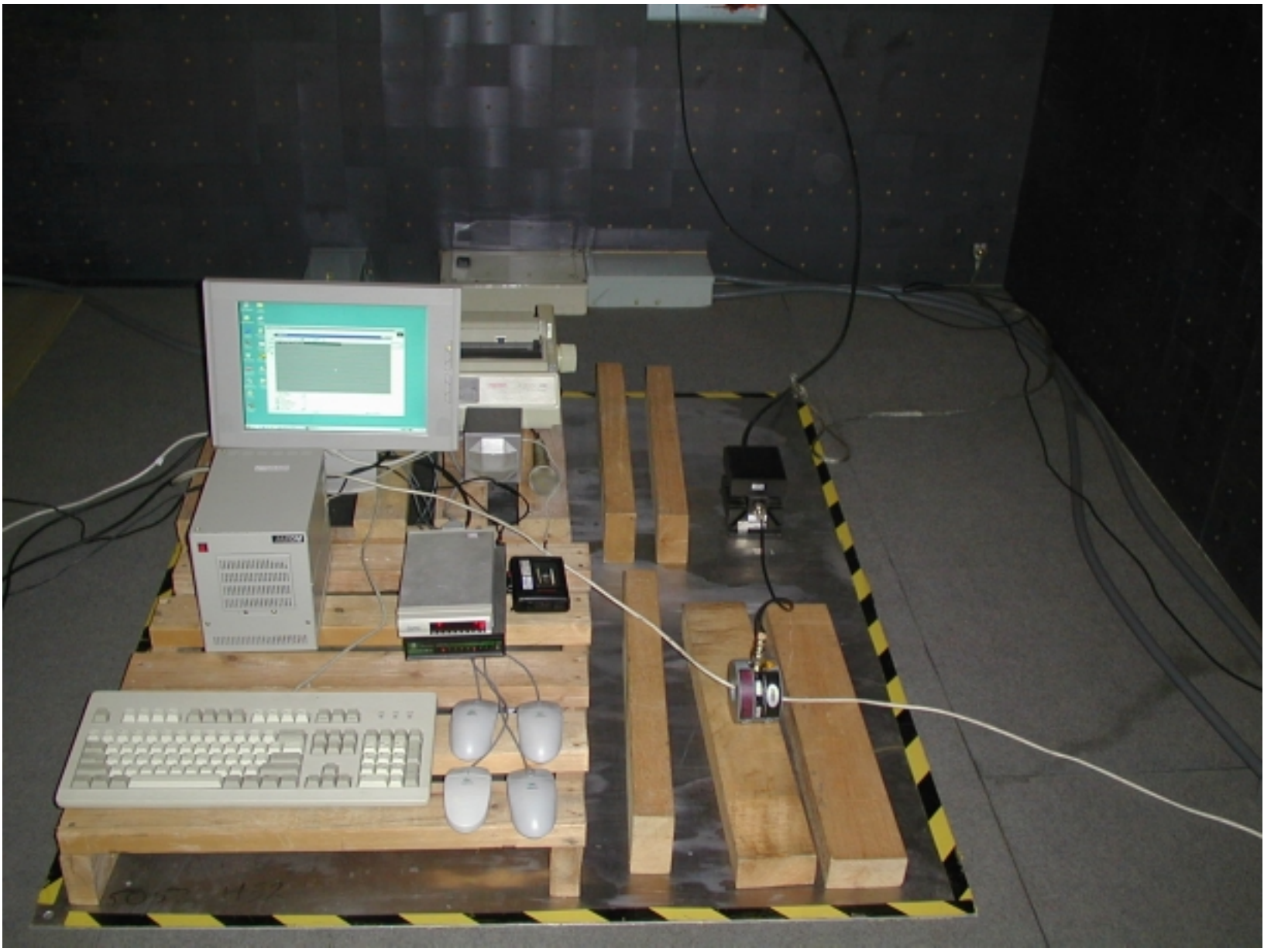
01I9420 (IEC 61000-4-4/5 I/O)



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)