CE EMC TEST REPORT

REPORT NO.: CE920430A06

MODEL NO.: SBC-780-XXX-XX

RECEIVED: April 30, 2003

TESTED: May 02 ~ 30, 2003

APPLICANT: AAEON TECHNOLOGY INC.

ADDRESS: 5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien City, Taipei, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei, Taiwan, R.O.C.

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1 CERTIFICATION

PRODUCT:	Full-Size CPU Card	
BRAND NAME:	AAEON	
MODEL NO:	SBC-780-XXX-XX	
TEST ITEM:	ENGINEERING SAMPLE	
APPLICANT:	AAEON TECHNOLOGY INC.	
STANDARDS:	**EN 55011: 1998+A1:1999, Group I Class A**	**EN 61000-6-2: 2001**
	EN 61000-3-2:2000, Class D	IEC 61000-4-2:2001
	EN 61000-3-3:2001	IEC 61000-4-3:2002
		IEC 61000-4-4:1995+A1: 2000+A2: 2001
		IEC 61000-4-5:2001
		IEC 61000-4-6:2001
		IEC 61000-4-8:2001
		IEC 61000-4-11:2001

We, **Advance Data Technology Corporation**, hereby certify that one sample (Model: SBC-780-A10) of the designation has been tested in our facility from May 02 ~30, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

PREPARED BY: Kathy Tseng , **DATE:** June 02, 2003

(Kathy Tseng)

APPROVED BY: Mike Su , **DATE:** June 02, 2003

(Mike Su, Manager)

2 SUMMARY OF TEST RESULTS

EMISSION			
Standard	**Test Type**	**Result**	**Remarks**
EN 55011: 1998+A1:1999, Group I, Class A	Conducted Test	PASS	Meets Class B Limit Minimum passing margin is –25.48 dB at 20.879MHz
	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is –5.20 dB at 146.12 MHz
EN61000-3-2:2000	Harmonic current emissions	PASS	Meets Class D Limit
EN61000-3-3:2001	Voltage fluctuations & flicker	PASS	Meets the requirements.

IMMUNITY (EN 61000-6-2: 2001)			
Standard	**Test Type**	**Result**	**Remarks**
IEC 61000-4-2: 2001	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-3: 2002	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4: 1995+A1: 2000+A2: 2001	Electrical fast transient / burst immunity test.	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-5: 2001	Surge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6: 2001	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-8: 2001	Power frequency magnetic field immunity test.	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11: 2001	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Meets the requirements of **Voltage Dips:** 1. 30% reduction - Performance Criterion A 2. 60% reduction – Performance Criterion A 3. 60% reduction – Performance Criterion C **Voltage Interruptions:** 1. >95% reduction – Performance Criterion C

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Full-Size CPU Card
MODEL NO.	SBC-780-XXX-XX
POWER SUPPLY	Switching Rating: Input: 115/230V, 7/4A, 50-60Hz
DATA CABLE	N/A

Note: The EUT is a Full-Size CPU Card.

The “X” could be defined as “A~Z” “0~9” or blank according to customer’s requirement.

During the test, the model SBC-780-A10 was chosen as a representative model and therefore only its test data was recorded in this report

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

3.2 DESCRIPTION OF TEST MODES

The following parts and EUT are used to establish a basic configuration of system during the test:

COMPONENT	BRAND & MODEL NO.
CPU	Intel PIII,1.24Hz
HDD	Maxtor, model: 4D040H2, 40.0GB
FDD	Teac, model:FD-235HF,1.44MB
CD-ROM	FREEY, model:CD205IE, 52X
MEMORY	GENIUNE, model: QESR015, 64MB
POWER SUPPLY	SEVENTEAM, model: ST-300HLP Rating: Input: 115-240V, 8A, 50-60Hz Output: +3.3V 30A, +5V 40A, +12V 15A, -5V 0.5A, -12V 1A, +5sb 2A Max 276W

3.2.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is according to the specifications of the manufacturers, must comply with the requirements of the following standards:

EN 55011: 1998+A1: 1999, Group 1, Class A	**EN61000-6-2: 2001**
EN 61000-3-2:2000, Class D	IEC 61000-4-2:2001
EN 61000-3-3:2001	IEC 61000-4-3:2002
	IEC 61000-4-4:1995+A1: 2000+A2: 2001
	IEC 61000-4-5:2001
	IEC 61000-4-6:2001
	IEC 61000-4-8:2001
	IEC 61000-4-11:2001

3.3 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 were used to form a representative test configuration during the tests.

3.3.1 FOR EMISSION TEST

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	MONITOR	ADI	CM100	020058T10200179	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY017075	FCC DoC Approved
3	MODEM	ACEEX	1414	980020534	IFAXDM1414
4	MODEM	ACEEX	1414	980020532	IFAXDM1414
5	MODEM	ACEEX	1414	980020506	IFAXDM1414
6	USB KEYBOARD	SiliconGraphis	SK-2502U	M990206057	GYUR58SK
7	PS/2 KEYBOARD	BTC	5121W	A00801380	E5XKB5121WTH0110
8	USB MOUSE	Geniusnet	828 U+P	66820011004460	FCC DoC Approved
9	PS/2 MOUSE	LOGITECH	M-S61	HCA12605763	JNZ211403
10	EARPHONE	KOKA	ST-8	H201040	N/A
11	CASSETTE RECORDER	ADITION	BS-722A	C0102026	N/A
12	MICROPHONE	CAROL	MUD-329	N/A	N/A
13	SPEAKER	JAZZ	J-008	J791149	N/A
14	PERSONAL COMPUTER	NTI	PIII450	P201178	FCC DoC Approved
15	PERSONAL COMPUTER	NTI	PI I-450T	P201140	FCC DoC Approved
16	MONITOR	HP	D2842A	KR93473118	BEJCB910
17	MONITOR	ADI	CM100	N/A	FCC DoC Approved
18	PS/2 KEYBOARD	BTC	5121W	A00801371	E5XKB5121WTH0110
19	PS/2 KEYBOARD	BTC	5121W	A00801377	E5XKB5121WTH0110
20	PS/2 MOUSE	DEXIN	A2P800A	80102095	NIYA2P800A
21	PS/2 MOUSE	LOGITECH	M-S61	HCA12002841	JNZ211403

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
4	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
6	2.5 m braid shielded wire, terminated with USB connector via drain wire, w/o core.
7	1.6 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
8	1.5 m foil shielded wire, terminated with USB connector via drain wire, w/o core.
9	1.8 m Non shielded wire, terminated with PS/2 connector via drain wire, w/o core.
10	1.8 m wrapped shielded wire, terminated with 3.5mm phone plug via drain wire, w/o core.
11	N/A
12	3.0 m wrapped shielded wire, terminated via drain wire, with 3.5 mm phone plug, w/o core.
13	1.1 m wrapped shielded wire, terminated via drain wire, with 3.5 mm phone plug, w/o core.
14	N/A
15	N/A
16	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.
17	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core
18	1.6 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
19	1.6 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
20	1.5 m foil shielded wire, terminated with PS/2 connector via drain wire, w/o core.
21	1.8 m Non shielded wire, terminated with PS/2 connector via drain wire, w/o core.

NOTE: 1. All power cords of the above support units are non shielded (1.8m).
2. The EUT acted as SERVER PC and communicated with support units 14~21 (kept in a remote area), which acted as WORKSTATION and partners of communication system via two UTP Lan cable (10m) x2.

3.3.2 FOR HARMONICS / FLICKER / IMMUNITY TEST

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	LCD MONITOR	CTX	S700	051-30200008	FCC DoC Approved
2	PRINTER	HP	2225C+	2813S10112	DSI6XU2225
3	MODEM	GVC	F-1128V1R6	96-191-113003	DK4F1128VR6
4	MODEM	GVC	F-1114V/R6	853E100	DK4F1114VR6
5	MODEM	GVC	F-1128V1R6	96-191-113004	DK4F1128VR6
6	PS/2 KEYBOARD	HP	6511-PK	99P468101CY1W05S000533	FCC DoC Approved
7	USB KEYBOARD	SiliconGraphis	SK-2502U	M990207208	GYUR58SK
8	PS/2 MOUSE	HP	M-S48a	LZE11308388AW	JNZ201213
9	USB MOUSE	Geniusnet	828 U+P	66820011002708	FCC DoC Approved
10	CASSETTE RECORDER	SONY	WM-FX193	N/A	N/A
11	SPEAKER	J-S	J-009	S501012	N/A
12	MICROPHONE	WECAN	EM-418	NA	N/A
13	PERSONAL COMPUTER	HP	BRIO BA410	SG10602704	FCC DoC Approved
14	MONITOR	DELL	E772f		
15	PS/2 KEYBOARD	HP	C3758A	C3758-60223	CIGE03633
16	PS/2 MOUSE	LOGITECH	M-S43	LZE93501869	DZL211106
17	LAN CARD	3 COM	3C905-TXM ETHERLINK 10/100 PCI	HKQD46B282	FCC DoC Approved
18	NOTEBOOK	COMPAQ	Evo N800c	PP2130	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.5 m braid shielded wire, terminated with D-SUB connector via metallic frame, w. 2 cores
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
4	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
6	1.8 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core
7	2.5 m braid shielded wire, terminated with USB connector via drain wire, w/o core.
8	1.8 m Non shielded wire, terminated with PS/2 connector via drain wire, w/o core.
9	1.5 m foil shielded wire, terminated with USB connector via drain wire, w/o core.
10	NA
11	1.5 m wrapped shielded wire, terminated via drain wire, with 3.5 mm phone plug, w/o core.
12	1.0 m wrapped shielded wire, terminated via drain wire, with 3.5 mm phone plug, w/o core.
13	NA
14	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, with core
15	1.5 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
16	1.8 m foil shielded wire, terminated with PS/2 connector via drain wire, w/o core.
17	NA
18	NA

NOTE: 1. All power cords of the above support units are non shielded (1.8m).
2. The EUT acted as SERVER PC and communicated with support units 13~18 (kept in a remote area), which acted as WORKSTATION and partners of communication system via two UTP Lan cable (10m x 2).

4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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 in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

(3) All emanations 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS30	834115/016	Mar. 04, 2004
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ESH2-Z5	892107/003	July 10, 2003
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Nov. 29, 2003
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Nov. 29, 2003
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	July 10, 2003
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C03.01	July 11, 2003
Terminator (For EMCO LISN)	NA	E1-01-300	Feb. 23, 2004
Terminator (For EMCO LISN)	NA	E1-01-301	Feb. 23, 2004

NOTE: 1.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. "*": These equipment are used for conducted telecom port test only (if tested).

3. The test was performed in ADT Shielded Room No. 3.

4. The VCCI Site Registration No. is C-274.

4.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

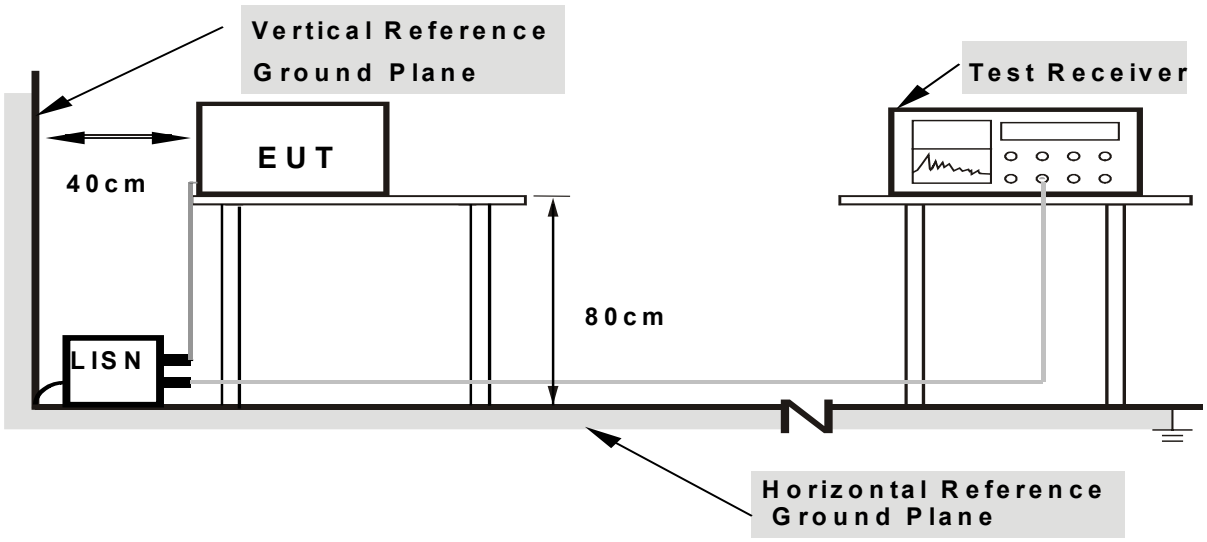
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

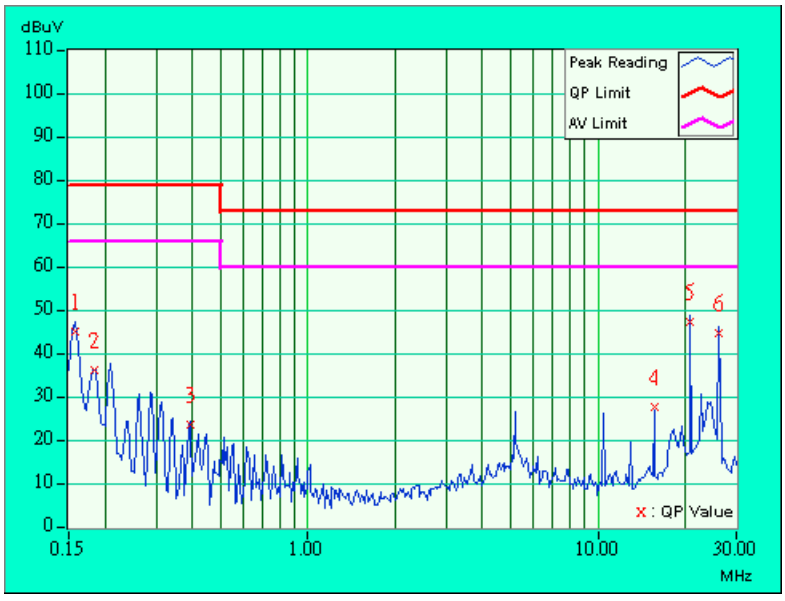
a. Turned on the power of all equipment.
b. EUT ran a test program to enable all functions of EUT.
c. EUT read and wrote messages from HDD.
d. EUT sent and received messages from WORKSTATION PC via two of 10m UTP Lan cables.
e. EUT sent “H” messages to monitor and its screen, then monitor and its screen displayed them on their screens simultaneously.
f. EUT sent messages to modems.
g. EUT sent messages to printer.
h. EUT sent audio message to earphone or speaker.
i. Steps c-h were repeated.

4.1.7 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL NO.**	SBC-780-A10
		6dB BANDWIDTH	9 kHz
INPUT POWER	230Vac, 50 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	26 deg. C, 70 % RH, 1005 hPa	**TESTED BY**: Martin Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.10	44.51	-	44.61	-	79.00	66.00	-34.39	-
2	0.184	0.10	35.62	-	35.72	-	79.00	66.00	-43.28	-
3	0.392	0.10	23.06	-	23.16	-	79.00	66.00	-55.84	-
4	15.629	0.51	27.17	-	27.68	-	73.00	60.00	-45.32	-
5	20.852	0.62	46.78	-	47.40	-	73.00	60.00	-25.60	-
6	26.055	0.70	44.19	-	44.89	-	73.00	60.00	-28.11	-

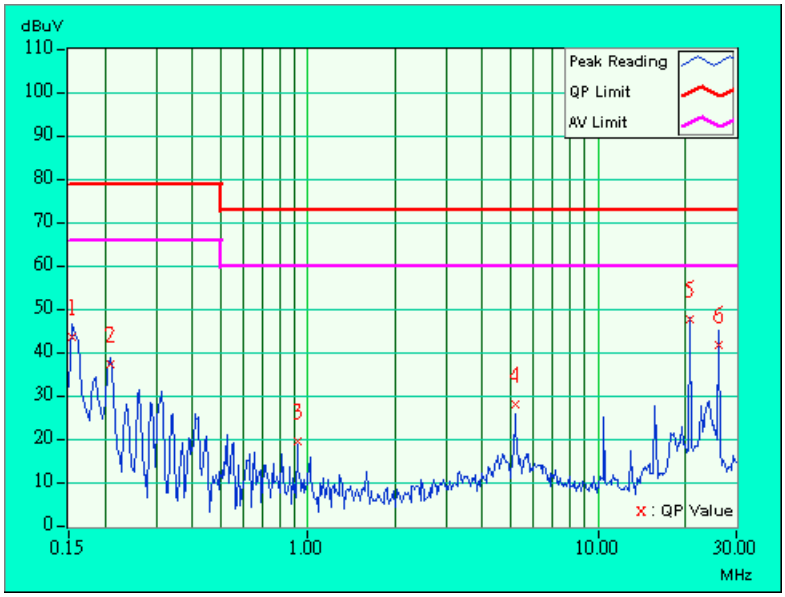
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Full-Size CPU Card	**MODEL NO.**	SBC-780-A10
		6dB BANDWIDTH	9 kHz
INPUT POWER	230Vac, 50 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	26 deg. C, 70 % RH, 1005 hPa	**TESTED BY**: Martin Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.10	42.78	-	42.88	-	79.00	66.00	-36.12	-
2	0.210	0.10	36.46	-	36.56	-	79.00	66.00	-42.44	-
3	0.920	0.19	18.48	-	18.67	-	73.00	60.00	-54.33	-
4	5.216	0.50	27.00	-	27.50	-	73.00	60.00	-45.50	-
5	20.879	0.84	46.68	-	47.52	-	73.00	60.00	-25.48	-
6	26.113	1.00	40.79	-	41.79	-	73.00	60.00	-31.21	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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 emanations 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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HP Spectrum Analyzer	8590L	3520A00667	Aug. 26, 2003
CHASE Preamplifier	CPA9231A/4	3215	Nov. 06, 2003
* HP Preamplifier	8449B	3008A01201	Dec. 01, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 07, 2003
* ROHDE & SCHWARZ TEST RECEIVER	ESVS10	846285/012	Sept. 16, 2003
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 13, 2004
SCHAFFNER Tunable Dipole Antenna SCHWARZBECK Tunable Dipole Antenna	VHBA 9123 UHA 9105	459 977	Nov. 22, 2003
* CHASE BILOG Antenna	CBL6112B	2751	March 21, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 3, 2003
* EMCO Horn Antenna	3115	9312-4192	Mar. 23 2004
* CHANCE Turn Table & Tower Controller	ACS-I	NA	NA
* Software	ADT_Radiated_V5.14	NA	NA
* ANRITSU RF Switches	MP59B	M51167	Aug. 21, 2003
* TIMES RF cable	LMR-600	CABLE-ST6-01	Aug. 21, 2003

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipment are used for the final measurement.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the

measurement of emission frequency above 1GHz if tested.

4. The test was performed in ADT Open Site No. 6.
5. The VCCI Site Registration No. is R-728.

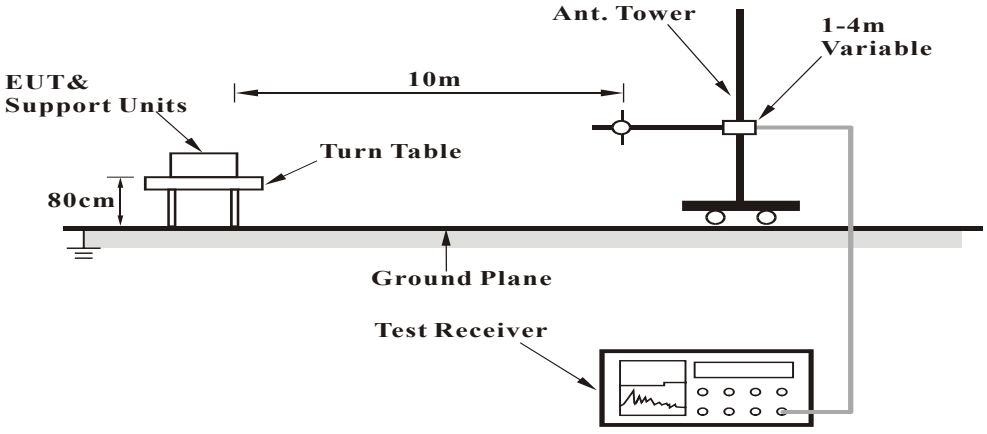
4.2.3 TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10-meter open field site. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi- peak method or average method as specified and then reported In Data sheet peak mode and QP mode.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

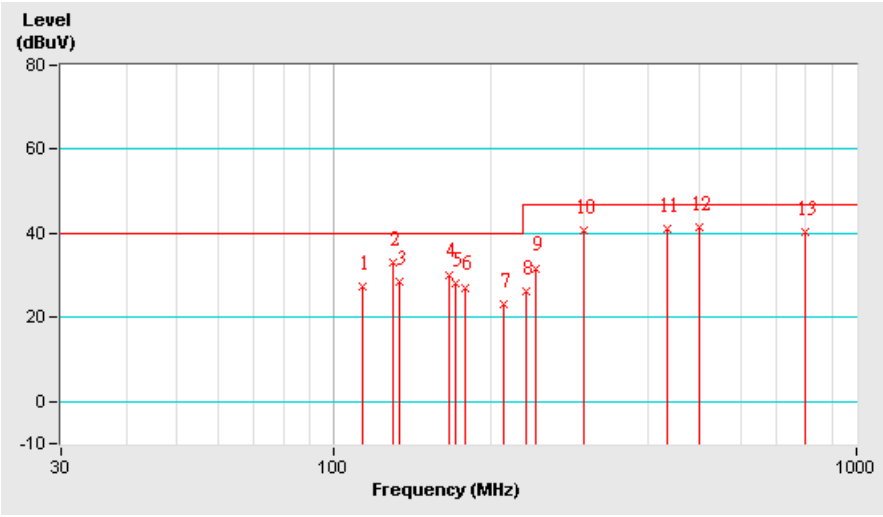
Same as 4.1.6.

4.2.7 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL NO.**	SBC-780-A10
		FREQUENCY RANGE	30-1000 MHz
INPUT POWER	230Vac, 50 Hz	**DETECTOR FUNCTION & BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	27 deg. C, 62 % RH, 1005 hPa	**TESTED BY**: Nick Chen	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	113.66	27.3 QP	40.00	-12.70	4.00 H	276	15.20	12.20
2	129.53	33.2 QP	40.00	-6.80	4.00 H	0	20.90	12.30
3	133.28	28.6 QP	40.00	-11.40	4.00 H	220	16.40	12.20
4	166.59	30.2 QP	40.00	-9.80	4.00 H	196	19.90	10.30
5	170.49	28.2 QP	40.00	-11.80	4.00 H	219	18.00	10.20
6	178.69	27.1 QP	40.00	-12.90	4.00 H	296	17.30	9.90
7	211.06	23.1 QP	40.00	-16.90	4.00 H	78	12.30	10.80
8	233.31	26.2 QP	47.00	-20.80	4.00 H	254	14.00	12.20
9	243.65	31.8 QP	47.00	-15.20	4.00 H	0	18.90	12.80
10	299.70	40.7 QP	47.00	-6.30	2.37 H	90	26.20	14.50
11	433.00	41.0 QP	47.00	-6.00	1.93 H	345	23.10	18.00
12	499.80	41.4 QP	47.00	-5.60	2.30 H	322	22.00	19.30
13	799.80	40.2 QP	47.00	-6.80	1.00 H	344	17.60	22.50

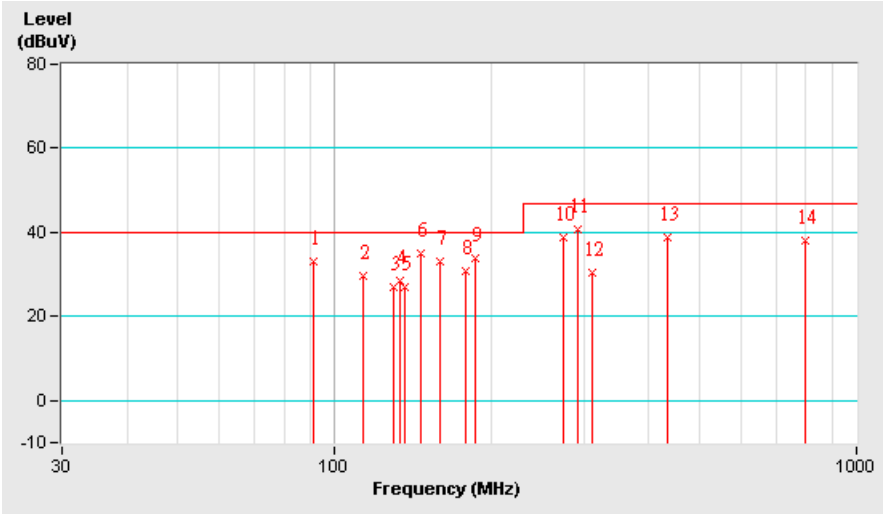
REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



EUT	Full-Size CPU Card	**MODEL NO.**	SBC-780-A10
		FREQUENCY RANGE	30-1000 MHz
INPUT POWER	230Vac, 50 Hz	**DETECTOR FUNCTION & BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	27 deg. C, 62 % RH, 1005 hPa	**TESTED BY**: Nick Chen	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	90.91	32.9 QP	40.00	-7.10	1.30 V	278	23.20	9.70
2	113.67	29.7 QP	40.00	-10.30	1.00 V	38	17.50	12.20
3	129.89	26.9 QP	40.00	-13.10	1.00 V	28	14.60	12.30
4	133.30	28.6 QP	40.00	-11.40	1.00 V	106	16.40	12.20
5	136.39	26.8 QP	40.00	-13.20	1.00 V	156	14.80	12.00
6	146.12	34.8 QP	40.00	-5.20	1.00 V	115	23.30	11.50
7	159.57	32.9 QP	40.00	-7.10	1.00 V	45	22.30	10.60
8	178.59	30.9 QP	40.00	-9.10	1.00 V	170	21.00	9.90
9	186.06	33.9 QP	40.00	-6.10	1.00 V	174	24.00	9.90
10	275.10	38.7 QP	47.00	-8.30	1.00 V	325	24.70	13.90
11	291.60	40.6 QP	47.00	-6.40	1.00 V	286	26.30	14.30
12	310.50	30.3 QP	47.00	-16.70	2.01 V	76	15.50	14.70
13	433.00	38.7 QP	47.00	-8.30	2.56 V	186	20.70	18.00
14	799.57	38.2 QP	47.00	-8.80	1.77 V	72	15.60	22.50

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



4.3 HARMONICS CURRENT MEASUREMENT

4.3.1 LIMITS OF HARMONICS CURRENT MEASUREMENT

Limits for Class A equipment	
Harmonics Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15<=n<=39	0.15x15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	0.23x8/n

Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd Harmonics only		
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.30	0.21
15<=n<=39	3.85/n	0.15x15/n

NOTE: 1. Class A and Class D are classified according to item 4.3.3 b.

2. The above limits for Class D equipment are for all applications having an active input power > 75 W. No limits apply for equipment with an active input power up to and including 75 W.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMC PARTNER EMC Emission Tester	HAR1000-1P	078	July 3, 2003

NOTE: 1. The test was performed in EMS Room No. 1.

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

4.3.2.1 TEST PROCEDURE

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

b. The classification of EUT is according to section 5 of EN 61000-3-2:1995+

A14:2000.

The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

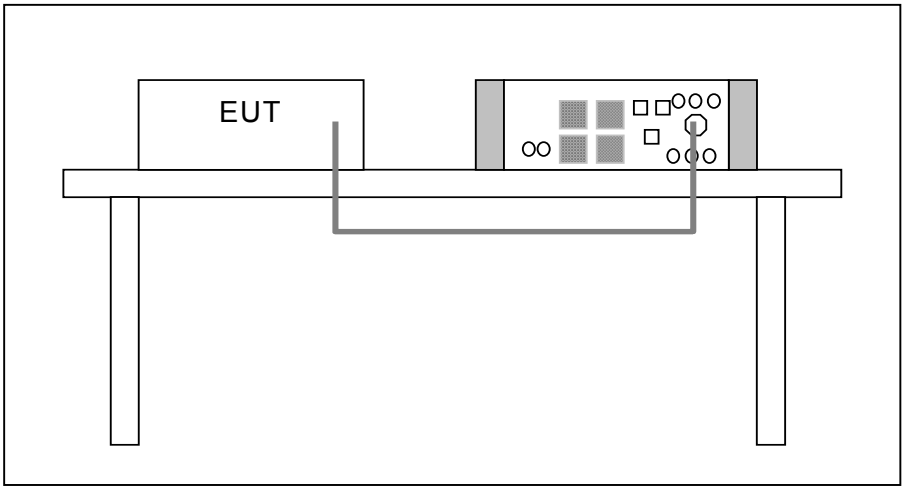
Class B: Portable tools.

Class C: Lighting equipment, including dimming devices.

Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors.

c. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

4.3.3 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.3.4 EUT OPERATING CONDITIONS

Same as item 4.1.6.

4.3.5 1EST RESULTS

EUT	Full-Size CPU Card	MODEL	SBC-780-A10
FUNDAMENTAL VOLTAGE/AMPERE	230.3 Vrms/ 0.374 Arms	POWER FREQUENCY	50.078 Hz
POWER CONSUMPTION	77.73 W	POWER FACTOR	0.904
ENVIRONMENTAL CONDITIONS	23 deg. C, 62 % RH, 1005 hPa	TESTED BY:	Kenny Meng

STEADY TEST DATA

Harm. Order	Reading Data (A)	Limit (A)
1	0.3674	-
3	0.0609	2.3000
5	0.0170	1.1400
7	0.0152	0.7700
9	0.0132	0.4000
11	0.0131	0.3300
13	0.0038	0.2100
15	0.0096	0.1500
17	0.0091	0.1324
19	0.0104	0.1184
21	0.0072	0.1071
23	0.0035	0.0978
25	0.0030	0.0900
27	0.0021	0.0833
29	0.0020	0.0776
31	0.0026	0.0726
33	0.0037	0.0682
35	0.0030	0.0643
37	0.0015	0.0608
39	0.0009	0.0577

Harm. Order	Reading Data (mA/W)	Limit (mA/W)
1	-	-
3	0.7817	3.4000
5	0.2180	1.9000
7	0.1952	1.0000
9	0.1694	0.5000
11	0.1686	0.3500
13	0.0486	0.2962
15	0.1231	0.2567
17	0.1168	0.2265
19	0.1340	0.2026
21	0.0925	0.1833
23	0.0455	0.1674
25	0.0384	0.1540
27	0.0274	0.1426
29	0.0251	0.1328
31	0.0337	0.1242
33	0.0478	0.1167
35	0.0384	0.1100
37	0.0196	0.1041
39	0.0110	0.0987

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

4.4 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

4.5 LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

TEST ITEM	LIMIT	NOTE
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3 %.
d_{max} (%)	4%	d_{max} means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

4.5.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMC PARTNER EMC Emission Tester	HAR1000-1P	078	July 3, 2003

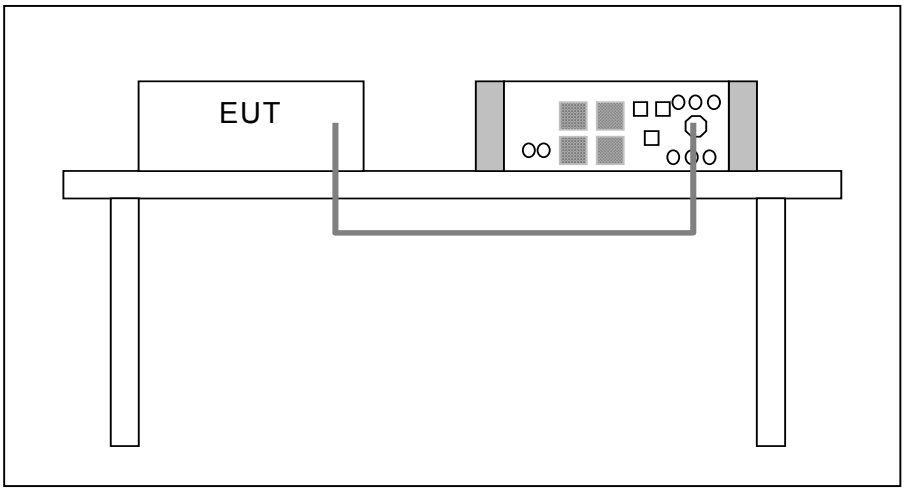
NOTE: 1. The test was performed in EMS Room No. 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.2 TEST PROCEDURE

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

b. During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 10 minutes.

4.5.3 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.5.4 EUT OPERATING CONDITIONS

Same as item 4.1.6.

4.5.5 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL**	SBC-780-A10
INPUT VOLTAGE/AMPERE	230.3 Vrms / 0.372 Arms	**POWER FREQUENCY**	50.078 Hz
OBSERVATION PERIOD (Tp)	10 minutes	**POWER FACTOR**	0.903
ENVIRONMENTAL CONDITIONS	22 deg. C, 50 % RH, 1005 hPa	**TESTED BY:** Kenny Meng	

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARKS
P_{st}	0.110	1.0	Pass
P_{lt}	0.110	0.65	Pass
T_{dt} (ms)	0	500	Pass
d_{max} (%)	0	4%	Pass
dc (%)	0	3.3%	Pass

NOTE: (1) P_{st} means short-term flicker indicator.
(2) P_{lt} means long-term flicker indicator.
(3) T_{dt} means maximum time that dt exceeds 3.3 %.
(4) d_{max} means maximum relative voltage change.
(5) dc means relative steady-state voltage change.

5 IMMUNITY TEST

5.1 GENERAL DESCRIPTION

Product Standard:	**EN 61000-6-2: 2001**	
Basic Standard, Specification, and Performance Criteria:	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 10V/m, 80% AM (1kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: 2kV, Signal line: 1kV, Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, Power Line - 1 kV, line to earth - 2kV, Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15-80 MHz, 10V, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 30A/m, 60Hz, 30A/m Performance Criterion A
	IEC 61000-4-11	Voltage Dips: 30% reduction -0.5 period, Performance Criterion B 60% reduction – 5 period, Performance Criterion C 60% reduction – 50 period, Performance Criterion C Voltage Interruptions: >95% reduction – 250 period, Performance Criterion C

5.2 GENERAL 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 OPERATING CONDITION

Same as item 4.1.6.

5.4 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

5.4.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge –2,4,8 kV (Direct)
	Contact Discharge – 2,4 kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Minimum 50 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

5.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
KeyTek, ESD Simulator	MZ-15/EC	9902287	Feb. 25, 2004
EM Test ESD Simulator	ESD 30C	0201-28	Jul. 15, 2003
EM Test ESD Discharge Unit	P30C	0201-28	Jul. 15, 2003
EM Test ESD Discharge Unit	P30C-RFCI	0601-07	Jul. 15, 2003
FCC Coupling Decoupling Network	FCC-801-T2	020022	Jun.12, 2003
FCC Coupling Decoupling Network	FCC-801-T4	020033	Jun.12, 2003

NOTE: 1. The test was performed in ESD Room No. 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.4.3 TEST PROCEDURE

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.

b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c. The time interval between two successive single discharges was at least 1 second.

d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

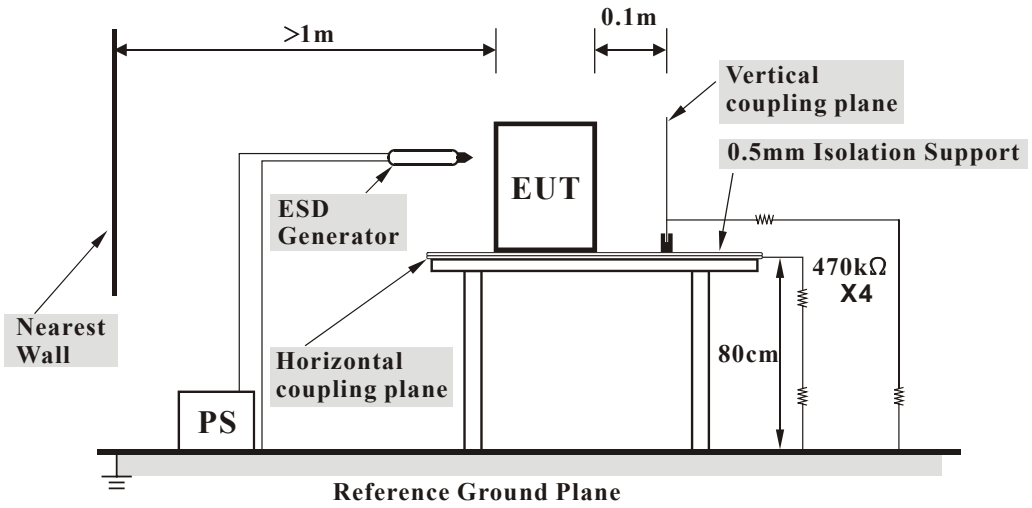
g. At least ten single discharges (in the most sensitive polarity) were applied to the **H**orizontal **C**oupling **P**lane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP.**

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **V**ertical **C**oupling **P**lane in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **G**round **R**eference **P**lane. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **H**orizontal **C**oupling **P**lane (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2:1995, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2:1995, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

5.4.6 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL**	SBC-780-A10
		INPUT POWER	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	20 deg. C, 53 % RH, 1005 hPa	**TESTED BY**: Alan Chang	

TEST RESULTS OF DIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2,4,8	+/-	1 ~ 5	NA	Note 1	A
2, 4	+/-	7, 8	Note 1	NA	A
2	+/-	6	Note 1	NA	A
4	+/-	6	Note 2	NA	B

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

1. Junction of case
2. LED
3. AC input
4. F.D.D.
5. CD-ROM
6. I/O ports
7. Screws
8. Metal case

TEST RESULTS OF INDIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	1 ~ 4	Note 1	Note 1	A

Description of test point:

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

NOTE:1. There was no change compared with initial operation during the test.
2. The transmission of LAN stopped during the test, but self-recoverable after the test.

5.5 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

5.5.1 TEST SPECIFICATION

Basic Standard:	IEC 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
Antenna Height:	1.5m
Dwell Time:	at least 3 seconds

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Signal Generator	SMY01	840490/009	July 31, 2003
KALMUS Power Amplifier	LA1000V	091995-1	NA
KALMUS Power Amplifier	757LC	091995-2	NA
HOLADAY Field Probe	HI-4422	89915	Mar. 05, 2004
EMCO BiconiLog Antenna	3141	1001	NA
COMTEST Compact Full Anechoic Chamber (7x3x3 m)	CFAC	ADT-S01	Aug. 10, 2003

NOTE: 1. The test was performed in RS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.5.3 TEST PROCEDURE

The test procedure was in accordance with IEC 61000-4-3

a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sinewave. The rate of sweep did not exceed 1.5 x 10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

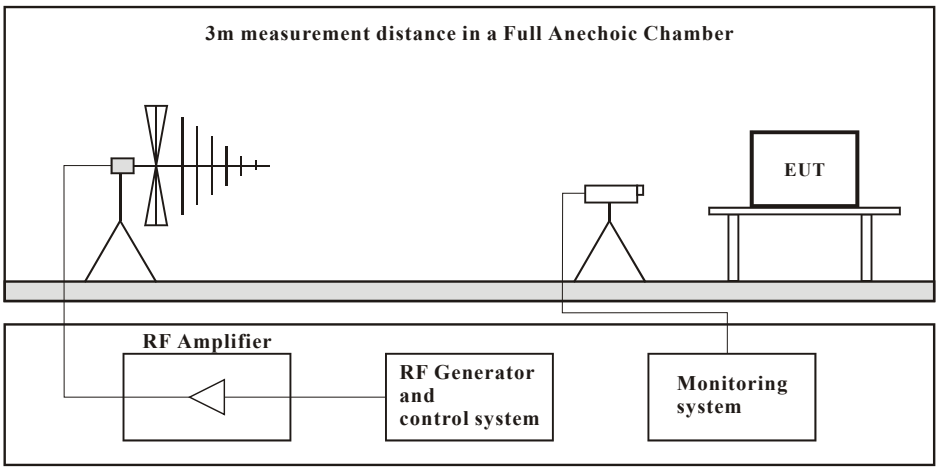
d. The field strength level was 10V/m.

e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT
The EUT installed in a representative system as described in section 7 of IEC 61000-4-3:1995 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT
The EUT installed in a representative system as described in section 7 of IEC 61000-4-3:1995 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

5.6 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL**	SBC-780-A10
		INPUT POWER	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	24 deg. C, 60 % RH, 1005 hPa	**TESTED BY**:Alan Chang	

Frequency (MHz)	Result	Polarity	Azimuth	Field Strength (V/m)	Obser-vation	Performance Criterion
80 -1000 MHz	PASS	V&H	0	10	Note	A
80 -1000 MHz	PASS	V&H	90	10		
80 -1000 MHz	PASS	V&H	180	10		
80 -1000 MHz	PASS	V&H	270	10		

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

5.7 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)

5.7.1 TEST SPECIFICATION

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

5.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
KeyTek, EFT Generator	CE-40	9508257	Aug. 27, 2003
KeyTek, Capacitive Clamp	CE-40-CCL	9508259	NA
KeyTek, EMS Simulator	EMCPro	9902207	March 4, 2004

NOTE: 1. The test was performed in EMS Room No. 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.7.3 TEST PROCEDURE

a. The EUT was tested with 2000 volt discharges to the AC power input leads and 1000 volt discharges to the interconnect cables.

b. Both positive and negative polarity discharges were applied.

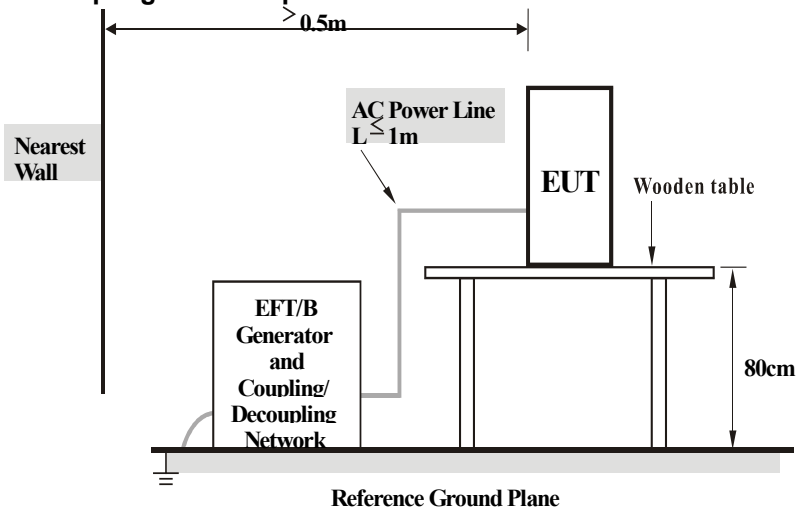
c. The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.

d. The duration time of each test sequential was 1 minute.

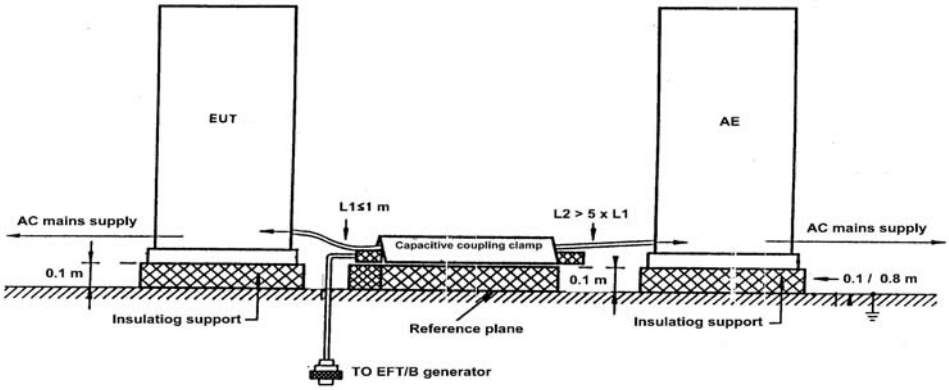
e. The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

5.7.4 TEST SETUP

a. Direct Coupling Test Setup



b. Capacitive Clamp Test Setup (if any)



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-4:1995 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

5.7.5 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL**	SBC-780-A10
		INPUT POWER	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	25 deg. C, 51 % RH, 1005 hPa	**TESTED BY**: Alan Chang	

Test Point	Polarity	Test Level (kV)	Observation	Performance Criterion
L1	+/-	2	Note	A
L2	+/-	2	Note	A
Ground	+/-	2	Note	A
Signal/Control Line: RJ45 x 2	+/-	1	Note	A

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

5.8 SURGE IMMUNITY TEST

5.8.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power Line - 1 kV / 2 kV
Surge Input/Output:	L1-L2 / L1-G, L2-G, L1 L2-G
Generator Source Impedance:	2 ohm between networks 12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0° /90°/180°/270°
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

5.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATION UNTIL
KeyTek, Control Center	E103	9508347	NA
KeyTek,Surge Combination Wave	E501A	9508349	Aug. 27, 2003
KeyTek, Surge Coupler/Decoupler	E551	9508350	Aug. 27, 2003
KeyTek External Coupler/Decoupler for Telecom Lines	CM-TELCD	9906194	NA
KeyTek I/O Signal Line Coupler/Decoupler	CM-I/OCD	9907177	NA
FCC Coupling Decoupling Network	FCC-801-T2	020023	Jun.12. 2003
FCC Coupling Decoupling Network	FCC-801-T4	020034	Jun.12. 2003
KeyTek, EMS Simulator	EMCPro	9902207	March 4, 2004

NOTE: 1. The test was performed in EMS Room No. 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.8.3 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

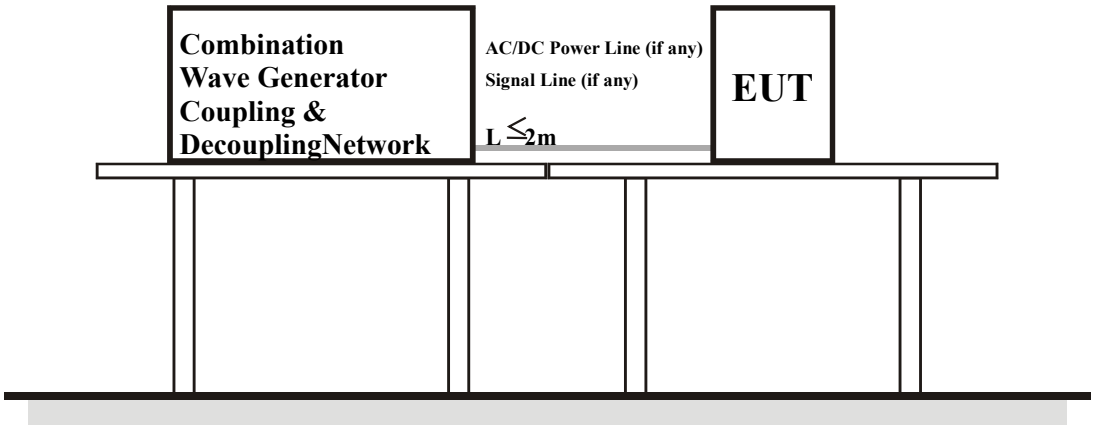
b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

5.8.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.8.5 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL**	SBC-780-A10
		INPUT POWER	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	23 deg. C, 57 % RH, 1005 hPa	**TESTED BY**: Alan Chang	

VOLTAGE (kV)	TEST POINT	POLARITY (+/-)	OBSERVATION	PERFORMANCE CRITERION
1	L1-L2	+/-	NOTE	A
2	L1-G	+/-	NOTE	A
2	L2-G	+/-	NOTE	A
2	L1, L2-G	+/-	NOTE	A

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

5.9 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)

5.9.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz - 80 MHz
Field Strength:	10 $V_{r.m.s.}$
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Coupled Cable:	Power Mains, Unshielded
Coupling Device:	CDN-M3 (3 wires), CDN-T4

5.9.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Signal Generator	SMY01	848027/030	Feb. 18, 2004
COMTEST Power Amplifier	GPA301	BCS320-1038	NA
FCC Coupling Decoupling Network	FCC-801-M3-25A	48	Aug. 7. 2003
FCC Coupling Decoupling Network	FCC-801-M3-25A	01022	Apr. 3. 2004
FCC Coupling Decoupling Network	FCC-801-M2-16A	01047	July 31. 2003
FISCHER CUSTOM COMMUNICATIONS EM Injection Clamp	FCC-203I	50	NA
FCC Coupling Decoupling Network	FCC-801-M1-25A	17	July 31. 2003
FCC Coupling Decoupling Network	FCC-801-T8	020038	Jun.12. 2003
FCC Coupling Decoupling Network	FCC-801-T2	020020	Jun.12. 2003
FCC Coupling Decoupling Network	FCC-801-T4	020028	Jun.12. 2003
BOONTON RF Voltage Meter	9200B	331801AE	July 31. 2003

NOTE: 1. The test was performed in CS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.9.3 TEST PROCEDURE

a. The EUT shall be tested within its intended operating and climatic conditions.

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

c. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate shall not exceed 1.5 x 10^{-3} decades/s. The step size shall not exceed 1 % of the start and thereafter 1 % of the preceding frequency value where the frequency is swept incrementally.

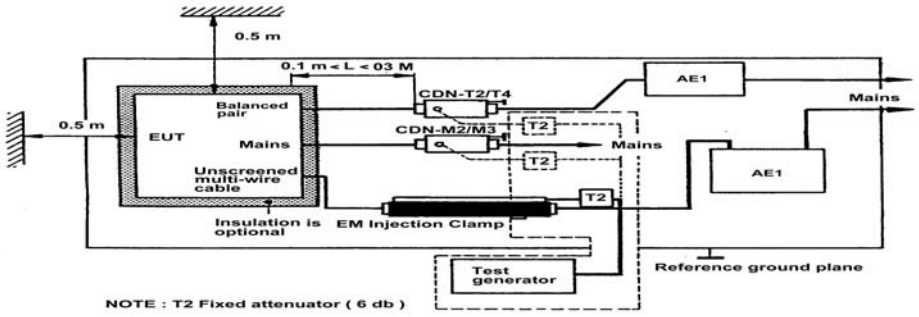
d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, shall be analyzed separately.

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

5.9.4 DEVIATION FROM TEST STANDARD

No deviation

5.9.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

5.9.6 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL**	SBC-780-A10
		INPUT POWER	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	21 deg. C, 52 % RH, 1005 hPa	**TESTED BY**: Alan Chang	

FREQUENCY (MHz)	RESULTS	FIELD STRENGTH (Vr.m.s.)	CABLE	OBSER-VATION	INJECTION METHOD	PERFORMANCE CRITERION
0.15 –80 MHz	PASS	10	AC power line (1.8m)	Note	A	CDN-M3
0.15 –80 MHz	PASS	10	LAN (10m)	Note	A	CDN-T4
0.15 –80 MHz	PASS	10	LAN (10m)	Note	A	CDN-T4

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

5.10 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

5.10.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-8
Frequency Range:	50Hz/60Hz
Field Strength:	30 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

5.10.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HAEFELY Magnetic Field Tester	MAG 100.1	083794-06	NA
COMBINOVA Magnetic Field Meter	MFM10	224	Nov. 4, 2003

NOTE: 1. The test was performed in EMS Room No. 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.10.3 TEST PROCEDURE

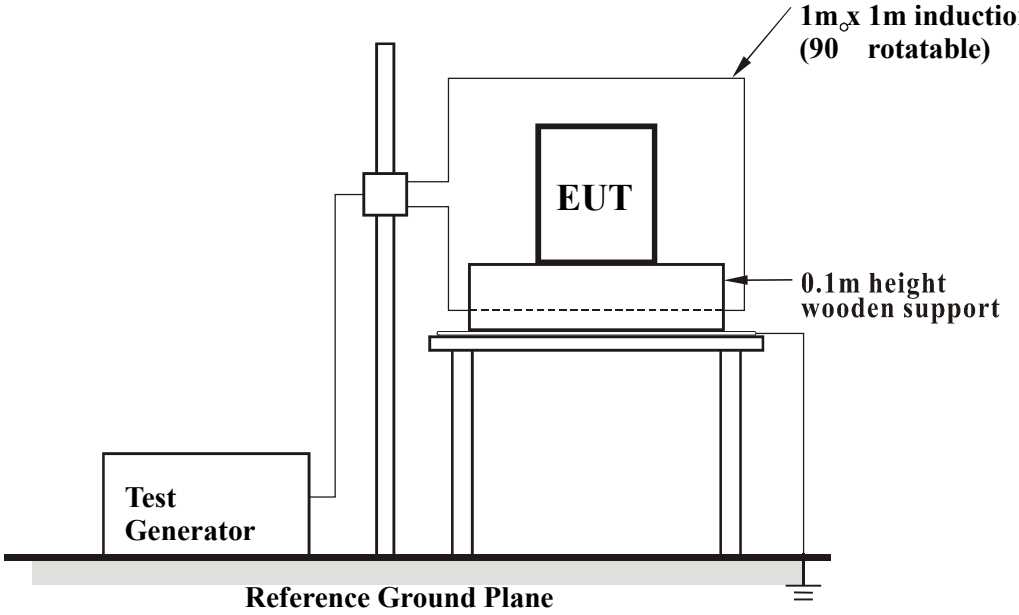
a. The equipment is configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m-thick insulating support.

b. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.

c. The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

d. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

5.10.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT
The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT
The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

5.10.5 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL**	SBC-780-A10
		INPUT POWER	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	24 deg. C, 51 % RH, 1005 hPa	**TESTED BY**: Alan Chang	

DIRECTION	RESULTS	OBSERVATION	PERFORMANCE CRITERION
X	PASS	Note	A
Y	PASS	Note	A
Z	PASS	Note	A

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

5.11 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST

5.11.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

5.11.2 TEST INSTRUMENTS

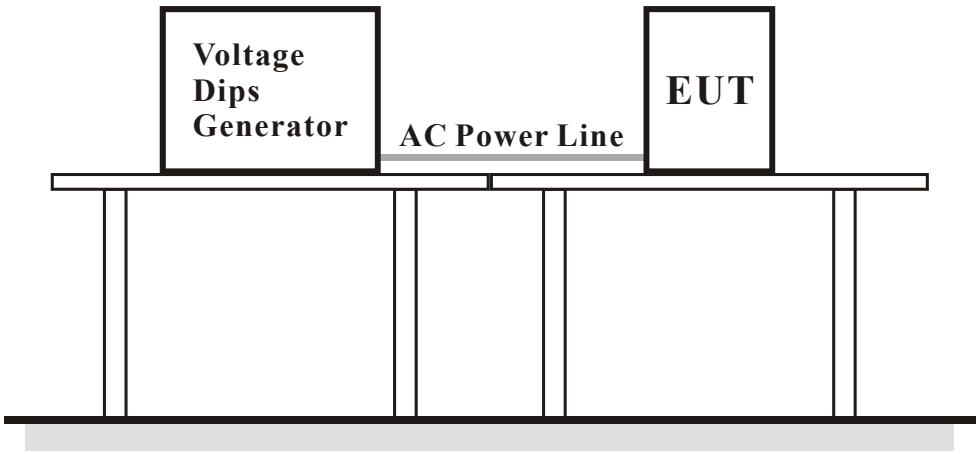
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HAEFELY Mains Interference Simulator	PLINE 1610	083690-17	March 3, 2004
KeyTek EMS Simulator	EMCPro	9902207	March 4, 2004

NOTE: 1. The test was performed in EMS Room No. 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.11.3 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of tree dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

5.11.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.11.5 TEST RESULTS

EUT	Full-Size CPU Card	**MODEL**	SBC-780-A10
		INPUT POWER	230Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	22 deg. C, 53 RH, 1005 hPa	**TESTED BY**: Alan Chang	

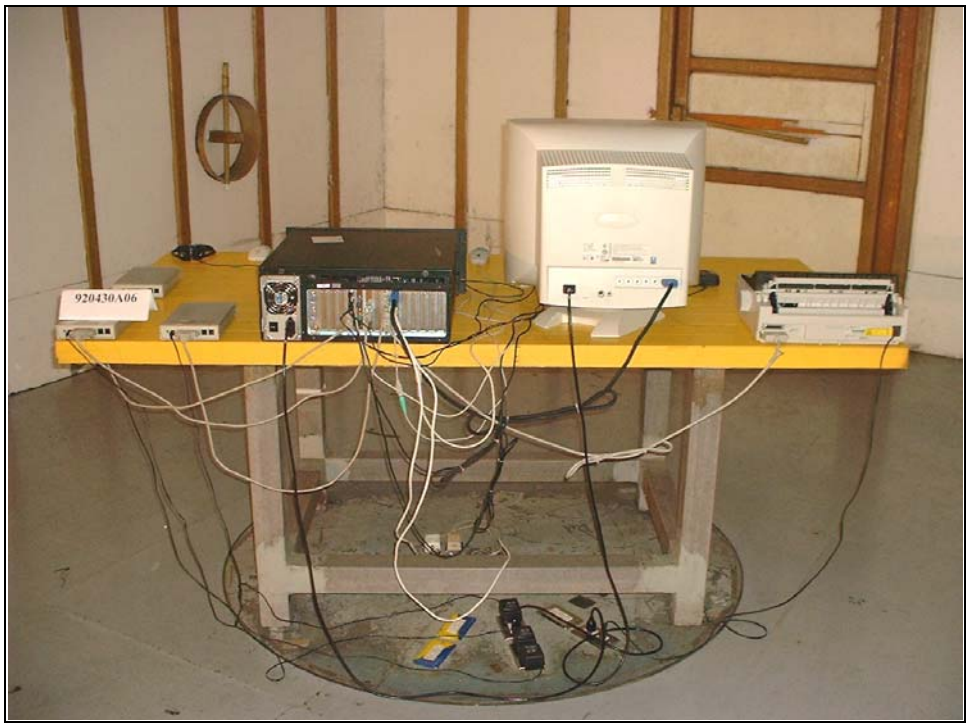
VOLTAGE % REDUCTION	PERIODS	RESULTS	OBSERVATION	PERFORMANCE CRITERION
30	0.5	PASS	Note 1	A
60	5	PASS	Note 1	A
60	50	PASS	Note 2	C
>95	250	PASS	Note 2	C

NOTE: 1.There was no change compared with initial operation during the test.
2. The EUT shut down during the test.

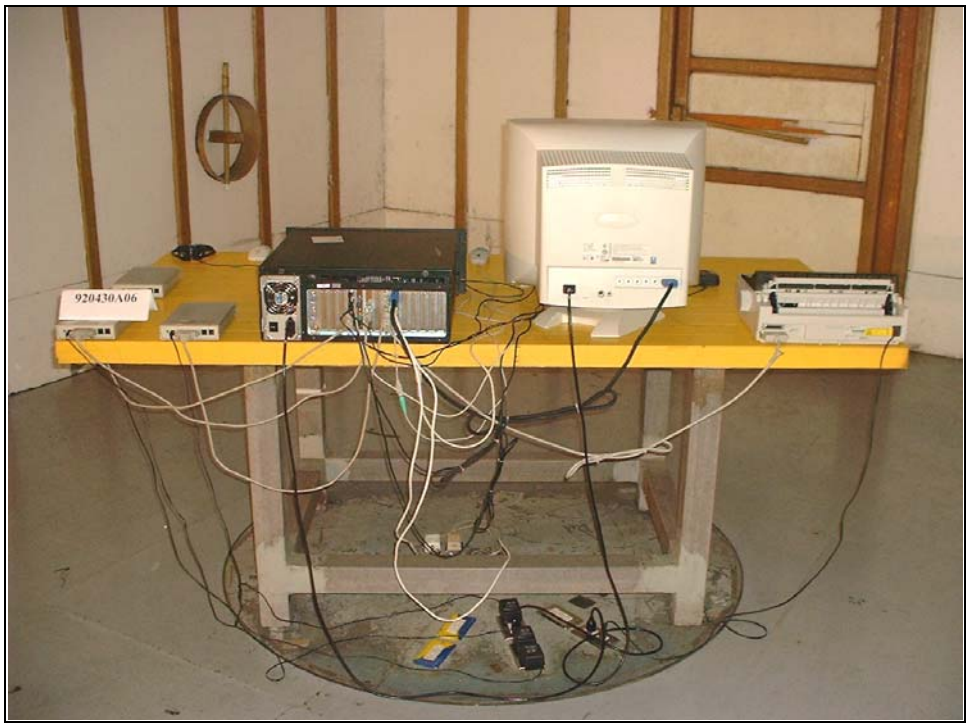
6 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

TELECOM PORTS TEST



RADIATED EMISSION TEST



HARMONICS EMISSION TEST & VOLTAGE FLUCTUATIONS AND FLICKER TEST

ESD TEST

1

2

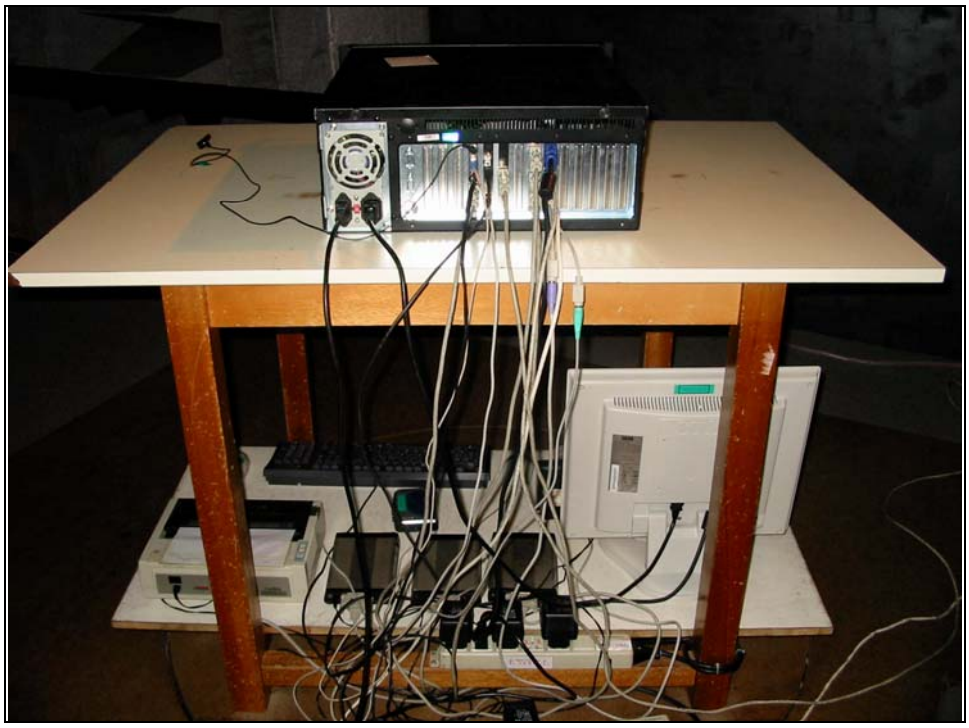
4

5


920430A06
3
6


920430A06
8
7

RS TEST



EFT TEST

EFT TEST (TELECOM PORT LAN 1)

EFT TEST (TELECOM PORT LAN 2)

SURGE TEST

CONDUCTED SUSCEPTIBILITY TEST

CONDUCTED SUSCEPTIBILITY TEST (TELECOM PORT LAN 1)

CONDUCTED SUSCEPTIBILITY TEST (TELECOM PORT LAN 2)

POWER-FREQUENCY MAGNETIC FIELDS TEST

VOLTAGE DIPS AND INTERRUPTIONS TEST

7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
Canada	INDUSTRY CANADA
R.O.C.	CNLA, BSMI

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

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Fax: 886-2-26052943

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The address and road map of all our labs can be found in our web site also.