EMC

TEST REPORT

REPORT NO. : CE89060710A
MODEL NO. : SPC-201-SCA, SPC-201,
IPC-613-SCA, IPC-613
DATE OF TEST : July 19 ~ 31, 2000

PREPARED FOR : ADVANTECH CO., LTD.

ADDRESS : FL. 4, NO. 108-3, MING-CHUAN ROAD,
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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

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1. CERTIFICATION

Issue date: August 7, 2000
Reference Date: 89071711

Product	:	INDUSTRIAL COMPUTER	
Trade Name	:	ADVANTECH	
Model No.	:	SPC-201-SCA, SPC-201, IPC-613-SCA, IPC-613	
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 have been tested in our facility from July 19 to 31, 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) (Jone Lin)

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 COMPUTER
Model No.	:	SPC-201-SCA, SPC-201, IPC-613-SCA, IPC-613
Power Supply Type	:	Switching
Power Cord	:	Nonshielded 3-pin (1.8m)

Note: This report is a supplementary of the original report, CE89060710 issued on June 30, 2000. The main change is addition of second source power supply, EMACS, P2U-6300P.

The EUT has four model names, which are identical to each other in all aspects except for their differences as following:

MODEL NAME	DIFFERENCES
SPC-201-SCA	FULL SYSTEM
SPC-201	W/O BACK PLANE OF HDD FOR HOT-SWAP
IPC-613-SCA	CHASSIS+Switching power supply with backplane of HDD
IPC-613	CHASSIS +Switching power supply

From the above model names, model: SPC-201-SCA was chosen as representative model for the final test and its data is recorded in this report: The EUT was tested under the following test mode and configuration:

COMPONENTS	REMARKS
CPU	Intel Pentium III 550
SERVER BOARD	TYAN Model: S1837L
VGA CARD	GAINWARD Model: V2B-11
SPS	EMACS, Model: P2U-6300P
FDD	TEAC, Model: FD-235HF, 1.44MB
HDD x 4	IBM, Type: Type: DMVS
CD-ROM	TEAC, Model: CD-540E, 40X
LAN CARD	D-LINK Model:DFE-530TX

For more detailed features description, please refer to manufacturer's specification or User's Manual.

2.2 GENERAL DESCRIPTION OF APPLIED STANDARD

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 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

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.

No	Product	Brand	Model No.	Serial No.	I/O Cable
1	MONITOR	HP	D2842A	KR93473118	Nonshielded Power(1.8m) Shielded Signal(2.5m)
2	PRINTER	HP	2225C+	3030S79138	Nonshielded Power(2.0m) Shielded Signal(1.2m)
3	MODEM	ACEEX	1414	980020504	Nonshielded Power(2.0m) Shielded Signal(1.2m)
4	MODEM	ACEEX	1414	980020502	Nonshielded Power(1.0m) Shielded Signal(1.2m)
5	KEYBOARD	FORWARD	FDA-104GA	FDKB8110129	Shielded Signal(1.4m)
6	USB KEYBOARD	SILICON GRAPHICS	SK-2502U	M990207273	Shielded Signal(2.5m)
7	MOUSE	LOGITECH	M-S43	LZE000703160	Shielded Signal(1.4m)
8	USB MOUSE	LOGITECH	M-BB48	LZE93051071	Shielded Signal(1.8m)
9	EARPHONE	KOKA	ST-8	H201032	Nonshielded Signal(2.5m)
10	EARPHONE	GAMMA	LH115	H201015	Nonshielded Signal (3.0m)
11	WALKMAN	AIWA	HS-PS140	C101019	Nonshielded Signal(1.5m)
12	MICROPHONE	CAROL	MUD-329	M501018	Nonshielded Signal(3.0m)
13	PERSONAL COMPUTER	HP	D5220B	SG74604095	Nonshielded Power(3.0m)
14	MONITOR	HP	D2846A	JP90512129	Shielded Signal(2.5m)
15	KEYBOARD	FORWARD	FDA-104GA	FDKB8110116	Shielded Signal(1.4m)
16	MOUSE	LOGITECH	M-S43	LZE00703078	Shielded Signal(1.8m)
17	HUB	3COM	HUB TP 800	7YNR011412	Nonshielded Signal (10m)
18	LAN CARD	INTEL	GD82559	009027A59648	NA

Note: The EUT acted as SERVER PC and communicated with support units 13- 18 which acted as WORKSTATION and partners of communication system via a STP cable (10m).

FOR IMMUNITY TEST

No	Product	Brand	Model No.	Serial No.	I/O Cable
1.	COLOR MONITOR	HITACHI	CM814U	G8K001804	Shielded Signal (1.5m) Nonshielded Power (1.8m)
2.	PRINTER	HP	C2145A	SG59N16035	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3.	MODEM X 2	GVC	F-1128V1R6	96-191-113003 96-191-113004	Shielded Signal (1.25m) Nonshielded Power (1.5m)
4.	KEYBOARD	HP	C3758A	C3758-60223	Shielded Signal (1.8m)
5.	USB KEYBOARD	SGI	6511-BN	99P43810A104K23 022S00000	Shielded Signal (2.7m)
6.	MOUSE	LOGITECH	M-S43	LZE93501869	Shielded Signal (1.8m)
7.	USB MOUSE	LOGITECH	M-BB48	NA	Shielded Signal (1.8m)
8.	EARPHONE	HP	LT-100	H201022	Shielded Signal (2.9m)
9.	MICROPHONE	L	UDM-535	M501005	Shielded Signal (1.6m)
10.	CASSETTE PLAYER	PANASONIC	RQ-L309GT	C101012	Shielded Signal (2.0m)
11.	SPEAKER	J-S	J-009	NA	Shielded Signal (1.1m)
12.	NOTEBOOK PC	USI	UNI-812	97207-0112-029850	Nonshielded Power (1.8m)
13.	LAN CARD	3COM	3CCFE575BT	6NV1F89B7A	NA
14.	HUB	BUFFALO	LSW10/100-8H	NA	Nonshielded Power (1.8m)

Note: 1. The EUT acted as SERVER PC and communicated with support units 12-14 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	ESCS30	834115/016	Feb. 22, 2001
ROHDE & SCHWARZ 4-wire ISN	ENY41	835154/007	Apr. 26, 2001
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	892107/003	July 11, 2001
EMCO L.I.S.N.	3825/2	9504-2359	July 11, 2001
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	Dec. 13, 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	1501	July 17, 2001
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 14, 2001

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.

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 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.

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.

4. TEST RESULTS (EMISSION)

4.1 RADIO DISTURBANCE

Product Family Standard	:	EN 55022+A1: 1995+A2: 1997, Class A
Frequency Range	:	0.15 - 30 MHz (Conducted Emission)
		30 - 1000 MHz (Radiated Emission)
Power System Voltage	:	230 Vac, 50 Hz
Temperature	:	24 Degree C
Humidity	:	60 %
Atmospheric Pressure	:	1000 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -34.6 dB at 0.152 MHz Minimum passing margin of radiated emission: -2.1 dB at 690.82 MHz

4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. Industrial PC (EUT) reads a test program to enable all functions.
3. Industrial PC (EUT) reads and writes messages from HDD and FDD.
4. Industrial PC (EUT) sends and receives messages from Workstation PC via a STP cable.
5. Industrial PC (EUT) sends "H" messages to monitor and monitor displays "H" patterns on screen.
6. Industrial PC (EUT) sends "H" messages to modem.
7. Industrial PC (EUT) sends "H" messages to printer and the printer prints them on paper.
8. Industrial PC (EUT) sends audio messages to earphone.
9. Repeat steps 2-9.

4.3 TEST DATA OF CONDUCTED EMISSION

EUT: **INDUSTRIAL COMPUTER** MODEL: **SPC-201-SCA**

6 dB Bandwidth: 10 kHz PHASE: LINE (L)

Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.152	0.2	42.4	-	42.6	-	79.0	66.0	-36.4	-
0.306	0.2	41.4	-	41.6	-	79.0	66.0	-37.4	-
3.207	0.5	26.1	-	26.6	-	73.0	60.0	-46.4	-
10.063	1.0	32.8	-	33.8	-	73.0	60.0	-39.2	-
17.691	1.3	34.8	-	36.1	-	73.0	60.0	-36.9	-
24.574	1.4	35.0	-	36.4	-	73.0	60.0	-36.6	-

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value 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

EUT: **INDUSTRIAL COMPUTER** MODEL: **SPC-201-SCA**

Bandwidth: 10 kHz PHASE: NEUTRAL (N)

Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.152	0.2	44.2	-	44.4	-	79.0	66.0	-34.6	-
0.306	0.2	42.7	-	42.9	-	79.0	66.0	-36.1	-
3.207	0.4	28.1	-	28.5	-	73.0	60.0	-44.5	-
10.063	0.7	33.6	-	34.3	-	73.0	60.0	-38.7	-
17.691	0.9	32.8	-	33.7	-	73.0	60.0	-39.3	-
24.574	1.1	34.3	-	35.4	-	73.0	60.0	-37.6	-

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value 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.

4.4 TEST DATA OF RADIATED EMISSION

EUT: **INDUSTRIAL COMPUTER** MODEL: **SPC-201-SCA**

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)
49.15	9.0	20.1	29.1	40.0	-10.9	400	83
86.00	9.0	23.7	32.7	40.0	-7.3	400	0
123.12	12.7	19.2	31.9	40.0	-8.1	400	28
147.48	12.9	16.4	29.3	40.0	-10.7	400	0
159.73	12.1	17.2	29.3	40.0	-10.7	400	337
184.31	11.2	20.8	32.0	40.0	-8.0	400	78
196.69	11.6	18.3	29.9	40.0	-10.1	400	230
200.06	11.7	21.2	32.9	40.0	-7.1	400	286
208.91	12.1	19.1	31.2	40.0	-8.8	400	329
233.85	13.4	23.4	36.8	47.0	-10.2	400	265
455.88	19.7	25.1	44.8	47.0	-2.2	176	265
689.28	24.9	16.9	41.8	47.0	-5.2	100	252
690.82	24.9	20.0	44.9	47.0	-2.1	106	256
692.36	24.9	14.6	39.5	47.0	-7.5	100	282
860.17	27.1	10.1	37.2	47.0	-9.8	100	261

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

EUT: **INDUSTRIAL COMPUTER** MODEL: **SPC-201-SCA**

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)
49.15	9.0	27.0	36.0	40.0	-4.0	100	323
122.87	12.7	18.3	31.0	40.0	-9.0	100	105
144.01	13.2	15.1	28.3	40.0	-11.7	100	289
147.44	12.9	16.7	29.6	40.0	-10.4	100	335
152.10	12.6	18.6	31.2	40.0	-8.8	100	67
159.83	12.1	18.8	30.9	40.0	-9.1	100	29
172.04	11.5	19.0	30.5	40.0	-9.5	100	235
184.32	11.2	20.1	31.3	40.0	-8.7	100	50
197.45	11.6	21.1	32.7	40.0	-7.3	100	306
209.00	12.1	17.9	30.0	40.0	-10.0	100	351
240.15	13.7	26.4	40.1	47.0	-6.9	100	72
455.87	19.6	23.5	43.1	47.0	-3.9	255	275
690.80	24.9	18.6	43.5	47.0	-3.5	291	311

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

4.5 DISTURBANCE IN SUPPLY SYSTEM

Product Family Standard	:	EN 61000-3-2, Class A
Input Voltage	:	230Vac, 50Hz
Temperature	:	25 Degree C
Humidity	:	58 %
Atmospheric Pressure	:	1003 mbar

TEST RESULT	Remarks
PASS	Meets the requirement of Class A Model: SPC-201-SCA

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

4.5.1 EUT OPERATION CONDITION

Same as 4.2.

4.5.2 MEASUREMENT DATA OF HARMONICS TEST

EUT: **INDUSTRIAL COMPUTER** MODEL: **SPC-201-SCA**

Input Voltage : 229.704 Vrms Input Amperes : 0.566 Arms

Power Factor : 0.969 Power Frequency: 50 Hz

Power consumption: 125.959 W

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

4.6 VOLTAGE FLUCTUATIONS AND FLICKER

Basic Standard	:	EN 61000-3-3
Input Voltage	:	230Vac, 50Hz
Temperature	:	25 Degree C
Humidity	:	58 %
Atmospheric Pressure	:	1008 mbar

TEST RESULT	Remarks
PASS	Model: SPC-201-SCA

4.6.1 EUT OPERATION CONDITION

Same as item **4.2**

4.6.2 TEST DATA OF VOLTAGE FLUCTUATIONS AND FLICKER

EUT: **INDUSTRIAL COMPUTER** MODEL: **SPC-201-SCA**

Input Voltage : 229.704 Vrms Input Amperes : 0.566 Arms

Power Frequency: 50 Hz Observation period (Tp): 2 hour

Test Parameter	Measurement Value	Limitation	Remark
Pst	0.090	1.0	pass
Plt	0.039	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 Specification and Performance Criteria	:	EN 61000-4-2	(Electrostatic Discharge, ESD, 8kV air discharge, 4kV Contact discharge, Performance Criterion B)
		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)

Power System Voltage	:	230 Vac, 50 Hz
Temperature	:	25 Degree C
Humidity	:	58 %
Atmospheric Pressure	:	1000 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 **4.2.**

5.4 TEST RESULT OF ELECTROSTATIC DISCHARGE (ESD)

Basic Standard	:	EN 61000-4-2
Discharge Impedance	:	330 ohm / 150 pF
Discharge Voltage	:	Air Discharge - 8 kV (Direct) Contact Discharge - 4 kV (Direct/Indirect)
Polarity	:	Positive/Negative
Number of Discharge	:	Minimum 20 times at each test point
Discharge Mode	:	Single Discharge
Discharge Period	:	1-second minimum

Test Result		Remarks
Criterion A	**PASS**	Model: SPC-201-SCA

OBSERVATION DESCRIPTION

Direct Application			Test Result	
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
8	+/-	1 ~ 5	NA	Note 1
4	+/-	1,2	Note 1	NA

Description of test point: (Please refer to ESD test photo)

1. Metal case
2. I/O ports
3. FDD
4. CD-ROM
5. Junction of case

Indirect Application			Test Result	
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane
4	+/-	1 ~ 4	Note 1	Note 1

Description of test point:

1. Left side
2. Right side
3. Front side
4. Rear side

Description of test result:

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

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**	Model: SPC-201-SCA

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 - 1kV
Polarity	:	Positive/Negative
Impulse Frequency	:	5 kHz
Tr / Th	:	5/50 ns
Burst Duration	:	15 ms
Burst Period	:	300 ms
Test Duration	:	Not less than 1 min.

Test Result		Remarks
Criterion A	**PASS**	Model: SPC-201-SCA

OBSERVATION DESCRIPTION

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

Description of test result:

Note 1: There was no change compared with initial operation during 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), Clamp

Test Result		Remarks
Criterion A	**PASS**	Model: SPC-201-SCA

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**	Model: SPC-201-SCA

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**	Model: SPC-201-SCA

Note: Four sides of EUT are verified separately.

OBSERVATION DESCRIPTION

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

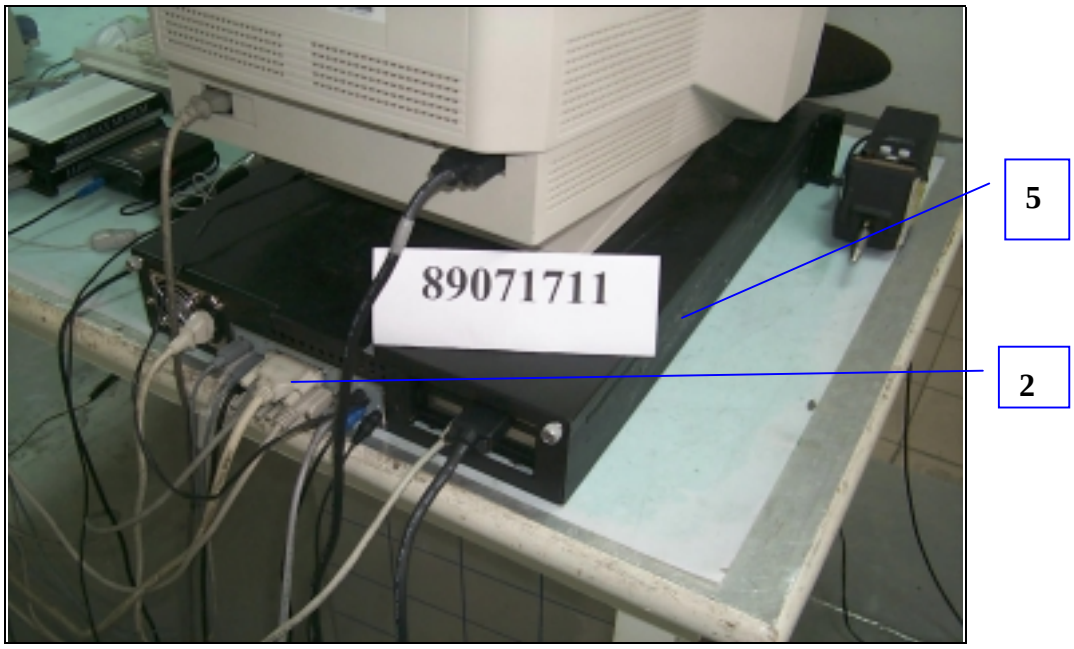
6. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST)

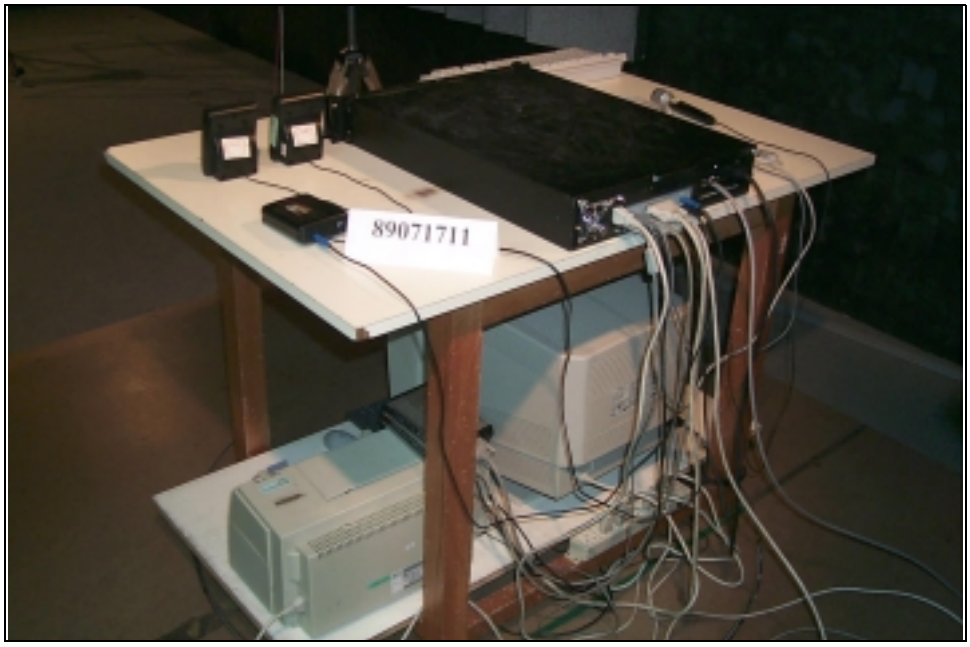
RADIATED EMISSION TEST

HARMONICS AND VOLTAGE FLUCTUATION FLICKER TEST

ESD TEST


89071711
5
2

RS TEST & PULSE MODULATION TEST



EFT TEST

EFT CLAMP TEST

CONDUCTED SUSCEPTIBILITY TEST

CS CLAMP TEST

MAGNETIC TEST

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:

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Hsin Chu EMC Lab:
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