



EMC

TEST REPORT

REPORT NO. : CE89041012

MODEL NO. : AWS-8120TX-XX

DATE OF TEST : Apr. 21 ~ May 4, 2000

PREPARED FOR : ADVANTECH CO., LTD.

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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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1.

CERTIFICATION

Issue date: May 6, 2000

Product	:	INDUSTRIAL WORKSTATION	
Trade Name	:	ADVANTECH	
Model No.	:	AWS-8120TX-XX	
Applicant	:	ADVANTECH CO., LTD.	
Standard	:	EN 55022:1994+A1: 1995+A2: 1997, Class A	EN 50082-2:1995
		EN 61000-3-2: 1995, Class A	EN 61000-4-2: 1995
		EN 61000-3-3: 1995	EN 61000-4-3: 1996
			EN 61000-4-4: 1995
			EN 61000-4-6: 1996
			EN 61000-4-8: 1993
			ENV 50204: 1995

We hereby certify that one sample of the designation has been tested in our facility from Apr. 21 to May 4, 2000. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

TESTED BY: _____ , DATE: _____
(Emission) (Michael Wang)

TESTED BY: _____ , DATE: _____
(Immunity) (S. S. Wang)

CHECKED BY: _____ , DATE: _____
(Sharon Hsiung)

APPROVED BY: _____ , DATE: _____
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION



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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product : INDUSTRIAL PANEL WORKSTATION
Model No. : AWS-8120TX-XX
Power Supply Type : Switching
Power Cord : Nonshielded (1.8m)

Note: The EUT is a brand new compact workstation, incorporated with a NLX bus backplane, this system provides both ISA and PCI slots for various riser card options. The NLX structure is supported by a broad alliance, including most PC system companies. With the NLX workstation, it preserves your current ISA investment, but still allows upward growth for PCI cards.

The model: AWS-8120TX-XX can be defined as following:

AWS-8120TX-XX

Backplane:

Null: PCA-6104 (ISA Bus)
N: PCA-6105NP2 (NLX Bus)
P: AWS8100TP Backplane (PCI Bus)

Power supply Type:

Null: AC 100~230/60 Hz Input
1. DC 24V Input
2: DC 48 V Input

Touchscreen Function:

Null: Without Touchscreen
T: With resistive Touchscreen
N: With NFI Touchscreen



The EUT was pre-tested with the following configurations:

MODE	1	2
EUT MODEL NO.	AWS-8120TN-T	AWS-8120TP-4
CPU	INTEL PENTIUM 233 MMX	INTEL CELERON 500
CPU BOARD	ADVANTECH model: PCN-6351	ADVANTECH Model: PCI-6771
BACK PLANE	ADVANTECH model: PCA-6105NP2	ADVANTECH Model: AWS-8100TP
LCD DISPLAY	TOSHIBA, 12" TFT model: LTM12C275C	
CHASSIS	ADVANTECH, model: AWS-8120TN	
HDD	QUANTUM, model: LA08A011, 8.4 g	
FDD	YE-DATA, model: YD-702J-6037J	
CD-ROM	TOSHIBA, model: XM-1702B, 24X	
POWER SUPPLY	SNP-8086 (80W) (AC 100~230V/60 Hz Input)	SNP-4081 (80W) DC 48V INPUT
TOUCH SCREEN SENSOR & CONTROL BOARD	Dynapro 95641 12.1" sensor & PenMount 9516 control board	NA

MODE	3	4
EUT MODEL NO.	AWS-8120T-T4	AWS-8120TP-2
CPU	INTEL PENTIUM 266 MMX	INTEL CELERON 466
CPU BOARD	ADVANTECH model: PCA-6751	ADVANTECH model: PCI-6771
BACK PLANE	ADVANTECH model: PCA-6104	ADVANTECH model: AWS-8100TP
LCD DISPLAY	TOSHIBA, 12" TFT model: LTM12C275C	
CHASSIS	ADVANTECH, model: AWS-8120TN	
HDD	QUANTUM, model: LA08A011, 8.4 g	
FDD	YE-DATA, model: YD-702J-6037J	
CD-ROM	TOSHIBA, model: XM-1702B, 24X	
POWER SUPPLY	SNP-4081 (80W) DC 48V INPUT	SNP-4081 (80W) DC 24V INPUT
TOUCH SCREEN FOUNCTION	NA	NA

During the pre-test, the worst emission level was found in MODE 1 & 2, and therefore only their data are recorded in this report.
For more detailed features description, please refer to manufacturer's specification or User's Manual.



2.2 GENERAL DESCRIPTION OF APPLIED STANDARD

The EUT is an office equipment and is classified as a light industry equipment. According to the manufacturer's request, the EUT was tested with the requirements of the following standards:

EN 55022: 1994+A1: 1995+A2: 1997, Class A
EN 61000-3-2:1995, Class A
EN 61000-3-3: 1995

EN 50082-2:1995
EN 61000-4-2:1995
EN 61000-4-3:1996
EN 61000-4-4:1995
EN 61000-4-6:1996
EN 61000-4-8:1993
ENV 50204:1995

All tests are performed and recorded as per above standards.

2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

FOR EMISSION TEST

No	Product	Brand	Model No.	Serial No.	I/O Cable
1.	COLOR MONITOR	HP	D2846	980020540	Shielded Signal (1.8m) Nonshielded Power (1.8m)
2.	KEYBOARD	FORWARD	FDA-104GA	FDKB8110116	Shielded Signal (1.4m)
3.	KEYBOARD	HP	C3758A	C3758-60223	Shielded Signal (1.4m)
4.	MOUSE (for mode 1 only)	DEXIN	A2R800A	80110027	Shielded Signal (1.5m)
5.	MOUSE	LOGITECH	M-S43	LZE000703160	Shielded Signal (2.0m)
6.	PRINTER	HP	2225C+	3123S97230	Shielded Signal (2.2m) Nonshielded Power (1.9m)
7.	MODEM	ACEEX	1414	980020540	Shielded Signal (1.2m) Nonshielded Power (1.9m)
8.	DC POWER SUPPLY (for mode 2 only)	GW	NA	9081906	Nonshielded Power (1.8m)
9.	PERSONAL COMPUTER	IBM	2156-D1N	BNA349G	Nonshielded Power (1.8m)
10.	COLOR MONITOR	ADI	PD-959	730020U00100373	Shielded Signal (1.8m) Nonshielded Power (1.8m)
11.	KEYBOARD	BTC	5139	853300106	Shielded Signal (1.4m)
12.	MOUSE	DEXIN	A2P800A	80102118	Shielded Signal (1.5m)
13.	LAN CARD	INTEL	GD82559	009027A598FB	NA

Note: Support units 1-8 were set up as the SERVER PC system and communicated with support units 9-13 which acted as WORKSTATION and partners of communication system via a STP cable (10m).

**FOR IMMUNITY TEST (MODE 1)**

No	Product	Brand	Model No.	Serial No.	I/O Cable
1.	COLOR MONITOR	ACER	7234e	9174302003	Shielded Signal (1.8m) Nonshielded Power (1.8m)
2.	KEYBOARD	FORWARD	FDA-104GA	FDKB8110028	Shielded Signal (1.4m)
3.	KEYBOARD	HP	C3758A	C3758-60223	Shielded Signal (1.4m)
4.	MOUSE	LOGITECH	M-S43	LZE93501869	Shielded Signal (1.5m)
5.	PRINTER	HP	C2145A	SG59N16035	Shielded Signal (2.2m) Nonshielded Power (1.9m)
6.	MODEM	GVC	F-1128V1R6	96-191-113004	Shielded Signal (1.2m) Nonshielded Power (1.9m)
7.	NOTEBOOK COMPUTER	USI	UNI-812	97207-0112-029850E	Nonshielded Power (1.8m)
8.	LAN CARD	3COM	3CCFE575BT	6NV1F89B7A	NA

Note: Support units 1-6 were set up as the SERVER PC system and communicated with support units 7-8 which acted as WORKSTATION and partners of communication system via a STP cable (10m).

FOR IMMUNITY TEST (MODE 2)

No	Product	Brand	Model No.	Serial No.	I/O Cable
9.	COLOR MONITOR	ACER	7234e	9174302003	Shielded Signal (1.8m) Nonshielded Power (1.8m)
10.	KEYBOARD	HP	C3758A	C3758-60223	Shielded Signal (1.4m)
11.	KEYBOARD	HP	C3757A	C3757-60223	Shielded Signal (1.4m)
12.	MOUSE	LOGITECH	M-S43	LZE93501869	Shielded Signal (1.5m)
13.	MOUSE	DEXIN	A2R800A	80110026	Shielded Signal (1.5m)
14.	PRINTER	HP	C2145A	SG59N16035	Shielded Signal (2.2m) Nonshielded Power (1.9m)
15.	MODEM	GVC	F-1128V1R6	96-191-113004	Shielded Signal (1.2m) Nonshielded Power (1.9m)
16.	DC POWER SUPPLY	GW	NA	9081906	Nonshielded Power (1.8m)
17.	NOTEBOOK COMPUTER	USI	UNI-812	97207-0112-029850E	Nonshielded Power (1.8m)
18.	LAN CARD	3COM	3CCFE575BT	6NV1F89B7A	NA

Note: Support units 9-16 were set up as the SERVER PC system and communicated with support units 17-18 which acted as WORKSTATION and partners of communication system via a STP cable (10m).



2.4 TEST SETUP

Please refer to the photos of test configuration in Item 6.



3. TEST INSTRUMENTS

3.1 TEST INSTRUMENTS (EMISSION)

CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESH3	893495/006	July 7, 2000
ROHDE & SCHWARZ Spectrum Monitor	EZM	893787/013	July 8, 2000
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	892107/003	July 13, 2000
EMCO L.I.S.N.	3825/2	9504-2359	July 13, 2000
Shielded Room	Site 3	ADT-C03	NA

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8594E	3520A01861	Feb. 10, 2001
HP Preamplifier	8447D	2944A08118	June 20, 2000
HP Preamplifier	8347A	3307A01088	Aug. 30, 2000
HP Preamplifier	8449B	3008A01201	Dec. 14, 2000
ROHDE & SCHWARZ TEST RECEIVER	ESVS 10	840241/010	Sept. 9, 2000
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2000
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Aug. 30, 2000
CHASE BILOG Antenna	CBL6111A	1079	July 17, 2000
EMCO Double Ridged Guide Antenna	3115	9312-4192	March 29, 2001
CHANCE Turn Table	U200	9701	NA
CHANCE Tower	AT-100	CM-A003	NA
Open Field Test Site	Site 3	ADT-R03	July 16, 2000

Note: 1. The measurement uncertainty is less than +/- 3.0dB, which is calculated as per NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

CURRENT HARMONICS, VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

Description & Manufacturer	Model no.	Serial No.	Calibrated Until
KeyTek, Power Arb Waveform Generator	EP72HF	9508346	Mar. 29, 2001
KIKUSUI AC SWITCHING POWER SUPPLY	PCR 4000L	9508355	Mar. 29, 2001

Note: The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.



3.2 TEST INSTRUMENTS (IMMUNITY)

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
KeyTek, ESD Test System	2000	9105240/41	Aug. 10, 2000
KeyTek, ESD Simulator	MZ-15/EC	9902287	Feb. 28, 2001
KeyTek, EFT Generator	CE-40	9508257	Sept. 5, 2000
KeyTek, Capacitive Clamp	CE-40-CCL	9508259	Sept. 5, 2000
KeyTek, Control Center	E103	9508347	NA
KeyTek, Surge Combination Wave	E501A	9508349	Aug. 30, 2000
KeyTek, Surge Coupler/Decoupler	E551	9508350	Aug. 30, 2000
External Coupler /Decoupler	CM-TELCD	9926194	NA
I/O Signal Line Coupler/Decoupler	CM-110CD	9907177	NA
ROHDE & SCHWARZ Signal Generator	SMY01	840490/009	Aug. 19, 2000
KALMUS Power Amplifier	LA1000V	091995-1	NA
KALMUS Power Amplifier	757LC	091995-2	NA
HOLADAY Field Probe	HI-4422	89915	Aug. 12, 2000
EMCO BiconiLog Antenna	3141	1001	NA
FCC Coupling Decoupling Network	FCC-801-M3-25	48	NA
FCC Coupling Decoupling Network	FCC-801-M2-25	20	NA
FISCHER CUSTOM COMMUNICATIONS EM Injection Clamp	FCC-203I	50	NA
FCC Coupling Decoupling Network	FCC-801-M1-25	17	NA
BOONTON RF Voltage Meter	9200B	331801AE	Aug. 19, 2000
COMTEST Compact Full Anechoic Chamber (7x3x3 m)	CFAC	ADT-S01	Aug. 24, 2000
HAEFELY Magnetic Field Tester	MAG 100.1	083794-06	NA
COMBINOVA Magnetic Field Meter	MFM10	224	Oct. 29, 2000
KEYTEK Mains Interference Simulator	EMC Pro	9902207	Feb. 16, 2001
HAEFELY Mains Interference Simulator	PLINE 1610	083690-17	March 01, 2001

Note: The calibration interval of the above test instruments is 12 months.
And the calibrations are traceable to NML/ROC and NIST/USA.

3.3 LIMITS OF CONDUCTED AND RADIATED EMISSION

LIMIT OF RADIATED EMISSION OF EN 55022

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

- Note: (1) The lower limit shall apply at the transition frequencies.
 (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
 (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

LIMIT OF CONDUCTED EMISSION OF EN 55022

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	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 to 0.50 MHz
 (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



4. TEST RESULTS (EMISSION)

4.1 RADIO DISTURBANCE

Product Family Standard : EN 55022:1994+A1: 1995+A2: 1997, Class A
Frequency Range : 0.15 - 30 MHz (Conducted Emission)
30 - 1000 MHz (Radiated Emission)
Input Voltage : 230 Vac, 50 Hz
Temperature : 24
Humidity : 80 %
Atmospheric Pressure : 1005 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -14.3 dB at 0.516 MHz Minimum passing margin of radiated emission: -2.3 dB at 280.22 MHz

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. EUT runs a test program to enable all functions.
3. EUT reads and writes messages from FDD and HDD.
4. EUT sends/ receives messages to/ from WORKSTATION via a STP cable.
5. EUT sends "H" messages to monitor and monitor displays "H" patterns on screen.
6. EUT sends "H" messages to modem.
7. EUT sends "H" messages to printer, and the printer prints them on paper.
8. Repeat steps 3-8.



4.1.2 TEST DATA OF CONDUCTED EMISSION (A)

EUT: **INDUSTRIAL PANEL WORKSTATION**

MODE: **1**

MODEL: **AWS-8120TN-T**

6 dB Bandwidth: **10 kHz**

PHASE: **LINE (L)**

Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.189	0.2	49.2	-	49.4	-	79.0	66.0	-29.6	-
0.253	0.2	35.7	-	35.9	-	79.0	66.0	-43.1	-
0.958	0.2	33.2	-	33.4	-	73.0	60.0	-39.6	-
4.006	0.5	30.5	-	31.0	-	73.0	60.0	-42.0	-
11.974	0.9	45.3	-	46.2	-	73.0	60.0	-26.8	-
27.953	1.5	32.7	-	34.2	-	73.0	60.0	-38.8	-

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



TEST DATA OF CONDUCTED EMISSION (A)

EUT: **INDUSTRIAL PANEL WORKSTATION**

MODE: **1**

MODEL: **AWS-8120TN-T**

6 dB Bandwidth: **10 kHz**

PHASE: **NEUTRAL (N)**

Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.189	0.2	47.1	-	47.3	-	79.0	66.0	-31.7	-
0.253	0.2	36.0	-	36.2	-	79.0	66.0	-42.8	-
0.958	0.2	34.1	-	34.3	-	73.0	60.0	-38.7	-
4.006	0.4	30.2	-	30.6	-	73.0	60.0	-42.4	-
11.974	0.6	45.1	-	45.7	-	73.0	60.0	-27.3	-
27.953	1.2	35.7	-	36.9	-	73.0	60.0	-36.1	-

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



4.1.3 TEST DATA OF CONDUCTED EMISSION (B)

EUT: **INDUSTRIAL PANEL WORKSTATION**

MODE: **2**

MODEL: **AWS-8120TP-4**

6 dB Bandwidth: **10 kHz**

PHASE: **LINE (L)**

Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.187	0.2	58.1	-	58.3	-	79.0	66.0	-20.7	-
0.377	0.2	62.9	-	63.1	-	79.0	66.0	-15.9	-
0.516	0.2	58.0	-	58.2	-	73.0	60.0	-14.8	-
1.885	0.3	32.1	-	32.4	-	73.0	60.0	-40.6	-
5.603	0.5	30.1	-	30.6	-	73.0	60.0	-42.4	-
9.188	0.9	35.2	-	36.1	-	73.0	60.0	-36.9	-

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



TEST DATA OF CONDUCTED EMISSION (B)

EUT: **INDUSTRIAL PANEL WORKSTATION**

MODE: **2**

MODEL: **AWS-8120TP-4**

6 dB Bandwidth: **10 kHz**

PHASE: **NEUTRAL (N)**

Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.187	0.2	58.2	-	58.4	-	79.0	66.0	-20.6	-
0.377	0.2	63.7	-	63.9	-	79.0	66.0	-15.1	-
0.516	0.2	58.5	-	58.7	-	73.0	60.0	-14.3	-
1.885	0.3	47.0	-	47.3	-	73.0	60.0	-25.7	-
5.603	0.4	37.6	-	38.0	-	73.0	60.0	-35.0	-
9.188	0.6	40.0	-	40.6	-	73.0	60.0	-32.4	-

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



4.2 TEST DATA OF RADIATED EMISSION (A)

EUT: INDUSTRIAL PANEL WORKSTATION MODEL: AWS-8120TN-T

MODE: 1

ANT. POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
46.71	9.7	27.5	37.2	40.0	-2.8	376	0
70.03	6.4	19.0	25.4	40.0	-14.6	360	0
110.06	12.1	23.9	36.0	40.0	-4.0	400	298
113.42	12.2	22.7	34.9	40.0	-5.1	400	304
133.34	13.2	15.4	28.6	40.0	-11.4	400	224
167.18	11.7	17.9	29.6	40.0	-10.4	400	179
200.16	11.7	25.2	36.9	40.0	-3.1	400	91
210.16	12.2	20.4	32.6	40.0	-7.4	400	240
216.83	12.5	21.0	33.5	40.0	-6.5	400	151
223.51	12.9	20.0	32.9	40.0	-7.1	400	164
233.47	13.4	23.7	37.1	47.0	-9.9	359	181
280.22	15.0	29.7	44.7	47.0	-2.3	379	317
286.91	15.1	28.9	44.0	47.0	-3.0	396	295
322.17	16.1	20.0	36.1	47.0	-10.9	322	252

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB)
+ Reading value (dBuV).
 2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



TEST DATA OF RADIATED EMISSION (A)

EUT: INDUSTRIAL PANEL WORKSTATION MODEL: AWS-8120TN-T

MODE: 1

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
44.01	10.9	15.0	25.9	40.0	-14.1	100	62
76.06	7.7	17.5	25.2	40.0	-14.8	100	282
80.05	8.6	28.0	36.6	40.0	-3.4	100	221
180.21	11.1	25.6	36.7	40.0	-3.3	100	268
184.14	11.2	22.3	33.5	40.0	-6.5	100	261
201.04	11.7	19.9	31.6	40.0	-8.4	100	262
208.17	12.1	18.5	30.6	40.0	-9.4	100	250
220.15	12.7	23.7	36.4	40.0	-3.6	100	180
234.14	13.4	16.9	30.3	47.0	-16.7	100	7
252.15	14.2	18.5	32.7	47.0	-14.3	100	346
264.19	14.4	18.7	33.1	47.0	-13.9	100	301
272.19	14.8	21.5	36.3	47.0	-10.7	100	322
288.20	15.1	22.3	37.4	47.0	-9.6	100	286
292.20	15.2	24.8	40.0	47.0	-7.0	100	320
300.22	15.3	18.4	33.7	47.0	-13.3	100	198
308.23	15.6	21.8	37.4	47.0	-9.6	100	234
312.22	15.7	19.8	35.5	47.0	-11.5	100	215
488.33	20.7	16.8	37.5	47.0	-9.5	252	302

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB)
+ Reading value (dBuV).
 2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



4.3 TEST DATA OF RADIATED EMISSION (B)

EUT: INDUSTRIAL PANEL WORKSTATION MODEL: AWS-8120TP-4

MODE: 2

ANT. POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
48.15	9.3	11.9	21.2	40.0	-18.8	400	0
64.18	6.7	14.1	20.8	40.0	-19.2	400	328
72.16	6.9	20.1	27.0	40.0	-13.0	400	265
112.28	12.2	15.3	27.5	40.0	-12.5	400	153
152.34	12.6	10.9	23.5	40.0	-16.5	400	7
172.40	11.4	11.2	22.6	40.0	-17.4	400	169
188.43	11.3	14.6	25.9	40.0	-14.1	400	162
192.45	11.4	12.8	24.2	40.0	-15.8	400	158
208.48	12.1	12.2	24.3	40.0	-15.7	400	91
228.51	13.1	11.3	24.4	40.0	-15.6	400	169
268.61	14.7	18.2	32.9	47.0	-14.1	304	184
272.61	14.8	14.4	29.2	47.0	-17.8	304	267
406.80	18.9	13.2	32.1	47.0	-14.9	204	328

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB)
+ Reading value (dBuV).
 2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



TEST DATA OF RADIATED EMISSION (B)

EUT: INDUSTRIAL PANEL WORKSTATION MODEL: AWS-8120TP-4

MODE: 2

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
60.15	6.8	29.7	36.5	40.0	-3.5	100	0
68.17	6.5	26.6	33.1	40.0	-6.9	162	343
72.17	6.9	26.3	33.2	40.0	-6.8	145	287
108.26	12.0	23.4	35.4	40.0	-4.6	100	7
112.26	12.2	21.7	33.9	40.0	-6.1	100	3
180.41	11.1	15.0	26.1	40.0	-13.9	100	347
188.41	11.3	16.1	27.4	40.0	-12.6	100	0
192.44	11.4	18.2	29.6	40.0	-10.4	100	1
200.48	11.7	18.7	30.4	40.0	-9.6	100	0
212.49	12.3	17.2	29.5	40.0	-10.5	100	327
220.46	12.7	17.2	29.9	40.0	-10.1	100	0
228.53	13.1	14.5	27.6	40.0	-12.4	100	39
264.65	14.4	12.1	26.5	47.0	-20.5	100	358
272.70	14.8	17.6	32.4	47.0	-14.6	100	7
408.09	18.9	14.8	33.7	47.0	-13.3	123	336

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB)
+ Reading value (dBuV).
 2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level - Limit value



4.4 DISTURBANCE IN SUPPLY SYSTEM

Product Family Standard: EN 61000-3-2, Class A
Input Voltage : 230VAC, 50Hz
Temperature : 24
Humidity : 50 %
Atmospheric Pressure : 993 mbar

TEST RESULT	Remarks
PASS	MODE 1 Meet the requirement of Class A limit.

Note: Class A or Class D is classified by test instruments automatically.

4.4.1 EUT OPERATION CONDITION

Same as 4.1.1.



4.4.2 MEASUREMENT DATA OF HARMONICS TEST

EUT: INDUSTRIAL PANEL WORKSTATION MODEL: AWS-8120TN-T

MODE: 1

Fundamental Voltage : 229.659 Vrms Power Consumption: 56.826 W

Fundamental Amperes : 0.492 Arms

Fundamental Frequency: 50 Hz

Harm. Order	Reading Data (A)	Limit (A)
1	-	-
3	0.23	2.30
5	0.21	1.14
7	0.18	0.77
9	0.15	0.40
11	0.12	0.33
13	0.09	0.21
15	0.06	0.15
17	0.04	0.13
19	0.03	0.12
21	0.02	0.11
23	0.01	0.10
25	0.01	0.09
27	0.00	0.08
29	0.01	0.08
31	0.01	0.07
33	0.01	0.07
35	0.01	0.06
37	0.00	0.06
39	0.00	0.06

Harm. Order	Reading Data (A)	Limit (A)
2	0.00	1.08
4	0.00	0.43
6	0.00	0.30
8	0.00	0.23
10	0.00	0.18
12	0.00	0.15
14	0.00	0.13
16	0.00	0.11
18	0.00	0.10
20	0.00	0.09
22	0.00	0.08
24	0.00	0.08
26	0.00	0.07
28	0.00	0.07
30	0.00	0.06
32	0.00	0.06
34	0.00	0.05
36	0.00	0.05
38	0.00	0.05
40	0.00	0.05

Note: Steady state values on AC mains are recorded in the table.



4.5 VOLTAGE FLUCTUATIONS AND FLICKER

Basic Standard : EN 61000-3-3
Input Voltage : 230Vac, 50Hz
Temperature : 24
Humidity : 50 %
Atmospheric Pressure : 1012 mbar

TEST RESULT	Remarks
PASS	MODE 1

4.5.1 EUT OPERATION CONDITION

Same as item 4.1.1.



4.5.2 TEST DATA OF VOLTAGE FLUCTUATIONS AND FLICKER

EUT: INDUSTRIAL PANEL WORKSTATION

MODEL: AWS-8120TN-T

MODE: 1

Input Voltage : 229.659 Vrms

Input Amperes : 0.492 Arms

Power Factor : 0.503

Power Frequency: 50 Hz

Observation period (Tp): 2 hour

Test Parameter	Measurement Value	Limitation	Remark
Pst	0.091	1.0	pass
Plt	0.040	0.65	pass
Tdt (ms)	0	200	pass
dmax (%)	0	4%	pass
dc (%)	0	3%	pass

- Note:
- (1) Plt means long-term flicker indicator
 - (2) Pst means short-term flicker indicator
 - (3) dc means relative steady-state voltage change
 - (4) dmax means maximum relative voltage change
 - (5) Tdt means maximum time that dt exceeds 3 %



5. TEST RESULTS (IMMUNITY)

5.1 GENERAL DESCRIPTION

Generic Standard	: EN 50082-2: 1995
Basic Standard	: EN 61000-4-2 (Electrostatic Discharge, ESD, 8kV air discharge, 4kV Contact discharge, Performance Criterion B)
Specification and Performance Criteria	EN 61000-4-3 (Radio-Frequency Electromagnetic Field Susceptibility Test, RS, 80-1000 MHz, 10V/m, 80% AM (1kHz), Performance Criterion A)
	EN 61000-4-4 (Electrical Fast Transient/Burst, EFT, Power line: 2kV, Signal line: 1kV, Performance Criterion B)
	EN 61000-4-6 (Conducted Radio Frequency Disturbances Test, CS, 0.15-80 MHz, 10V/m, 80% AM, 1kHz, Performance Criterion A)
	EN 61000-4-8 (Power Frequency Magnetic Field Test, 50 Hz, 30A/m, Performance Criterion A)
	ENV 50204 (Radio-Frequency Electromagnetic Field, Pulse modulated, 900+/-5 MHz, 10V/m, 50 % duty cycle, Rep. Frequency 200 Hz, Performance Criterion A)
Input Voltage	: 230 Vac, 50 Hz
Temperature	: 25
Humidity	: 59 %
Atmospheric Pressure	: 1012 mbar



5.2 PERFORMANCE CRITERIA DESCRIPTION

- Criterion 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.
- Criterion 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.
- Criterion C - Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

5.3 EUT OPERATION CONDITION

Same as item **4.1.1**.



5.5 TEST RESULT OF RADIATED ELECTROMAGNETIC FIELDS (RS)

Basic Standard : EN 61000-4-3
Frequency range : 80 MHz - 1000 MHz
Field strength : 10 V/m
Modulation : 1kHz Sine Wave, 80%, AM Modulation
Frequency step : 1 % of fundamental
Polarity of Antenna : Horizontal and Vertical
Test distance : 3 m

Test Result		Remarks
Criterion A	PASS	MODE 1
Criterion A	PASS	MODE 2

Note: Four sides of EUT are verified separately.

Description of test result:

There was no change compared with initial operation during the test.

5.6 TEST RESULT OF ELECTRICAL FAST TRANSIENT (EFT)

Basic Standard	:	EN 61000-4-4
Test Voltage	:	Power Line - 2 kV Signal/Control Line - 1 kV
Polarity	:	Positive/Negative
Impulse Frequency	:	5 kHz
Tr / Tn	:	5/50 ns
Burst Duration	:	15 ms
Burst Period	:	300 ms
Test Duration	:	Not less than 1 min.

Test Result		Remarks
Criterion B	PASS	MODE 1
Criterion B	PASS	MODE 2

OBSERVATION DESCRIPTION (MODE 1)

Test Point	Polarity	Test Level (kV)	Result
L1	+ / -	2	Note 2
L2	+ / -	2	Note 2
GND	+ / -	2	Note 2
Signal/Control Line	+ / -	1	Note 1

OBSERVATION DESCRIPTION (MODE 2)

Test Point	Polarity	Test Level (kV)	Result
L1	+ / -	2	Note 2
L2	+ / -	2	Note 2
Signal/Control Line	+ / -	1	Note 1

Description of test result:

Note 1: There was no change compared with initial operation during the test.

Note 2: The transmission of data was interrupted during the test but self-recoverable after the test.



5.7 TEST RESULT OF CONDUCTED RADIO FREQUENCY

DISTURBANCES (CS)

Basic Standard : EN 61000-4-6
Frequency range : 0.15 MHz - 80 MHz
Field strength : 10 V/m
Modulation : 1kHz Sine Wave, 80%, AM Modulation
Frequency step : 1 % of fundamental
Coupled cable : Power Mains, Unshielded
Coupling device : CDN-M3 (3 wires) for mode 1
CDN-M2 (2 wires) for mode 2
CLAMP for mode 1 & 2

Test Result		Remarks
Criterion A	PASS	MODE 1
Criterion A	PASS	MODE 2

OBSERVATION DESCRIPTION

There was no change compared with initial operation during the test.



5.8 TEST RESULT OF POWER FREQUENCY MAGNETIC FIELD

Basic Standard : EN 61000-4-8
Frequency range : 50Hz
Field strength : 30 A/m
Observation Time : 1 minute
Inductance coil : Rectangular type, 1mx1m

Test Result		Remarks
Criterion A	PASS	MODE 1
Criterion A	PASS	MODE 2

OBSERVATION DESCRIPTION

There was no change compared with initial operation during the test.



5.9 TEST RESULT OF RADIO-FREQUENCY ELECTROMAGNETIC FIELD, PULSE MODULATED

Basic Standard : ENV 50204
Frequency range : 900 +/- 5 MHz
Field strength : 10 V/m
Modulation : 200Hz, Square Wave, 50% Duty Cycle
Dwell Time : 30 second
Polarity of Antenna : Horizontal and Vertical
Test distance : 3 m

Test Result		Remarks
Criterion A	PASS	MODE 1
Criterion A	PASS	MODE 2

Note: Four sides of EUT are verified separately.

OBSERVATION DESCRIPTION

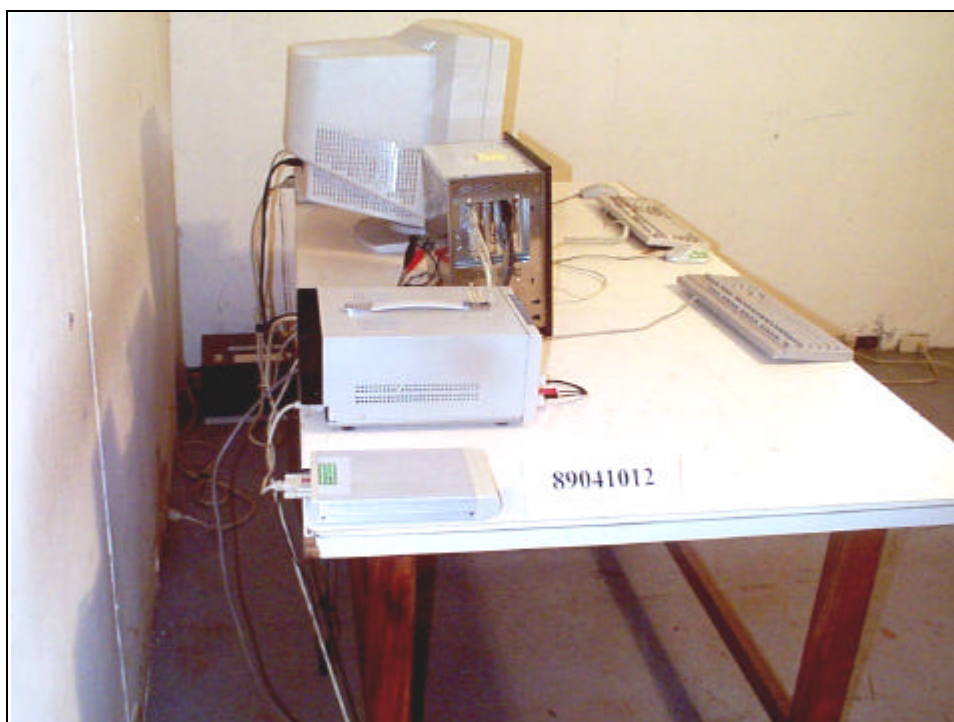
There was no change compared with initial operation during the test.

6. PHOTOGRAPHS OF THE TEST CONFIGURATION

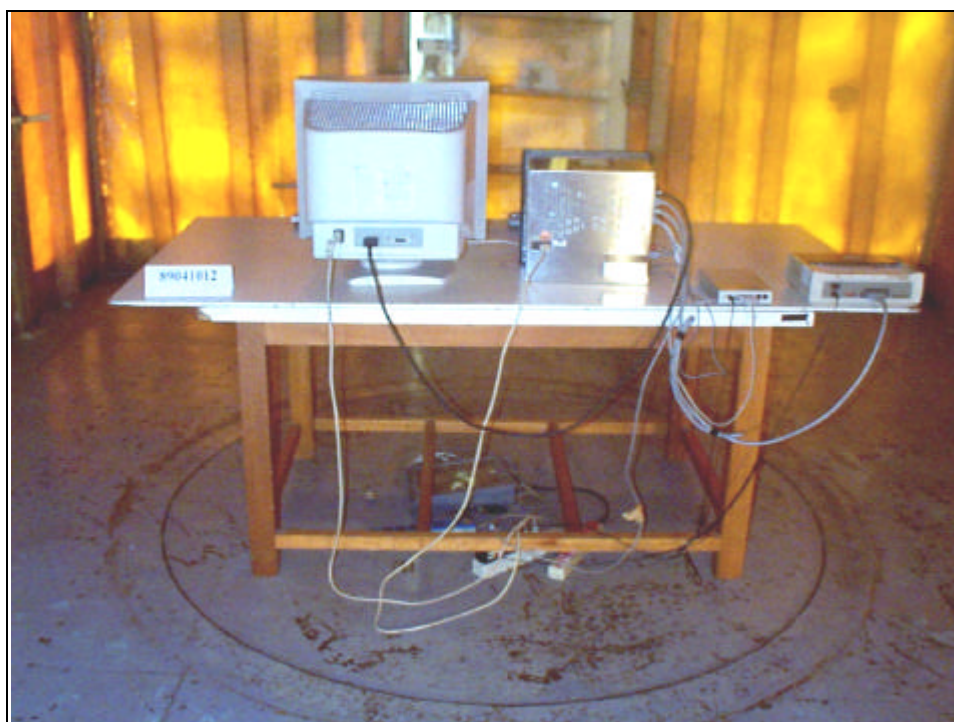
CONDUCTED EMISSION TEST (MODE 1)



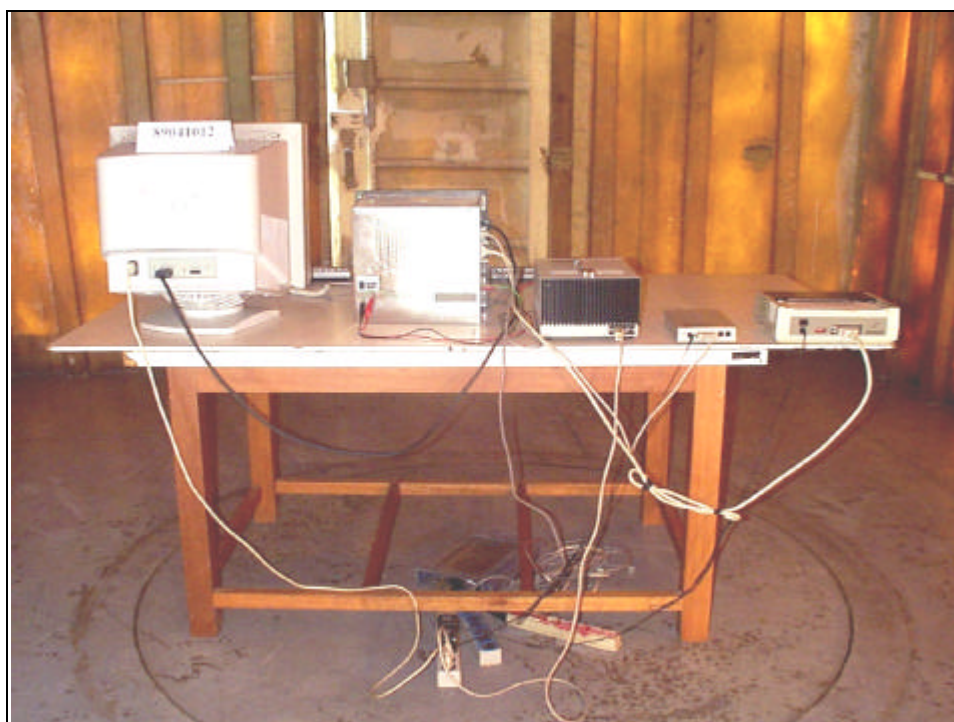
CONDUCTED EMISSION TEST (MODE 2)



RADIATED EMISSION TEST (MODE 1)



RADIATED EMISSION TEST (MODE 2)



HARMONICS EMISSION TEST & VOLTAGE FLUCTUATIONS AND FLICKER TEST (MODE 1)



ESD TEST (MODE 1)



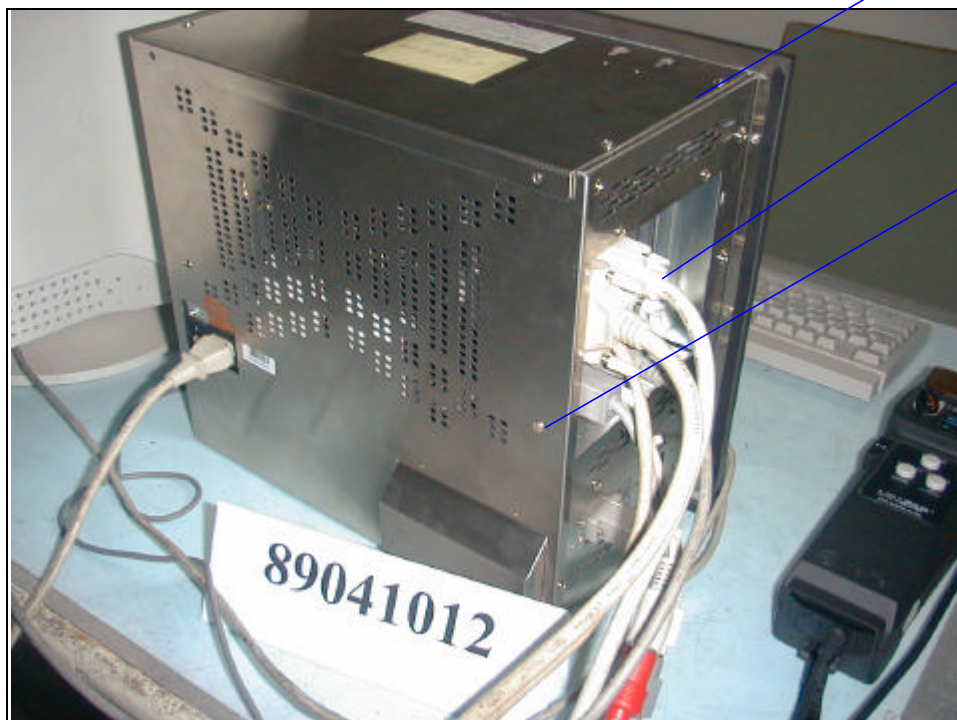
1



2

3

4

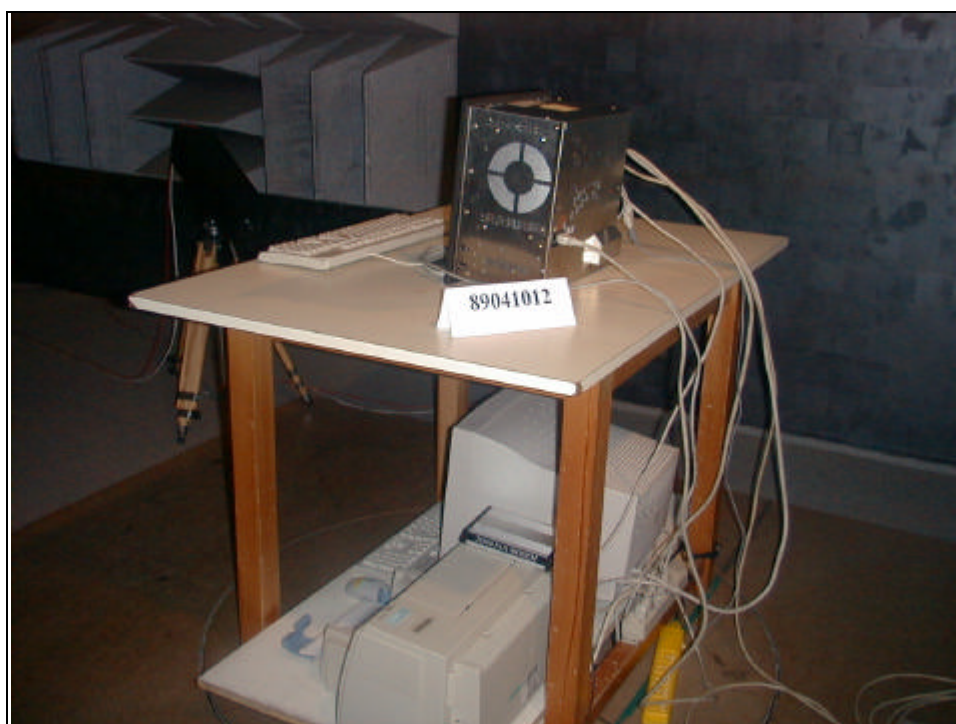


ESD TEST (MODE 2)





RS & PULSE MODULATION TEST (MODE 1)



RS & PULSE MODULATION TEST (MODE 2)



EFT TEST (MODE 1)



EFT TEST (MODE 2)



CONDUCTED SUSCEPTIBILITY TEST (MODE 1)



CONDUCTED SUSCEPTIBILITY CLAMP TEST (MODE 1)



CONDUCTED SUSCEPTIBILITY TEST (MODE 2)



CONDUCTED SUSCEPTIBILITY CLAMP TEST (MODE 2)



MAGNETIC TEST (MODE 1)



MAGNETIC TEST (MODE 2)





7. APPENDIX - INFORMATION OF THE TESTING LABORATORY

Information of the testing laboratory

We, ADT Corp., are founded in 1988, to provide our best service in EMC and Safety consultation. Our laboratory is accredited by the following approval agencies according to ISO/IEC Guide 25 or EN 45001:

- | | |
|---------------|--------------------------------------|
| ● USA | FCC, UL, NVLAP |
| ● Germany | TUV Rheinland
TUV Product Service |
| ● Japan | VCCI |
| ● New Zealand | RFS |
| ● Norway | NEMKO, DNV |
| ● U.K. | INCHCAPE |
| ● R.O.C. | BSMI |

Enclosed please find some certificates of our laboratory obtained from approval agencies. If you have any comments, please feel free to contact us with the following:

Lin Kou EMC Lab.:
Tel: 886-2-26032180
Fax: 886-2-26022943

Hsin Chu EMC Lab:
Tel: 886-35-935343
Fax: 886-35-935342

Lin Kou Safety Lab.:
Tel: 886-2-26093195
Fax: 886-2-26093184

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E-mail: service@mail.adt.com.tw