Veriton FP2 TEST REPORT

PRODUCT: Veriton FP2

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THE TEST REPORT OF VERITION FP2

Reliability Test *August 22, 2000*

A. Purpose:

This reliability test plan serves as a guide for conducting environment tests, and for evaluating the reliability performance of FP2 system.

The objectives of these environment tests are to verify the design and process maturity of products before mass production and to justify a critical, reasonable and acceptable engineering change.

B. Details of Definitions for Reliability Test:

I. Performance Definitions

1. Electrical Function

The following definitions of the Performance Criteria in operation mode are referred to EN 50082-1 or IEC 1000-4-X EMS Standard. On the basis of the operating conditions and functional specifications of the equipment under test, the test results shall be classified as in the following table, unless, different specifications are given by product specifications. These error or performance criteria definitions will be also used in each test item's "test criteria" field.

Performance Criteria*	EN50082-1/ IEC 1000-4-X Description	Error Level	Acer Product Assurance Division Description
A	- IEC 1000-4-X: Normal performance within the specification limits - EN 50082-1: The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.	No Error	Normal performance within the specification limits.
B	- IEC 1000-4-X: Temporary degradation or loss of function or performance which is self-recoverable - EN 50082-1: The apparatus shall continue to operate as intended **after the test**. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the	Soft Error	Temporary degradation or loss of function or Performance which is self-recoverable within 10 seconds. e.g. * Without user intervention: Screen flicker; video still for a few seconds; temporary but not periodic noise from speaker; HDD read/write retry and then continue to operate; FDD read/write retry and then continue to operate; CDROM access retry and then continue to operate; Modem/Network Adapter data transfer retry and then continue to operate; speaker's temporary noise, etc.

	permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.		
Minor C	N/A	Minor Re-start Error	Temporary degradation or loss of function or performance which is very easy to recover with user intervention within 30 seconds. e.g. * With user intervention: With just ONE key pressed from keyboard or ONE click from mouse, touch-pad or some other pointing device or unplug and re-plug abnormal peripheral to recover to EUT's original operation status, no any error defined in the "Re-start error" permitted. More than one key/click to recover is not permitted either.
C	- IEC 1000-4-X: Temporary degradation or loss of function or performance which requires operator intervention or system reset - EN 50082-1: Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls	Re-start Error	Temporary degradation or loss of function or performance that requires operator intervention or system reset. e.g. - System halt - Keyboard , mouse, touch-pad, track point or other user-interface devices halt - HDD, FDD, LS120, Zip or other storage device fails to perform data transfer but no data loss or physical damage happened - CDROM/DVD-ROM, etc., data access or movie playback suspend - Permanent unexpected noise from speaker (recoverable after reboot) - Abnormal screen (shiver, missing line, black or white block, wavy, distortion, etc.) - Modem, Network Adapter data transmission interruption - System shut down unexpectedly - System reboot unexpectedly - Others defined by Acer PA
D	- IEC 1000-4-X: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data. EN 50082-1: N/A	Damage Error	Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data. No safety issue permitted (No fire, smoke, electrical shock, etc.) e.g. Require replacing parts/components to recover EUT's original operation.

Table I Electrical Performance Criteria

*: The meaning of character "A","B" and "C" for performance criteria is the same as in EN 50082-1 EMS Standard

2. Requirements of Appearance & Mechanical Function
   - No scratch (especially after drop or non-operating vibration test)
   - No dent. (especially after drop or non-operating vibration test)
   - No crack (especially after drop or non-operating vibration test)
   - No mold speckle (especially after temperature/humidity test)
   - No unclear letter (especially after non-operating temperature/humidity test)
   - No easily removed button (especially after drop, vibration test or non-operating temperature/humidity test, etc.)
   - No obvious fingerprint to degrade the quality image of the product.
   - Input and output terminals' connection must be easily matched (customer simulation reliability test)
   - No units wobbles (if bad mechanical design happens)
   - No migration materials in the set's plinths (e.g. foot of EUT dropped off after drop test)
   - No transfigure, deformity (especially after non-operating temperature/humidity test)
   - No stiffness or squeak for buttons when pressed (if bad mechanical design happens)
   - No warp or rust for metal parts (especially after non-operating temperature/humidity test)
   - No slack (e.g. screw loose)
   - No cracks to cushion (especially after drop test)
   - No severe damage to carton box (especially after drop test)

II. Test Software

(a) Scorpion I: Execute the following batch files at the same time in Windows 98 (Windows 98 has been installed)
   1. Display Resolution: 800*600*16 bpp [bit per pixel] or above
   2. HDD R/W and compare repeatedly:
   3. FDD: R/W and compare repeatedly:
   4. CDROM drive: Use "Media Player" in Windows to playback movie repeatedly (action movie is preferred; the VCD should exercise audio and video functions)
5. DVD-ROM drive: Use qualified software to playback movie repeatedly (action movie is preferred; the DVD should exercise audio and video functions)
6. Keyboard & mouse: Manually function test
7. Modem (if there is one) : Send or receive a long length file (back to back or some other data transfer methods)
8. Network Card: Connecting to a file server and map a network drive and perform files copy and compare repeatedly like HDD.bat
9. Playback a MIDI or wave file repeatedly.
10. Copy a movie file (*.mpg, *.avi, etc.) whose length is more than 30 minutes to HDD and use "Media Player" in Windows to playback the movie repeatedly.
11. Scorpion II: Scorpion I except FDD.BAT test
12. Scorpion III: Idle in Windows 98 environment
13. QAFE (or PQA) Diagnostics Program:
    For "Acceptance Criteria of C3 Entry", "Acoustic Noise Test" and for quick hardware functional check.
14. Onoff.exe:
    For EUT's system time record for "Power ON/OFF Characteristics" test
15. K-power:
    For measure the temperature of the Intel CPU.

III. Laboratory Climatic Conditions:

The tests shall be carried out in standard climate conditions in accordance with IEC 68-1 (Environmental Testing - General and Guidance), unless otherwise stated:

Temperature: 15?C ~ 35?C

Relative humidity: 25% ~ 75%
Barometric pressure: 86kPa ~ 106kPa (860 mbar ~ 1060 mbar)

Summary

Test Results are listed as follows:

1. Acceptance Criteria of C3 Entry ..... Pass
2. Voltage Dips & Short Interruptions Immunity Test ..... Pass
3. Electrical Fast Transient/Burst Immunity Test ..... Pass
4. Surge Immunity Test ..... Pass
5. Electrostatic Discharge Susceptibility Test ..... Pass
6. DC Margin and Power Consumption Test ..... Pass
7. Line Voltage and Frequency Test ..... Pass
8. Power ON/OFF Characteristics ..... Pass
9. Temperature/Thermal Profile Test ..... Pass
10. Operating Temperature and Humidity Test ..... Pass
11. Non-operating Temperature and Humidity Test ..... Pass
12. Operating Vibration Test ..... Pass
13. Non-operating Vibration Test ..... Pass
14. Acoustic Noise Measurement(Sound Pressure Level) ..... Pass
15. Acoustic Noise Measurement(Sound Power Level) ..... Pass
16. Transportation Drop Test ..... Pass

C. Contents of Reliability Tests:

1. Acceptance Criteria of C3 Entry

(a) Test Equipment:

1. N/A

(b) Test Criteria:

1. Function check:
   No any major problem allowed in each function check; each minor problem should be scheduled to be cleared in limited time period.
2. Appearance/mechanical function check:
   No major mechanical function problem (e.g. Floppy disk locked in FDD drive, CDROM tray can not be ejected, etc.) , no obvious assembly gap (0.8mm), no uniformity problem, no unit wobbles (0.5mm)

(c) Test Procedures:

1. Function check:
   (1) Power on to Windows operating environment and power off for 5 times
   (2) Check device manager of system property in control panel and confirm all devices are working normally
   (3) HCT quick function check
   (4) Use HCT for long run test (over night)
2. Appearance/mechanical function check:
   (1) Open/close all doors and covers for 10 times
   (2) Push/slide all switches and buttons for 10 times
   (3) Apply appropriate force on mechanical parts forward and backward to identify if there is unit wobbles.

(d) Test Result:

	Check Result
Function Check	Pass
Appearance/mechanical Check	Pass

Table 1-1

2. Voltage Dips & Short Interruptions Immunity Test

(a) Test Equipment:

1. Pacific Power Source 140TMX
2. CHROMA programmable AC Source, Model: 6120
3. Other relevant equipment

(b) Test Configuration:

Model	**Model 1**
CPU	Coppermine 933 /133
DIMM	Infineon 128MB x2 /PC-133
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100
CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (and API0PC03)
Keyboard	Dafon USB Keyboard 52UV
Modem	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0

Table 2-1

(c) Test Specifications:

U_T: The lower and upper input nominal AC voltage of the SPS (e.g. 115Vac and 240Vac)

Condition	Test level (% of U_T)	Duration (ms)	Number of disturbance	Polarity	Time interval between shoots
1	0	5000	3	90? and 0?, 180?	Depends on the time to enter windows environment
2	40	100	3	90? and 0?, 180?	Depends on the time to enter windows environment
3	70	10	6	90? and 0?, 180?	10s
4	0	10	6	90? and 0?, 180?	10s
5	0	20	6	90? and 0?, 180?	10s

Table 2-2

(d) Test Criteria:

Condition	Performance criterion (permitted)
1	C
2	C
3	A
4	A
5	B (for reference)

Table 2-3

Note:
1. Condition 1, 2 and 3 are based on the requirements of EN 50082-1
2. The criteria of condition 3 in EN 50082-1 is "B"

(e) Test Software:
1. Refer to Test Software on page 3

(f) Test Result:

Condition	Performance criterion (permitted)	Test Result
1	C	Pass
2	C	Pass
3	A	Pass
4	A	Pass
5	B (for reference)	Pass

Table 2-4

3. Electrical Fast Transient/Burst Immunity Test

(a) Test Equipment:

KeyTek ECAT electric fast transient generator test system with the following parameter:

- Open circuit output voltage range (energy storage capacitor voltage): 0.25kV to 4kV
- Characteristics for operation into 50? load condition (short-circuit condition):

1. Maximum energy : 4mJ/pulse at 2kV
2. Polarity : positive/negative
3. Dynamic source impedance : 50? +/- 20% between 1MHz and 100MHz
4. Rise time of one pulse : 5ns ? 30%
5. Pulse duration (50%~50%) : 50ns ? 30%
6. Pulse repetition frequency : 5.0kHz or 2.5kHz
7. Burst duration : 15ms ? 20% (Max.)
8. Burst period : 300ms ? 20% (Min.)

(b) Test Configuration:

Model	**Model 1**
CPU	Coppermine 933 /133
DIMM	Infineon 128MB x2 /PC-133
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100
CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (and API0PC03)
Keyboard	Dafon USB Keyboard 52UV
Modem	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0

Table 3-1

(c) Test Specifications:

1. Input AC power ports
   (1) Rise time of one pulse : 5ns
   (2) Impulse duration : 50ns
   (3) Repetition frequency of the impulses : 5kHz
   (4) Charge voltage : +/- 1kV
   (5) Duration of the test for each condition : 1 minutes
   (6) Ports to be tested : Line, neutral and chassis ground
2. Ports for signal lines and control lines (if modem or network card is built in the system)
   (1) Rise time of one pulse : 5ns
   (2) Impulse duration : 50ns
   (3) Repetition frequency of the impulses : 5kHz
   (4) Charge voltage : +/- 0.5kV
   (5) Duration of the test for each condition : 1 minutes

Note: Capacitive coupling clamp used

(d) Test Criteria:

1. Test on AC power port:

Error Level / Testing voltage	?500V	?750V	?1000V	?1250V
Performance criteria permitted	A	A	B	Margin Test for reference

Table 3-2

2. Test on signal line or control line: (only for signal or control line which is more than 3 meters long)

Error Level / Testing voltage	?250V	?500V	?750V
Performance criteria permitted	A	B	Margin Test for reference

Table 3-3

(e) Test Software
Refer to Test Software on page 3

(f) Test result:
Test on AC power port:

Error Level / Testing voltage	?500V	?750V	?1000V	?1250V
Performance criteria permitted	A	A	B	Margin Test for reference
Test Result	Pass	Pass	Pass	Pass

Table 3-2

Test on signal line or control line: (only for signal or control line which is more than 3 meters long)

Error Level / Testing voltage	?250V	?500V	?750V
Performance criteria permitted	A	B	Margin Test for reference
Test Result	Pass	Pass	Pass

Table 3-3

4. Surge Immunity Test

(a) Test Equipment
KeyTek ECAT Lightning Surge Generator

(b) Test Configuration:

Model	**Model 1**
CPU	Coppermine 933 /133
DIMM	Infineon 128MB x2 /PC-133
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100
CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (and API0PC03)
Keyboard	Dafon USB Keyboard 52UV
Modem	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0

Table 4-1

(c) Test Specification

Test Mode	Test Voltage	Polarity	Phase Shifting	No. of surges	Repetition Rate
Line to line (differential mode)	1kV	Positive & negative	0?, 90? and 270?	5	1 surge/minute

Line to ground (common mode)	2kV	Positive & negative	0?, 90? and 270?	5	1 surge/minute

Table 4-2

Note: Lower voltage levels must pass the test too.

(d) Test Criteria:

a. AC power port: Line to Line

Error Level / Testing voltage	?500V	?750V	?1000V	?1250V
Performance criteria permitted	A	A	B	Margin Test for reference

Table 4-3

b. AC power port: Line to ground

Error Level / Testing voltage	?1000V	?1500V	?2000V	?2250V
Performance criteria permitted	A	A	B	Margin Test for reference

Table 4-4

(e) Test Software

Refer to Test Software on page 3

(f) Test Result:

AC power port: Line to Line

Error Level / Testing voltage	?500V	?750V	?1000V	?1250V
Performance criteria permitted	A	A	B	Margin Test for reference
Test Result	Pass	Pass	Pass	Pass

Table 4-3

AC power port: Line to ground

Error Level / Testing voltage	?1000V	?1500V	?2000V	?2250V
Performance criteria permitted	A	A	B	Margin Test for reference
Pass	Pass	Pass	Pass	Pass

Table 4-4

5. Electrostatic Discharge Susceptibility Test

(a) Test Equipment

1. Electrostatic Discharge Tester (KeyTek Series 2000): KeyTek model ESD-1 ESD Simulator.
2. IEC Discharge Network
3. KeyTek model DN-10 rated 150 pF, 330 ohm with DT-2 (point) or DT-1 (IEC Ball) discharge tip.

(b) Test Configuration:

Model	**Model 1**
CPU	Coppermine 933 /133
DIMM	Infineon 128MB x2 /PC-133
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100
CD-ROM	LG 24X Slim CD-ROM
DVD-ROM	MKE Model:SR-8175-B
FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (and API0PC03)
Keyboard	Dafon USB Keyboard 52UV
Modem	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0

Table 5-1

(c) Test Specifications and Criteria

1. Climatic conditions shall be within the following ranges: (IEC 1000-4-2)
   (1) Ambient Temperature: 15?C ~ 35?C
   (2) Relative Humidity: 30% ~ 60%
   (3) Atmospheric Pressure: 86kPa to 106kPa
2. Test level

Acceptance Criteria	ESD Voltage Level					
	Air Discharge	Contact Discharge	Air Discharge	Contact Discharge	Air Discharge	Contact Discharge
	?4 kV	?4 kV	?8 kV	?6 kV	?15 kV	?8 kV
A	Permitted		Permitted		Permitted	
B	Not Permitted		Permitted		Permitted	
C	Not Permitted		Not permitted		Permitted	
D	Not Permitted		Not Permitted		Not Permitted	
Remark	Note (1), (2)				Note (3)	

Table 5-2

Note:

(1) It is a minimum spec. of the add-on card which built in a PC system under an operation mode.
(2) Following the spec also if the speakers with finger guard are exposed.
(3) It is a minimum spec. of an operating PC whose add-on card under the idle mode.

3. At least 10 single discharges shall be applied to a pre-selected point
4. Time interval between successive single discharge: 1 second (standard) or 3 seconds.
5. Time interval between successive single discharge for test points on modem or LAN card: 3 seconds

(d) Test Software:

Refer to Test Software on page 3

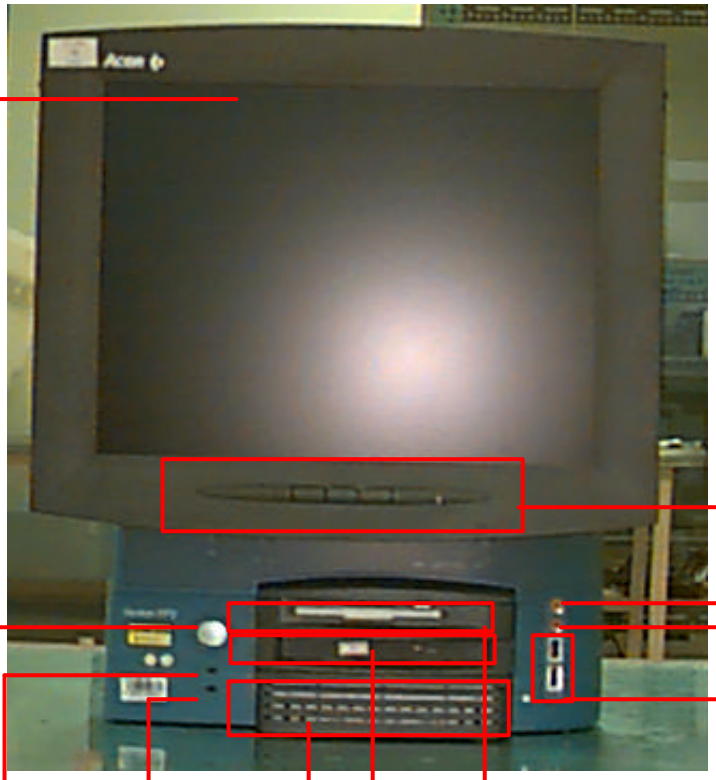
(e) Test result: Pass

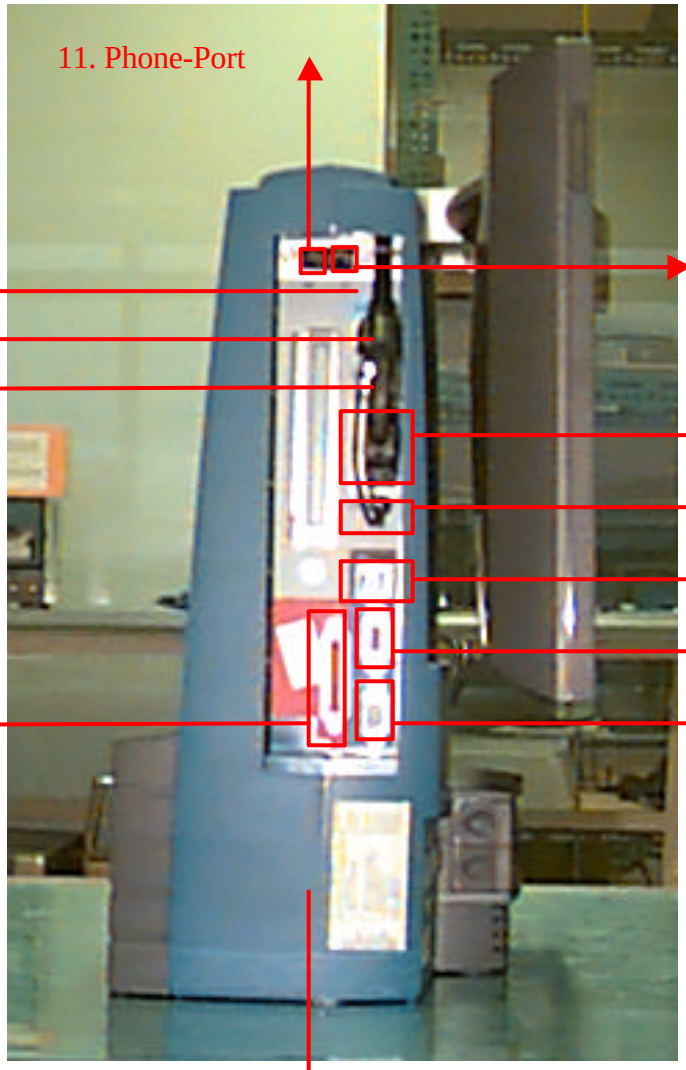
Acceptance Criteria	ESD Voltage Level

	Air Discharge	Contact Discharge	Air Discharge	Contact Discharge	Air Discharge	Contact Discharge
	?4 kV	?4 kV	?8 kV	?6 kV	?15 kV	?8 kV
A	Permitted		Permitted		Permitted	
B	Not Permitted		Permitted		Permitted	
C	Not Permitted		Not permitted		Permitted	
D	Not Permitted		Not Permitted		Not Permitted	
Test Result	Pass		Pass		Pass	

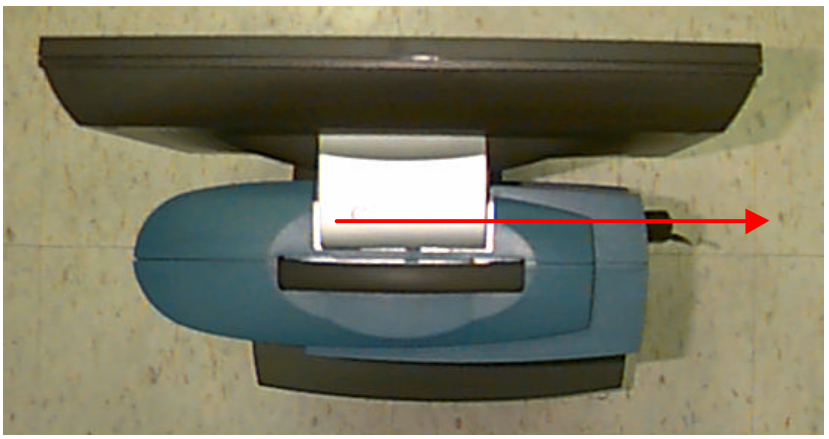
Table 5-2

The ESD Test point for Veriton front-side

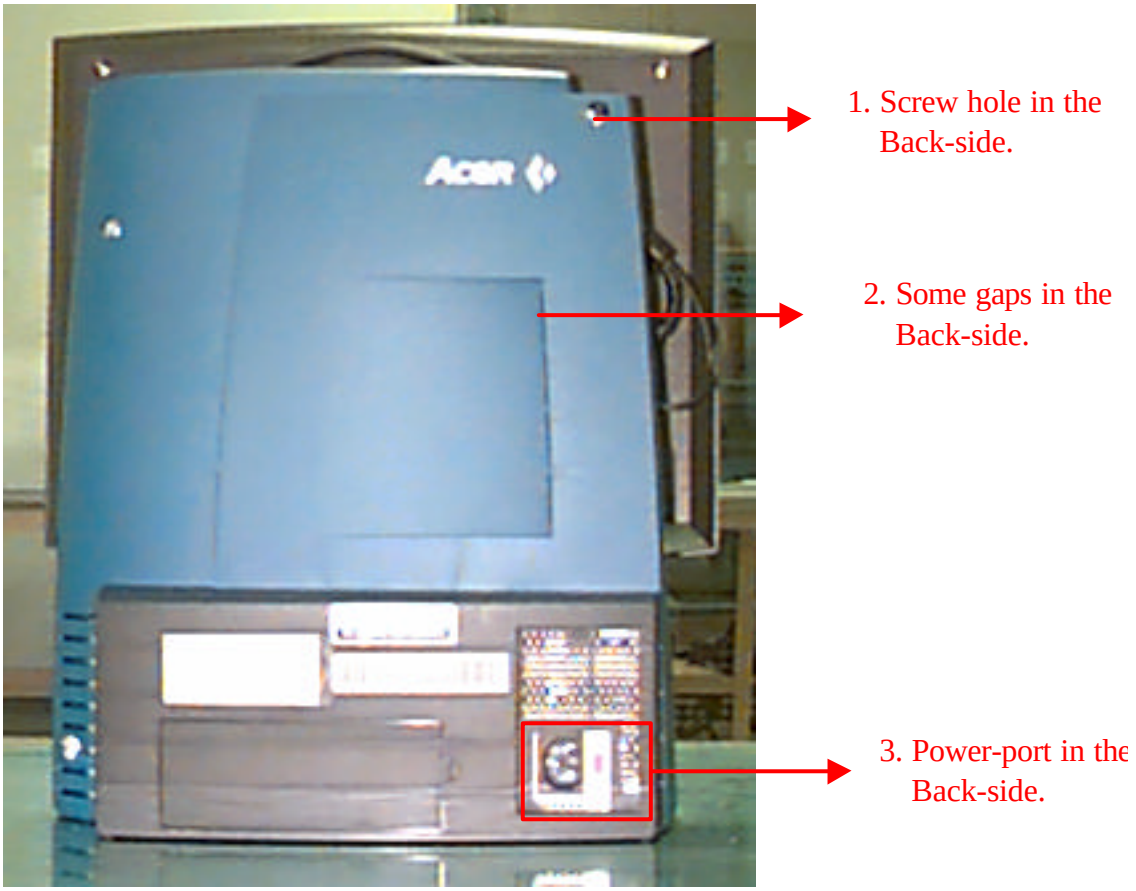

11. The gap around the panel
1.Panel control bottom
2.Headphone Output
3. MIC
4. 2 USB ports
10. Power ON/OFF bottom
5. Floppy Driver
6. DVD-ROM Driver
9. HDD LED
8. HDD LED
7. The gap of the mechanical design



The ESD Test point for Veriton Left-side



The ESD Test point for Veriton front-side



The ESD Test point for Veriton back-side

6. DC Margin and Power Consumption Test

(a) Test Equipment

1. DC Power Supply (such as HP 6031A, HP 6542A, HP E3610A, HP 6651A bench power supply or Acer laboratory tools)
2. Digital Multimeter
3. Other relevant equipment

(b) Test Configuration:

Model	Model 1	Model 2	Model 3
CPU	Coppermine 933 /133	Coppermine 850 /100	Celeron 700 /66
DIMM	Infineon 128MB x2 /PC-133	Micron 128MB x1 /PC-100	Infineon 64MB x1 /PC-100
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100	Quantum LCT15 30GB	Quantum LCT15 10.2GB
CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD	Panasonic Slim FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (and API0PC03)	Hi-power SFX-120M4 R.A0 (and API0PC03)	Hi-power SFX-120M4 R.A0 (and API0PC03)
Keyboard	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV
Modem	Askey	---	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0	V4.0	V4.0

Table 6-1

(c) Test Specifications:

DC Voltage on M.B. power socket		
+3.3Vdc	+5Vdc	+12Vdc
+5%	+5%	Fixed
+5%	-5%	
-5%	+5%	
-5%	-5%	

Table 6-2

2. Test Duration:
   i. 30 minutes at least for each test condition while test software is referred to page 11
   ii. Two loops of HCT quick check for each test item

(d) Test Criteria:

Performance criteria A must be met for each test condition.
The criteria of the Power Consumption is 60W for LCD-PC.

(e) Test Software:

Refer to Test Software on page 3

(f) Test Result:

1.DC Margin Test Result:
Model 2:

DC Voltage on M.B. power socket				
Situation	Item Specifications	Actual Measuring Value		Test Result
		Voltage (V)	Current (A)	
1	3.3V	3.30	1.22	Pass
	5V	5.05	1.68	
2	3.3V +5%	3.48	1.77	Pass
	5V +5%	5.35	1.22	
3	3.3V +5%	3.47	1.77	Pass
	5V -5%	4.85	1.20	
4	3.3V -5%	3.13	1.00	Pass
	5V +5%	5.30	1.05	
5	3.3V -5%	3.13	1.68	Pass
	5V -5%	4.85	1.19	
6	12V (Fixed)	12.00	1.90	Fixed

Table 6-3

2. Power Consumption Test Result:

Model 1:

AC test condition Configuration	115Vac, 60Hz (Wrms)	230Vac, 50Hz (Wrms)
Windows 98 low power state (within 30 minutes after system idle)	31.2	30.8
Scorpion I	79.2	80.9

Table 6-4

Model 2:

AC test condition Configuration	115Vac, 60Hz (Wrms)	230Vac, 50Hz (Wrms)
Windows 98 low power state (within 30 minutes after system idle)	30.6	30.4
Scorpion I	85	80.9

Table 6-5

Model 3:

AC test condition Configuration	115Vac, 60Hz (Wrms)	230Vac, 50Hz (Wrms)
Windows 98 low power state (within 30 minutes after system idle)	29.5	29.2
Scorpion I	81	79

Table 6-6

7. Line Voltage and Frequency Test

(a) Test Equipment

a. Frequency Converter
b. Power Meter
c. Multimeter
d. Other relevant equipment

(b) Test Configuration:

Model	Model 1	Model 2	Model 3
CPU	Coppermine 933 /133	Coppermine 850 /100	Celeron 700 /66
DIMM	Infineon 128MB x2 /PC-133	Micron 128MB x1 /PC-100	Infineon 64MB x1 /PC-100
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100	Quantum LCT15 30GB	Quantum LCT15 10.2GB
CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD	Panasonic Slim FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)	Hi-power SFX-120M4 R.A0 (or API0PC03)	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV
Modem	Askey	---	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0	V4.0	V4.0

Table 7-1

(c) Test Specifications

Function Test I

i. Voltage
   1. 100V/120V (-/+ 10%) : 90~132V
   2. 200V/240V (-/+ 10%) : 180~264V

ii. Frequency
   1. 50Hz (-/+ 3Hz) : 47~53Hz
   2. 60Hz (-/+ 3Hz) : 57~63Hz

Function Test II

iii. Voltage variation (frequency is fixed to 50Hz or 60Hz) :
   1. 90V to 132V increasingly and 132V to 90V decreasingly
   2. 180V to 264V increasingly and 264V to 180V decreasingly

iv. Frequency variation (voltage is fixed to 115V or 230V) :
   47Hz to 63Hz and 63Hz to 47Hz

(d) Test Criteria:

Performance Criteria A must be met for both test conditions

(e) Test Software:

Refer to Test Software on page 3

(f) Test Result:

Function Test I:

Frequency	50 Hz		60Hz	
Voltage(V)	47 Hz	53 Hz	57 Hz	63 Hz
90	Pass	Pass	Pass	Pass
132	Pass	Pass	Pass	Pass
180	Pass	Pass	Pass	Pass

264	Pass	Pass	Pass	Pass

Function Test II:

Model 1

Test Result						
Frequency	Voltage				Frequency	
Voltage(V) or Frequency(Hz)	90V~132V	132V~90V	264V~180V	180V~264V	47Hz~63Hz	63Hz~47Hz
115Vac	---	---	---	---	Pass	Pass
230Vac	---	---	---	---	Pass	Pass
50Hz	Pass	Pass	Pass	Pass	---	---
60Hz	Pass	Pass	Pass	Pass	---	---

Model 2

Test Result						
Frequency	Voltage				Frequency	
Voltage(V) or Frequency(Hz)	90V~132V	132V~90V	264V~180V	180V~264V	47Hz~63Hz	63Hz~47Hz
115Vac	---	---	---	---	Pass	Pass
230Vac	---	---	---	---	Pass	Pass
50Hz	Pass	Pass	Pass	Pass	---	---
60Hz	Pass	Pass	Pass	Pass	---	---

Model 3

Test Result						
Frequency	Voltage				Frequency	
Voltage(V) or Frequency(Hz)	90V~132V	132V~90V	264V~180V	180V~264V	47Hz~63Hz	63Hz~47Hz
115Vac	---	---	---	---	Pass	Pass
230Vac	---	---	---	---	Pass	Pass
50Hz	Pass	Pass	Pass	Pass	---	---
60Hz	Pass	Pass	Pass	Pass	---	---

8. Power ON/OFF Characteristics

(a) Test Equipment:
Electronic timer

(b) Test Configuration:

Model	**Model 1**
CPU	Coppermine 933 /133
DIMM	Infineon 128MB x2 /PC-133
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100
CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV
Modem	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0

Table 8-1

(c) Test Specifications

1. Basic Function Test:
   (1) System ON Time : Booting OK in MS-DOS mode (POST and loading MS-DOS successfully)
   (2) System OFF Time : 20 seconds
   (3) ON/OFF Cycle : 1000 times
2. Margin Test:
   (1) System ON/OFFtime : Not more than 1 second
   (2) ON/OFF Cycle : 100 times

(d) Test Criteria:

3. Basic function Test:
   (1) Successfully boot to MS-DOS mode at each power on/off cycle
   (2) No unacceptable RTC data loss
   (3) No physical damage after test
   (4) Function check OK using HCT "quick check"
4. Margin Test:
   (1) No unacceptable RTC data loss
   (2) No damage or safety problem after test
   (3) Function check OK using HCT "quick check"

(e) Test Software

a. Refer to Test Software on page 3

(f) Test Result:

Test Item	Result
Basic Function Test	Pass
Margin Test	Pass

Table 8-2

9. Temperature/Thermal Profile Test

(a) Test Equipment

1. Temperature Recorder
2. Thermocouple
3. IR camera

(b) Test Configuration:

Model	Model 1	Model 2	Model 3
CPU	Coppermine 933 /133	Coppermine 850 /100	Celeron 700 /66
DIMM	Infineon 128MB x2 /PC-133	Micron 128MB x1 /PC-100	Infineon 64MB x1 /PC-100
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100	Quantum LCT15 30GB	Quantum LCT15 10.2GB
CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD	Panasonic Slim FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (and API0PC03)	Hi-power SFX-120M4 R.A0 (and API0PC03)	Hi-power SFX-120M4 R.A0 (and API0PC03)
Keyboard	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV
Modem	Askey	---	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0	V4.0	V4.0

Table 9-1

(c) Test Specifications

1. Test Environment:
   (1) EUT is tested in NORMAL temperature/humidity environment without obvious wind flow for a period of four hours at least.
2. All thermal data measured must be converted to 35?C equivalent by linear interpolation method

(d) Test Criteria:

3. Key component:

No.	Component	Point	Tc(max) ?C
1	HDD	Central surface on top cover	60 (refer to databook)
2	CD-ROM	Central surface on bottom cover	55 or 60 (refer to databook)
3	DVD-ROM	Central surface on bottom cover	55 (refer to databook)
4	FDD	Central surface on top cover	57 (refer to databook)

Table 9-2

4. Component on main board
   (1) Major test points

No.	Chip Name	Point	Tj(max) ?C
1	CPU	Center of Surface	refer to databook
No.	Chip Name	Point	Tc(max) ?C
2	VGA CHIP	Center of Surface	75 or refer to databook
3	SOUND CHIP	Center of Surface	75 or refer to databook
4	DRAM/SRAM	Center of Surface	75 or refer to databook
5	CHIPSETS	Center of Surface	75 or refer to databook
6	MODEM CHIP	Center of Surface	75 or refer to databook
7	Hot Components around voltage regulator module (VRM)	Center of Surface	105?C for aluminium electrolytic capacitor or refer to databook
8	Other chips whose temperature is relative high according to the survey of IR camera.	Center of Surface	75 or refer to databook

Table 9-3

(2) Directions for each chip's Pass or Fail judgement:

(2-1) If Tc(max) is available on component data sheet then the measured Tc can not be over Tc(max) and the judgement is finished

(2-2) If Tc(max) is not available and Ta(max) is available on component data sheet then if the measured Tc is under Ta(max)+5?C, then the chip pass the test

(2-3) If the measured Tc is over Ta(max)+5?C and fail at item (b) criteria then use the following formula to check the result:

(2-3-1) Parameter definition:

i. Tj(max): maximum junction temperature which is provided by IC vendor (Typically, Tj(max)=125?C)

ii. $?_{JC}$: Junction to case thermal resistance (?C/Watt)

iii. $?_{JA}$: Junction to ambient thermal resistance (?C/Watt)

iv. Pd: Device power dissipation (Watt)

b. If $?_{JC}$, tj(max) and Pd is available, then the calculated Tj can not be over Tj(max)

$Tj = Tc + Pd * ?_{JC}$

c. If $?_{JA}$, Tj(max) and Pd is available, then the calculated Tj can not be over Tj(max)

$Tj = T_A + Pd * ?_{JA} ? (Tc - 5) + Pd * ?_{JA}$

(e) Test Software:

Refer to Test Software on page 3

(f) Test Result:

	Compenment	Tc at 43.56 °C	Tc at 35 °C	Specification At 35°C	Margin	Result
1.	ICS 92508F-27 0015 CA030249	82.16	73.6	75	+1.4	Pass
2.	SC 3.3 EZ1588CM 9814 E74681	79.52	70.96	75	+4.04	Pass
3.	DA82562ET L0	73.52	64.96	75	+9.04	Pass
4.	INTEL FW82801BA L016TB23 SL45H	74.72	66.16	75	+8.84	Pass
5.	INTEL 815 FW82815 L0171B68 SL4DF	77.56	69.00	75	+6.00	Pass
6.	Silicon Image sil164c T64 V102195.1vcc 0016 0.2	73.84	65.28	75	+9.72	Pass
7.	Smsc LPC47M102 B0018-A9462 8H22256-0 American Megatrend	73.36	64.80	75	+10.2	Pass
8.	SC1164CSW 9941 P96A71	78.64	70.08	75	+4.92	Pass
9.	Diod (D21)	78.40	69.84	75	+5.16	Pass

10.	PHB 55N03LT PHm9940/.3	57.60	49.04	75	+25.96	Pass
11.	RAM	79.44	70.88	75	+4.12	Pass
12.	FDD	53.60	45.04	57	+29.96	Pass
13.	HDD(Quantum LCT15 30GB)		48.00	60	+12.00	Pass
14.	Maxtor Altair VL 30.7GB/ ATA100		47.00	60	+13.00	Pass
15.	CD-ROM	54.32	45.76	60	+29.24	Pass
16.	POWER	61.44	52.88	75	+22.12	Pass
17.	CPU Celeron-700MHz		68.00	80	+12.00	Pass
18.	CPU PIII-850MHz		79.00	80	+1.00	Pass
19.	CPU PIII-933MHz		71.00	75	+4.00	Pass
20.	Room Temperature	43.56	35.00			

Table 9-4

10. Operating Temperature and Humidity Test

(a) Test Equipment

1. Temperature/Humidity chamber
2. Other relevant temperature/humidity chamber

(b) Test Configuration:

Model	Model 1	Model 2
CPU	Coppermine 933 /133	Coppermine 850 /100
DIMM	Infineon 128MB x2 /PC-133	Micron 128MB x1 /PC-100
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100	Quantum LCT15 30GB
CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV
Modem	Askey	---
Mainbroard	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0	V4.0

Table 10-1

(c) Test Specifications

1. Low temperature : +5?C / 20% R.H.
2. High temperature & high humidity : +35?C/ 80% R.H.

Notes:

(1) Temperature and humidity gradient should be less than 20?C/hour and 20% R.H./hour, respectively, to prevent condensation.

(2) Above humidity is non-condensing
(3) Provided that the maximum wet-bulb temperature is 32? C at high temperature and high humidity condition.

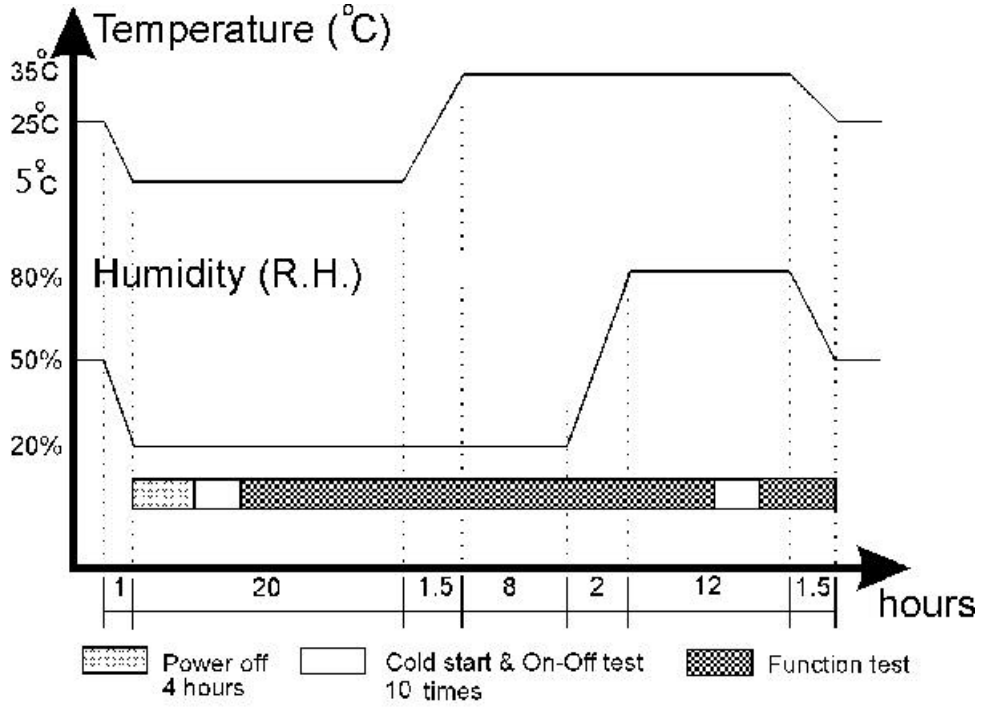


Figure 10-1 Operating temperature/humidity cycling test curve.

(d) Test Criteria:
a. Performance criteria A must be met during and after the test
b. During the test, temperature margin (? 5?C) must be added if number of test samples is less than 3

(e) Test Software:
Refer to Test Software on page 3

(f) Test Result:
The function of the machine is normal operating under the testing.
So the result is “Pass”.

Checking Item	Test Result
Cold Start	Pass
Hot Start	Pass
Function check after test	Pass

Table 10-2

11. Non-operating Temperature and Humidity Test

(a) Test Equipment
1. Temperature/Humidity chamber
2. Other relevant temperature/humidity chamber

(b) Test Configuration:

Model	Model 3
CPU	Celeron 700 /66
DIMM	Infineon 64MB x1 /PC-100
HDD (3.5")	Quantum LCT15 10.2GB
CD-ROM	LG 24X Slim CD-ROM
FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV
Modem	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0

Table 11-1

(c) Test Specifications
1. Un-packed
   (1) Low temperature : -10?C / humidity not controlled
   (2) High temperature & high humidity : +60?C/ 80% R.H.
2. Storage Package
   (1) Low temperature : -20?C / humidity not controlled
   (2) High temperature & high humidity : +60?C/ 90% R.H.

Notes:
(1) Temperature gradient should be less than 20?C /hour and 20%RH/hour to prevent condensation.
(2) The humidity in un-packed case is non-condensing
(3) Provided that the maximum wet-bulb temperature is 55? C at high temperature and high humidity condition in un-packed case.

(d) Test Criteria:
1. Un-packed
   (1) Performance criteria A must be met after the test
   (2) No assembly problem
   (3) Appearance and mechanical function
      (3-1) No dent.
      (3-2) No crack
      (3-3) No mold speckle
      (3-4) No unclear letter, broken line
      (3-5) No easily removed button
      (3-6) Input and output terminals' connection must be easily matched
      (3-7) No units wobbles
      (3-8) No migration materials in the set's plinths (e.g. foot of EUT dropped off)
      (3-9) No letters or symbols on cabinet are missing
      (3-10) No transfigure, deformity
      (3-11) No stiffness or squeak for buttons when pressed
      (3-12) No warp or rust for metal parts
      (3-13) No slack (e.g. screw loose)

2. Storage Package
   (1) Performance criteria A must be met after the test
   (2) No assembly problem
   (3) Appearance and mechanical function
      (3-1) No scratch
      (3-2) No dent.
      (3-3) No crack
      (3-4) No mold speckle
      (3-5) No unclear letter, broken line
      (3-6) No easily removed button
      (3-7) No obvious fingerprint to degrade the quality image of the product.
      (3-8) Input and output terminals' connection must be easily matched
      (3-9) No units wobbles
      (3-10) No migration materials in the set's plinths (e.g. foot of EUT dropped off)
      (3-11) No letters or symbols on cabinet are missing
      (3-12) No transfigure, deformity
      (3-13) No stiffness or squeak for buttons when pressed
      (3-14) No warp or rust for metal parts
      (3-15) No slack (e.g. screw loose)
      (3-16) No cracks or severe damage to cushion
      (3-17) No server damage or crack to carton box

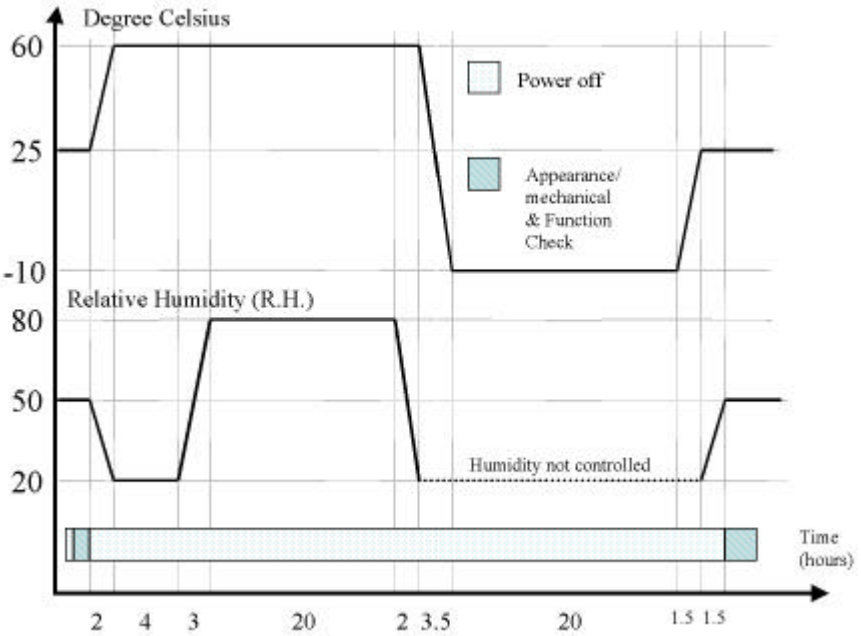


Figure 11-1 Non operating temperature/humidity test curve (unpacked)

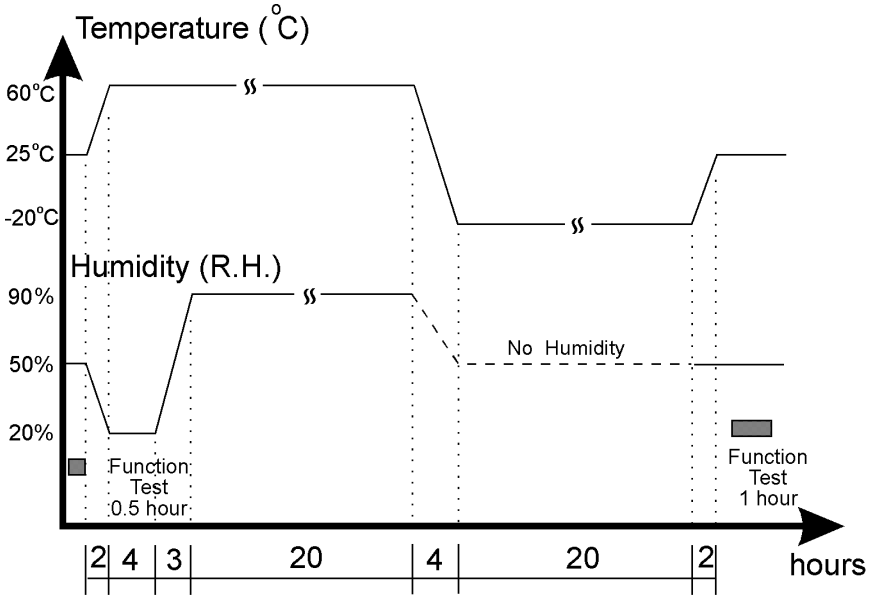


Figure 11-2 Storage's package temperature/humidity test curve.

(e) Test Software:
Refer to Test Software on page 3

(f) Test Result :

Check Item		Result
Un-packed	Mechanical Check	Pass
	Functional Check	Pass
Storage-package	Mechanical Check	Pass
	Functional Check	Pass

Table 11-2

12. Operating Vibration Test

(a) Test Equipment

1. Vibration system (Unholtz-Dickie MA115SA-40)
2. Control Software: Data Physics corporation DP550Win Vibration Control System Version:2.30
3. Other relevant equipment

(b) Test Configuration:

Model	Model 1	Model 2
CPU	Coppermine 933 /133	Coppermine 850 /100
DIMM	Infineon 128MB x2 /PC-133	Micron 128MB x1 /PC-100
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100	Quantum LCT15 30GB
CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM
DVD-ROM	MKE Model:SR-8175-B	MKE Model:SR-8175-B
FDD	Panasonic Slim FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV
Modem	Askey	---
Mainbroard	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0	V4.0

Table 12-1

(c) Test Specifications:

The specifications below are applicable to most products. Some products, due to their peculiar design, may require different tests. These limits must be determined by the responsible design engineer.

Frequency Hertz	Displacement (peak-peak) Or Acceleration	Sweep Rate	Endurance Cycle
5 ~ 16	0.38 mm (0.015")	1 Octave/Minute	1 Cycles (2 sweeps)
16 ~ 250	0.2 G		

Table 12-2

(d) Test Criteria:

During and after the test:

1. Function:
   Performance criteria A, B or minor C shall be met
2. Appearance & mechanical function
   The EUT should not suffer permanent deformation or fracture. No fixed part or assembly shall be loosening. No moving or movable part of an assembly should become free or sluggish in the testing process. No movable part should shift in setting, position or adjustment.

(e) Test Software
Refer to Test Software on page 3: Scorpion I

(f) Test Result:

Checking Item	Test Result
Mechanical check after test	Pass
Function check after test	Pass

Table 12-3

13. Non-operating Vibration Test

(a) Test Equipment

1. Vibration system (such as UD TA115-30 or UD TA115SA-40-12)
2. Control Software: DP550Win
3. Other relevant equipment

(b) Test Configuration:

Model	Model 1	Model 2
CPU	Coppermine 933 /133	Coppermine 850 /100
DIMM	Infineon 128MB x2 /PC-133	Micron 128MB x1 /PC-100
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100	Quantum LCT15 30GB
CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM
DVD-ROM	MKE Model:SR-8175-B	MKE Model:SR-8175-B
FDD	Panasonic Slim FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV
Modem	Askey	---
Mainbroard	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0	V4.0

Table 13-1

(c) Test Specifications:

1. Packed/Sine Mode: (Test time: 53 minutes/axis)

Frequency (Hertz)	Displacement (peak-peak) Or Acceleration	Sweep Rate	Endurance Cycle
5 ~ 27.1	0.6G	0.5 Octave/Minute	2 Cycles (4 sweeps)
27.1 ~ 50	0.016"(0.4mm)		
50 ~ 500	2.0G		

Table 13-2

(d) Test Criteria:

After the test:

1. Function:
   Performance criteria A shall be met
2. Appearance & mechanical function
   The EUT should not suffer permanent deformation or fracture. No fixed part or assembly shall be loosen.

No moving or movable part of an assembly should become free or sluggish in the testing process. No movable part should shift in setting, position or adjustment.

(e) Test Software

Refer to Test Software on page 3

(f) Test Result:

Checking Item	Test Result
Functional check	Pass
Appearance and mechanical check	Pass

Table 13-3

14. Acoustic Noise Measurement(Sound Pressure Level)

(a) Test Equipment

1. B&K 2143 Real Time Frequency Analyzer
2. B&K 4190 Low Noise Free-Field 1/2 inch Microphone
3. B&K 2669B Microphone Pre-Amplifier
4. B&K 4231 Sound Level Calibrator
5. B&K 4179 1 inch Condenser Microphone
6. Other relevant equipment

(b) Test Configuration:

Model	**Model 1**	**Model 2**
CPU	Coppermine 933 /133	Coppermine 850 /100
DIMM	Infineon 128MB x2 /PC-133	Micron 128MB x1 /PC-100
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100	Quantum LCT15 30GB
CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM
DVD-ROM	MKE Model:SR-8175-B	MKE Model:SR-8175-B
FDD	Panasonic Slim FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV
Modem	Askey	---
Mainbroard	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0	V4.0

Table 14-1

(c) Test Criteria:

Measurement position	Operation mode	Upper limits
Operator Position (dBA)	Idle mode	? 40
	Operating (a)*	? 42
	Operating (b)*	? 46
	Operating (c)*	? 46
	Operating (d)*	? 46
Bystander Position /LpA (dBA)	Idle mode	? 39
	Operating (a)*	? 40
	Operating (b)*	? 44
	Operating (c)*	? 42
	Operating (d)*	? 42

Table 14-2 Acoustic Noise Specifications

Note:

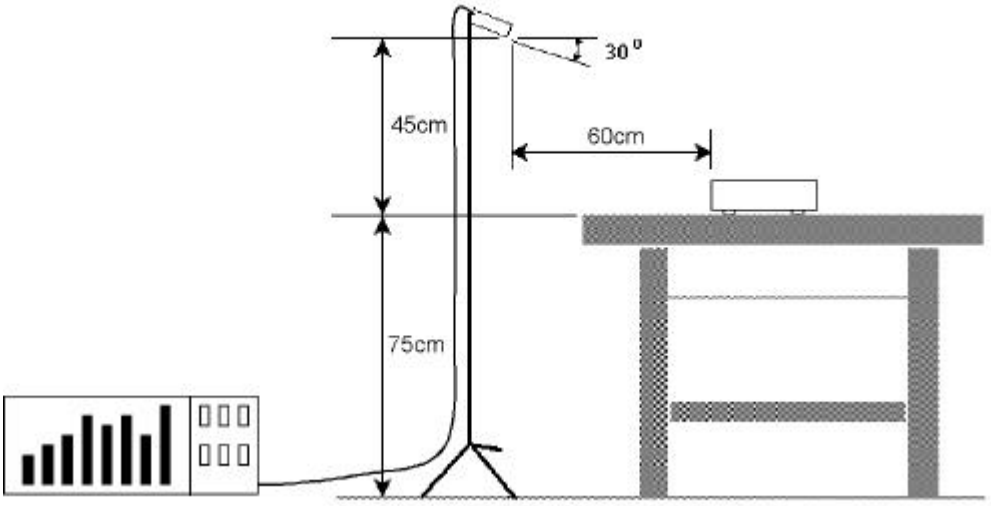


Figure 14-1 Operator Position

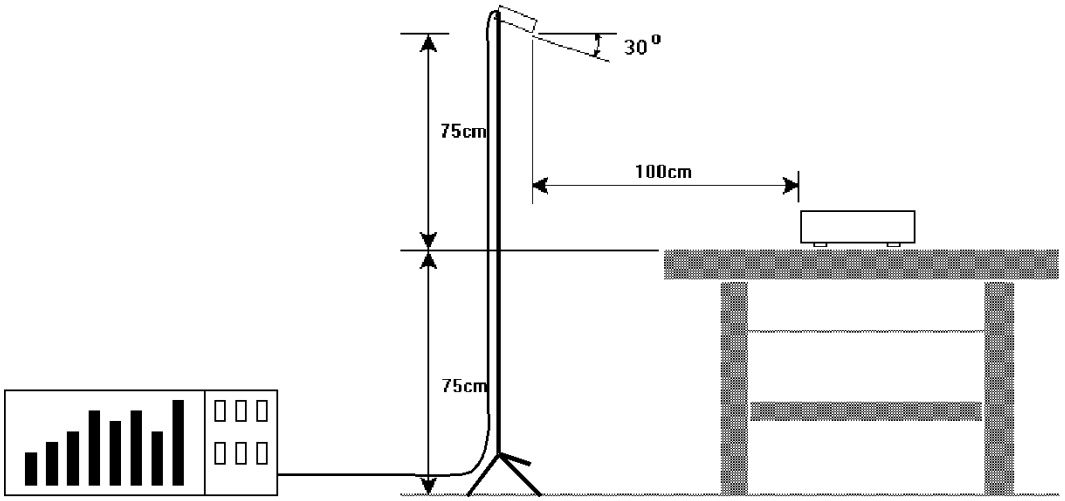


Figure 14-2 Bystander Position

(d) Test Software
refer to software on page 3 without Lan test

(e) Test result:

1. Background Noise Level: 18.1 dB

a. 60cm from microphone to EUT

2. Operator Position (60cm from microphone to EUT)

	Noise Level (dBA)					
Location	IDLE (Maxtor)	IDLE (Quantum)	FDD	HDD (Maxtor)	HDD (Quantum)	CD-ROM

Measured	38.5	35.5	41.2	40.3	36.1	45.3
Spec.	? 40	? 40	? 42	? 46	? 46	? 46
Result	Pass	Pass	Pass	Pass	Pass	Pass

Table 14-3

b. 50cm from microphone to EUT

1. Operator Position (50 cm from microphone to EUT)

	Noise Level (dBA)				
Location	IDLE (Quantum)	FDD	HDD (Quantum)	DVD	CD-ROM
Measured	37.2	39.8	39.8	40.1	43.5
Result	For reference	For reference	For reference	For reference	For reference

Table 14-4

3. Bystander Position

	Noise Level (dB) /LpA					
location	IDLE (Maxtor)	IDLE (Quantum)	FDD	HDD (Maxtor)	HDD (Quantum)	CD-ROM
Front	36.0	31.0	36.4	35.9	31.8	40.4
Left	39.6	35.4	40.1	39.6	35.8	41.2
Rear	38.7	34.1	39.0	38.6	34.7	40.6
Right	39.8	35.1	40.0	39.9	35.5	41.4
/LpA	38.8	34.2	39.1	38.8	34.7	40.9
Spec.	? 39	? 39	? 40	? 44	? 44	? 42
Result	Pass	Pass	Pass	Pass	Pass	Pass

Table 14-5

(f) Test result for DVD-ROM:

4. Background Noise Level: 16.7 dB
5. Operator Position

	Noise Level (dBA)	
Location	IDLE (DVD-ROM)	DVD-ROM
Measured	36.2	40.8
Spec.	? 40	? 46
Result	Pass	Pass

Table 14-6

6. Bystander Position

	Noise Level (dB) /LpA	
location	IDLE (DVD-ROM)	DVD-ROM
Front	29.6	37.1
Left	32.4	38.1
Rear	29.1	35.1
Right	32.5	38.9
/LpA	31.2	37.5
Spec.	? 39	? 42
Result	Pass	Pass

Table 14-7

Note: $LpA ? 10 ? Log\left(\frac{1}{n}\sum_{i=1}^{n} 10^{\frac{Lpi}{10}}\right)$

Lpi = Noise measured at direction I
n = Number of directions (Typically, n=4)

15. Acoustic Noise Measurement(Sound Power Level)

(a) Test Equipment

7. B&K 2143 Real Time Frequency Analyzer
8. B&K 4190 Low Noise Free-Field 1/2 inch Microphone
9. B&K 2669B Microphone Pre-Amplifier
10. B&K 4231 Sound Level Calibrator
11. B&K 4179 1 inch Condenser Microphone
12. Other relevant equipment

(b) Test Configuration:

Model	Model 1	Model 2
CPU	Coppermine 933 /133	Coppermine 850 /100
DIMM	Infineon 128MB x2 /PC-133	Micron 128MB x1 /PC-100
HDD (3.5")	Maxtor Altair VL 30.7GB/ ATA100	Quantum LCT15 30GB
CD-ROM	LG 24X Slim CD-ROM	LG 24X Slim CD-ROM
DVD-ROM	MKE Model:SR-8175-B	MKE Model:SR-8175-B
FDD	Panasonic Slim FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV	Dafon USB Keyboard 52UV
Modem	Askey	---
Mainbroard	S511P MB 00103-1A 48.37H03.01A	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0	V4.0

Table 15-1

(c) Test Criteria:

Idle Mode: Steady-state operation with normal load on all system components, no data operation required.

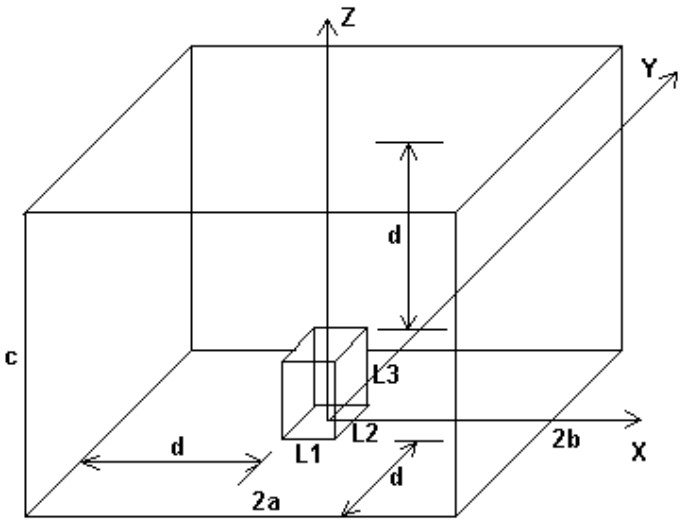
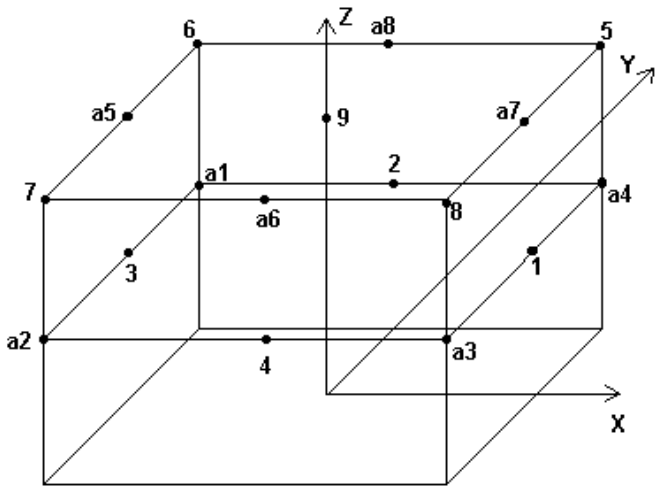


Figure 15-1 Reference box for EUT and measurement surface



Idle Mode:

Figure 15-2 Microphones' Positions

Calculate the sound pressure level averaged over the measurement surface, use the following equation:

$$\overline{Lp} = 10 \lg \left[\frac{1}{N} \sum_{i=1}^{N} 10^{0.1 Lpi} \right]$$

where: the band sound pressure level resulting averaged over the measurement surface, in dB;
Lpi: band sound pressure level resulting from the ith measurement, in dB;
N: the total number of measurements

Note: for A-weighted sound pressure levels, the symbols Lpi and should be replaced by L_{pAi} and

Correction for unwanted reflections:

$$\overline{Lpf} = \overline{Lp} - K$$

where K is the mean value, in dB, of the environmental correction over the measurement surface to account for the influence of unwanted reflections. (Annex A of ISO 3744)

Note: for A-weighted levels, the symbols and are replaced by and $\overline{LpA}$

Calculate the sound power levels:

$$L_{WA} = \overline{LpAf} + 10 \lg \frac{S}{S_0}$$

$$L_W = \overline{Lpf} + 10 \lg \frac{S}{S_0}$$

Where L_{WA}: A-weighted sound power level of the equipment, in dB;
L_W: the band sound power level of the equipment, in dB
S is the area of the measurement surface, in square meters;
S_0: 1 m^2;

(d) Test Software
Refer to software on page 3 without Lan test

(e) Test results:
1. Dimensions of EUT (refer to figure 15-1)

Dimensions of EUT (refer to Figure 15-1)		
X-aixs (m) = L1	Y-aixs (m) = L2	Z-aixs (m) = L3
0.333 m	0.214 m	0.4 m

2. Dimensions of Measurement Surface

Dimensions of EUT (refer to Figure 15-1)		
X-aixs (m) = L1+2 = 2a	Y-aixs (m) = L2+2 = 2b	Z-aixs (m) = L3+1 = 2c
2.333 m	2.214 m	1.40 m

3. Tthe area S of the measurement surface is S = 4(ab+bc+ca) = 11.531 m^2

4. 9-point sound pressure level:

Position	Sound pressure level measured (dBA)					
	Idle(Maxtor)	Idle(Quantum)	FDD	HDD(Maxtor)	HDD(Quantum)	CD-ROM
1	34.20	35.80	34.20	35.10	38.50	39.50
2	30.80	31.60	30.80	33.00	33.10	35.80
3	32.90	33.00	32.90	34.80	36.40	37.50
4	30.70	31.50	30.70	31.20	34.50	38.40
5	28.60	29.50	28.60	29.10	31.30	33.50
6	29.30	31.10	29.30	31.20	31.30	34.20
7	28.70	29.50	28.70	30.20	30.50	36.00
8	30.80	31.90	30.80	31.50	34.10	35.70
9	33.90	33.70	33.90	33.90	33.40	36.10
/LpA	31.6	32.40	31.60	32.70	34.40	36.70
Sound power level in B	4.71	4.79	4.94	4.82	4.99	5.22
(LwAu)Spec A-weighted level (overall)	4.8B	4.8B	5.1B	5.5B	5.5B	5.5B
Result	Pass	Pass	Pass	Pass	Pass	Pass

Table 15-3

Test Result for DVD-ROM

Position	Sound pressure level measured (dBA)	
	Idle (DVD-ROM)	DVD-ROM
1	30.40	33.40
2	33.70	36.50
3	34.90	37.60
4	29.20	31.10
5	36.20	38.50
6	29.50	32.00
7	29.20	34.60
8	33.90	38.40
9	34.10	35.30
/LpA	33.10	36.00
Sound power level in B	4.68	5.15
(LwAu)Spec A-weighted level (overall)	4.8	5.5
Result	Pass	Pass

Table 15-4

Note:

$$LpA = 10 \cdot Log\left[\frac{1}{n}\sum_{i=1}^{n} 10^{\frac{Lpi}{10}}\right]$$

Lpi = Noise measured at direction I

n = Number of directions (n = 9)

If the maximum sound pressure level minus the minimum sound pressure level is greater then 9dBA, then the extra 8 points positions' sound pressure level must be measured and averaged (refer to Figure 15-4 for a1 ~ a8 for the additional microphone positions)
Sound power level = /LpA + 10 lg(S) = --- dB = --- B (1B=10dB)

16. Transportation Drop Test

(a) Test Equipment
Drop Tester: King design KD-128.

(b) Configuration:

Model	**Model 3**
CPU	Celeron 700 /66
DIMM	Infineon 64MB x1 /PC-100
HDD (3.5")	Quantum LCT15 10.2GB
CD-ROM	LG 24X Slim CD-ROM
DVD-ROM	MKE Model:SR-8175-B
FDD	Panasonic Slim FDD
Mouse	Logitec USB mouse M-U48a
SPS	Hi-power SFX-120M4 R.A0 (or API0PC03)
Keyboard	Dafon USB Keyboard 52UV
Modem	Askey
Mainbroard	S511P MB 00103-1A 48.37H03.01A
BIOS Ver.	V4.0

Table 16-2

(c) Test Specifications

Packaged Gross Weight		Drop Height		
KG	lb	cm	inch	No. of Drops
0 ~ 9.1	0 ~ 20	76	30	10
> 9.1 ~ 18.2	> 20 ~ 40	61	24	10
> 18.2 ~ 27.3	> 40 ~ 60	46	18	10
> 27.3 ~ 45.4	> 60 ~ 100	31	12	10
10 drops : 1 corner , 3 edges and 6 surfaces				

Table 16-1

(d) Test Criteria:

1. Function: performance criteria A must be met after the test
2. Appearance & Mechanical Function after the test
   (1) No scratch
   (2) No dent.
   (3) No crack
   (4) No mold speckle
   (5) No unclear letter, broken line
   (6) No easily removed button
   (7) No obvious fingerprint to degrade the quality image of the product.
   (8) Input and output terminals' connection must be easily matched
   (9) No units wobbles
   (10) No migration materials in the set's plinths (e.g. foot of EUT dropped off)
   (11) No letters or symbols on cabinet are missing
   (12) No transfigure, deformity
   (13) No stiffness or squeak for buttons when pressed
   (14) No warp or rust for metal parts
   (15) No slack (e.g. screw loose)
   (16) No cracks to cushion
   (17) No server damage to carton box

(e) Test Software
Wintrax
K-power

(f) Test Result:

Drop Height 61cm	Physical Check
The Weakest corner of product	Pass
The shortest edge radiating from the corner 5-3-2	Pass
The next shortest edge radiating from the corner 5-3-2	Pass
The longest edge radiating from the corner 5-3-2	Pass
Surface 2	Pass
Surface 4	Pass
Surface 5	Pass
Surface 6	Pass
Surface 3	Pass
Surface 1	Pass

Table 16-3

Check items	Result
HDD check	Pass
CDROM check	Pass
FDD check	Pass
Package appearance	Pass
Cushion appearance	Pass

Table 16-4