威達電股份有限公司
ICP Electronics, Inc.

Reliability & Environment Test Plan

Product Name：E042
BIOS Version：V2.0

	APPROVED	CHECK	PREPARED
BY	Henry	Tony	Jabbar
DATE	2008/1/18	2008/1/18	2008/1/18

	CUSTOMER APPROVED
BY	
DATE	

1. Vibration Test

1.1 Objective

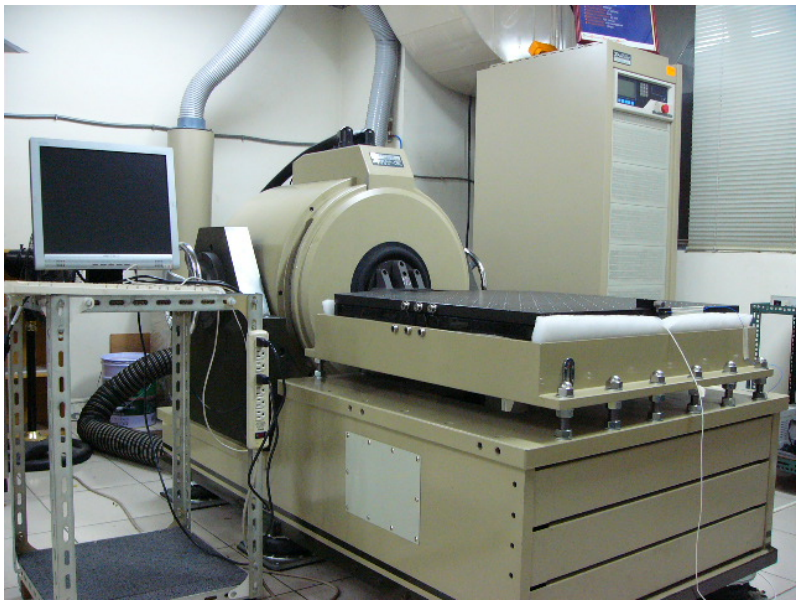
1. Operating (Random Mode)
   The purpose of the vibration test is to determine mechanical weakness or performance degradation of an equipment or component when subjected to vibration and to use this information, in conjunction with the relevant specifications, to decide whether the equipment or component, herein after referred to as DUT, is acceptable or not. It may be used in some cases to determine the structural integrity of the DUT and study its dynamic behavior.
2. Operating (Sine Mode)
   The purpose of the transport vibration test is to determine the protective ability of packaging materials which cushion, enclose and protect the finished products to withstand transportation stresses during shipment and handling.

1.2 Test Procedure

1. Inspect the DUT to establish operation pretest criteria and physical condition.
2. Verify the functionality of the DUT.
3. Mount the velocity transducers of the accelerometer on the surface of the DUT main components (usually choose the HDD) and take a picture. Repeat steps 1~2.
4. Mount the DUT on the vibration equipment table.
5. Expose the DUT to the test level and duration as determined from the Specifications.
6. Inspect the DUT and compare it to pretest data and physical condition, if anything physical issue or malfunction during testing should under recorded & reported.
1. Repeat steps 1~6 for each axis.

1.3 Test Equipment

KING DESIGN Inc.
KD-9363-EM-1000F2K-50N250



1.4 Test Software

Passmark Burn-in Test Program V5.0 under Microsoft Windows XP SP2.

1.5 Test Location

ICP Reliability & Environment Lab

1.6 Test Specifications

Operating Random Vibration Mode：

Axes: Vertical / Transverse / Longitudinal.
7.7Grms 20-2000 Hz Random Vibration. 60min/axis.

Operating Swept Sine Mode：

Axes: Vertical / Transverse / Longitudinal.
0.01in. p-p, 5-20Hz, 7.7g peak, 20-2000Hz Swept Sine, 60min/axis.

1.7 Test Criteria ：

1. Follow MIL-STD-810E 514.4
2. A minimum of 1 DUT must be test.
3. During and after the vibration test, all DUT must be pass diagnostic test.
   a) Functional check: The DUT will undergo Burn-in testing the HDD, CD-ROM, FDD and others.
   b) Visual inspection: The DUT will be thoroughly inspected inside and outside for any sign of damage, looseness or loose of components.

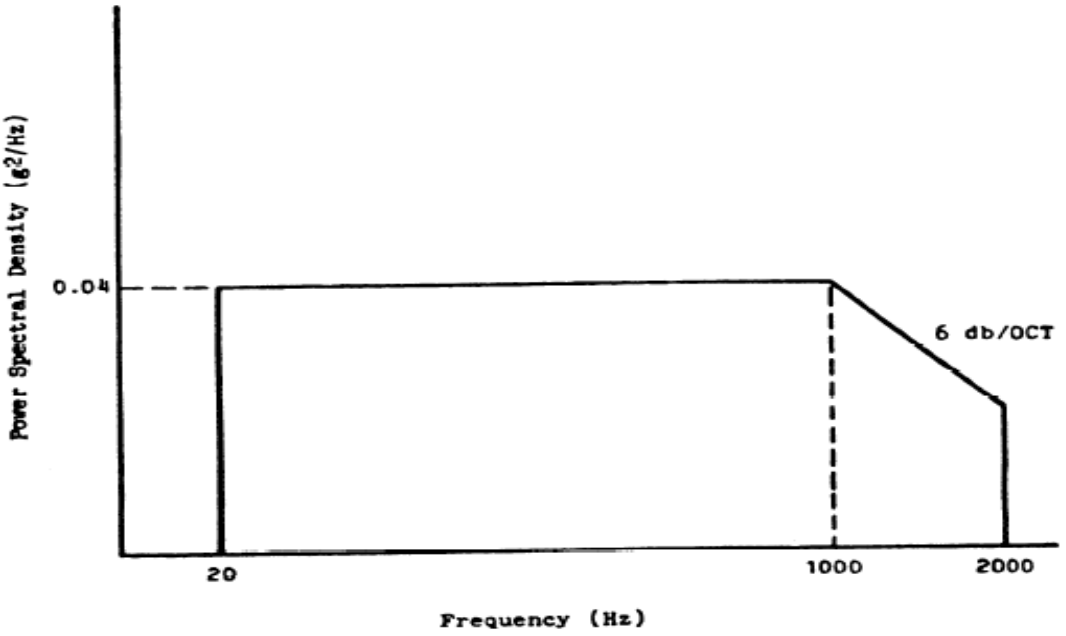
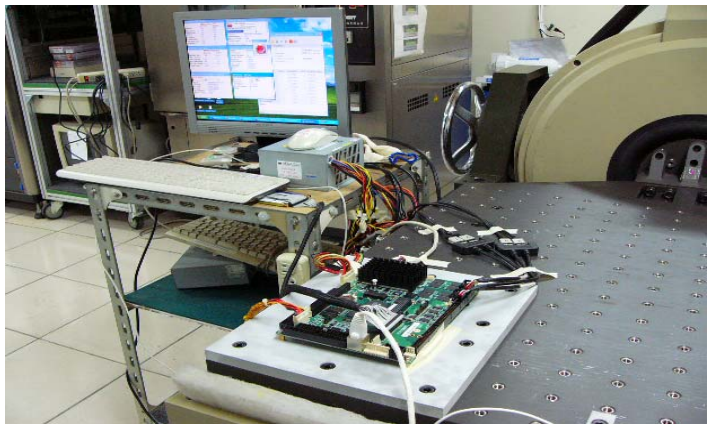


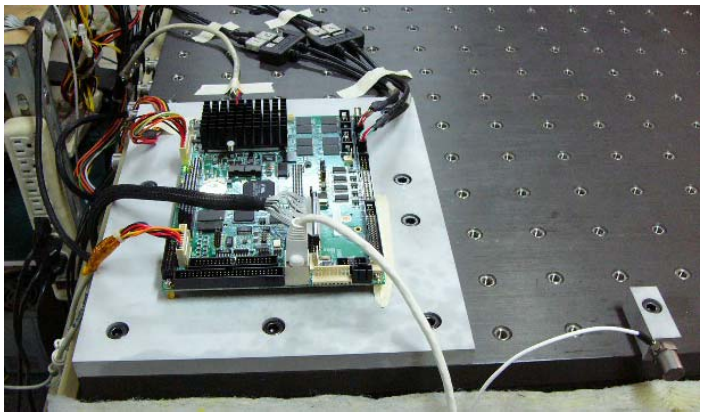
FIGURE 514.4-16 Minimum integrity test-general.

METHOD 514.4

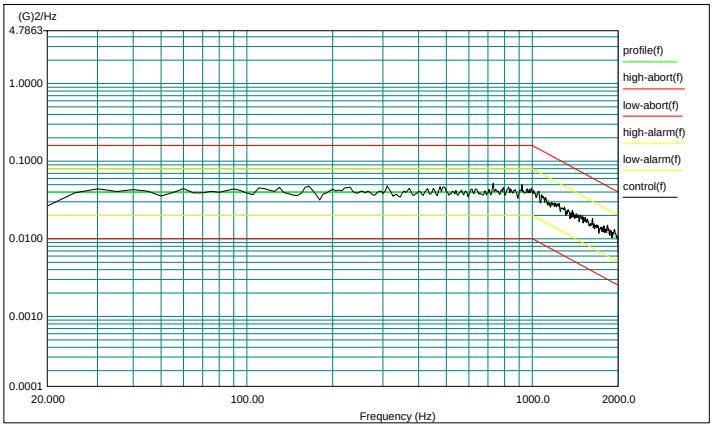
1.8 Test Result

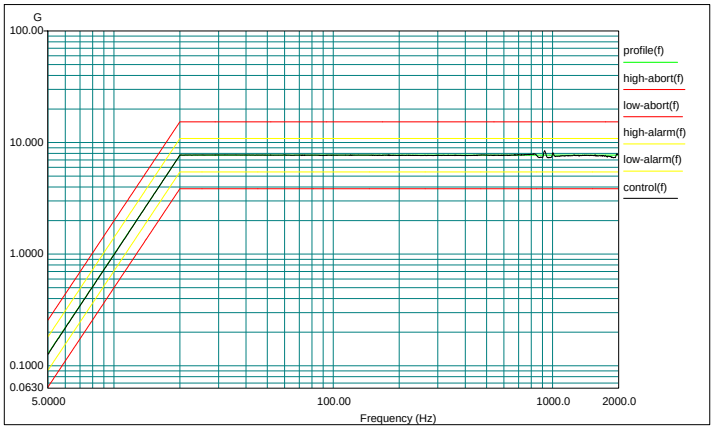
Transverse





Transverse- Operating Random Vibration	Transverse- Operating Sine Vibration





Operating Random Mode	Function Test	Physical Check
	System	System
Result	PASS	PASS

Operating Sine Mode	Function Test	Physical Check
	System	System
Result	PASS	PASS

E042 Vibration Random X.bmp

BurnInTest V5.0 Pro - Result Sheet

Machine Name: YY
Config file: LastUsed.bitcfg
CPU Manufacturer: CentaurHauls
CPU Type: 686 Gen
CPU Speed: 801.6 MHz
Start time: Thu Jan 10 19:02:10 2008
Stop time: Thu Jan 10 20:09:14 2008
Duration: 001h 07m 04s
Temperature: (Min / Current / Max)

Test Name	Cycle	Operations	Errors	Last Error Description
CPU - Maths	766	16.428 Billion	0	No errors
CPU - SIMD	624	14.898 Billion	0	No errors
Memory (RAM)	8	6.199 Billion	0	No errors
Disk (C:)	25	2.134 Billion	0	No errors
Disk (D:)	30	2.497 Billion	0	No errors
Network 1	71	574480	0	No errors
USB Plug 1	25	25.858 Million	0	No errors
USB Plug 2	27	27.687 Million	0	No errors
USB Plug 3	28	29.391 Million	0	No errors
USB Plug 4	41	42.713 Million	0	No errors

Notes:

E042 Vibration Random X.log

E042 Vibration Sine X.bmp

BurnInTest V5.0 Pro - Result Sheet

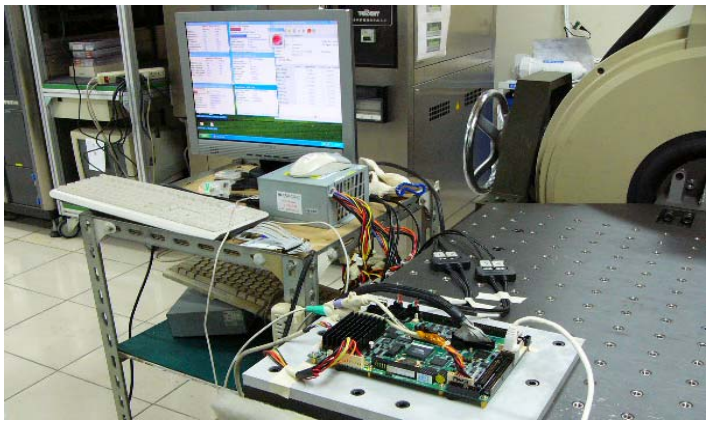
Machine Name: YY
Config file: LastUsed.bitcfg
CPU Manufacturer: CentaurHauls
CPU Type: 686 Gen
CPU Speed: 801.9 MHz
Start time: Thu Jan 10 20:15:34 2008
Stop time: Thu Jan 10 21:19:03 2008
Duration: 001h 03m 29s
Temperature: (Min / Current / Max)

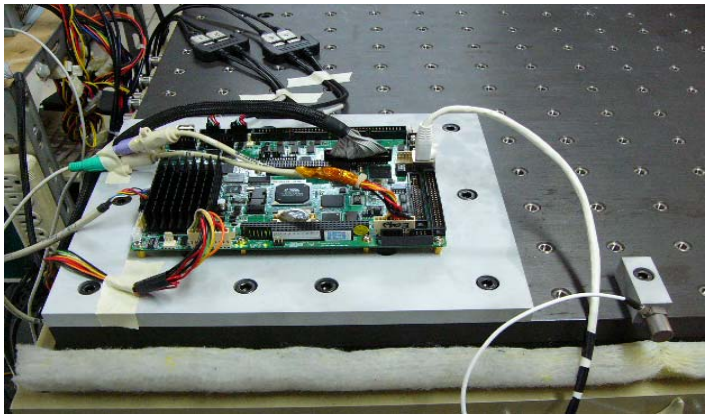
Test Name	Cycle	Operations	Errors	Last Error Description
CPU - Maths	691	12.312 Billion	0	No errors
CPU - SIMD	577	11.490 Billion	0	No errors
Memory (RAM)	6	4.840 Billion	0	No errors
Disk (C:)	22	1.866 Billion	0	No errors
Disk (D:)	261	895 Million	0	No errors
Network 1	67	539040	0	No errors
USB Plug 1	20	20.990 Million	0	No errors
USB Plug 2	24	24.791 Million	0	No errors
USB Plug 3	36	37.529 Million	0	No errors
USB Plug 4	23	23.750 Million	0	No errors

Notes:

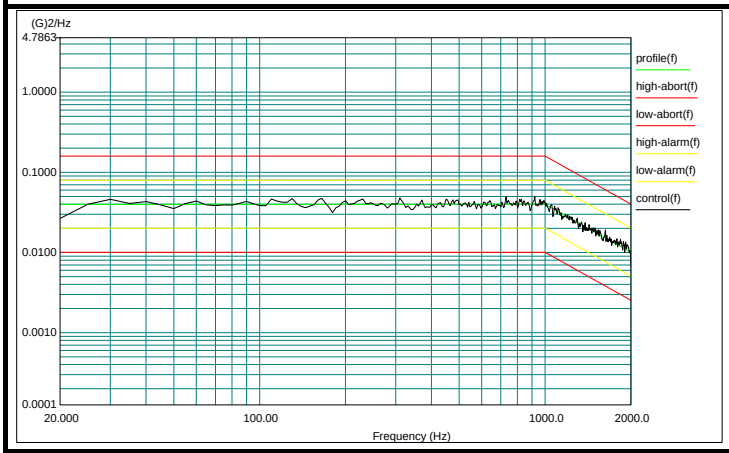

E042 Vibration Sine X.log

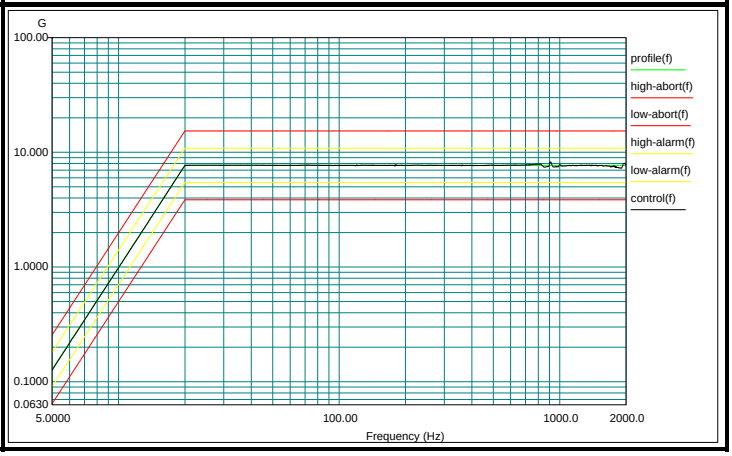
Longitudinal





Longitudinal - Operating Random Vibration	Longitudinal - Operating Sine Vibration





Operating Random Mode	Function Test	Physical Check
	System	System
Result	PASS	PASS

Operating Sine Mode	Function Test	Physical Check
	System	System
Result	PASS	PASS

E042 Vibration Random Y.bmp

BurnInTest V5.0 Pro - Result Sheet

Machine Name: YY
Config file: LastUsed.bitcfg
CPU Manufacturer: CentaurHauls
CPU Type: 686 Gen
CPU Speed: 801.8 MHz
Start time: Fri Jan 11 07:58:22 2008
Stop time: Fri Jan 11 09:27:01 2008
Duration: 001h 28m 39s
Temperature: (Min / Current / Max)

Test Name	Cycle	Operations	Errors	Last Error Description
CPU - Maths	1009	21.593 Billion	0	No errors
CPU - SIMD	825	19.520 Billion	0	No errors
Memory (RAM)	11	8.045 Billion	0	No errors
Disk (C:)	34	2.835 Billion	0	No errors
Disk (D:)	40	3.327 Billion	0	No errors
Network 1	95	762240	0	No errors
USB Plug 1	33	34.089 Million	0	No errors
USB Plug 2	35	36.721 Million	0	No errors
USB Plug 3	38	39.144 Million	0	No errors
USB Plug 4	54	56.218 Million	0	No errors

Notes:


E042 Vibration Random Y.log

E042 Vibration Sine Y.bmp

BurnInTest V5.0 Pro - Result Sheet

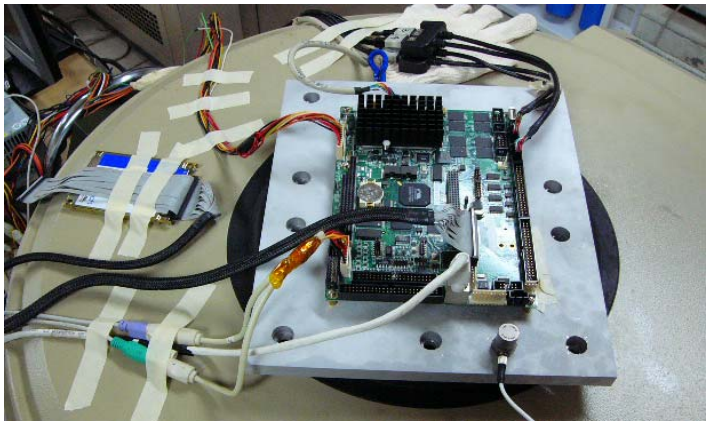
Machine Name: YY
Config file: LastUsed.bitcfg
CPU Manufacturer: CentaurHauls
CPU Type: 686 Gen
CPU Speed: 801.8 MHz
Start time: Fri Jan 11 09:30:34 2008
Stop time: Fri Jan 11 11:05:31 2008
Duration: 001h 34m 57s
Temperature: (Min / Current / Max)

Test Name	Cycle	Operations	Errors	Last Error Description
CPU - Maths	1082	23.268 Billion	0	No errors
CPU - SIMD	887	21.080 Billion	0	No errors
Memory (RAM)	12	8.615 Billion	0	No errors
Disk (C:)	36	3.030 Billion	0	No errors
Disk (D:)	42	3.561 Billion	0	No errors
Network 1	102	816400	0	No errors
USB Plug 1	35	36.551 Million	0	No errors
USB Plug 2	38	39.108 Million	0	No errors
USB Plug 3	41	42.184 Million	0	No errors
USB Plug 4	58	60.385 Million	0	No errors

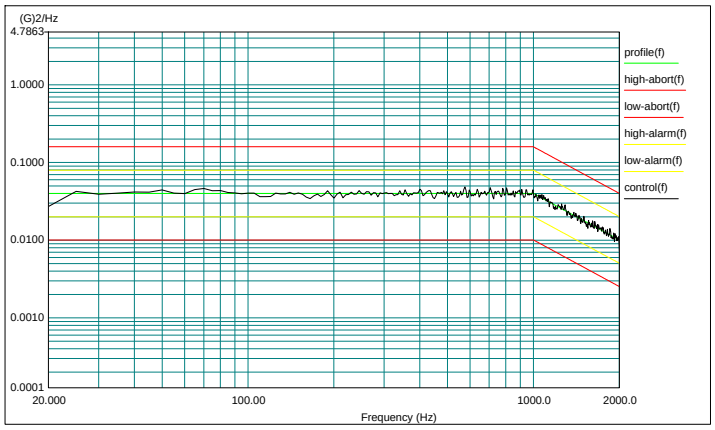
Notes:

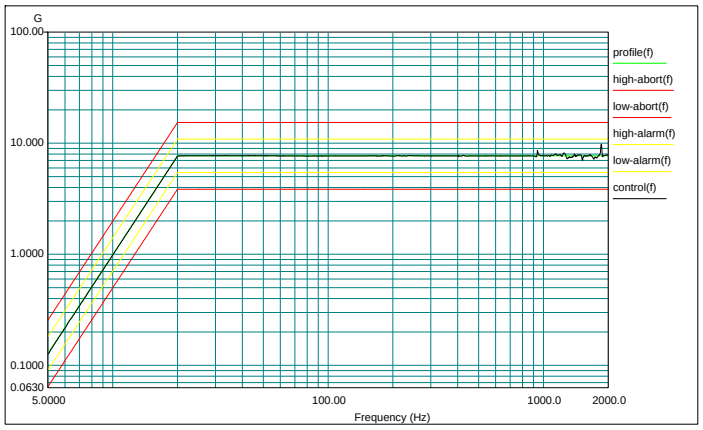

E042 Vibration Sine Y.log

Vertical



Vertical - Operating Random Vibration	Vertical - Operating Sine Vibration





Operating Random Mode	Function Test	Physical Check
	System	System
Result	PASS	PASS

Operating Sine Mode	Function Test	Physical Check
	System	System
Result	PASS	PASS

E042-Vibration Random Z.bmp

BurnInTest V5.0 Pro - Result Sheet

Machine Name: YY
Config file: LastUsed.bitcfg
CPU Manufacturer: CentaurHauls
CPU Type: 686 Gen
CPU Speed: 802.0 MHz
Start time: Thu Jan 10 14:07:59 2008
Stop time: Thu Jan 10 15:11:53 2008
Duration: 001h 03m 54s
Temperature: (Min / Current / Max)

Test Name	Cycle	Operations	Errors	Last Error Description
CPU - Maths	729	15.649 Billion	0	No errors
CPU - SIMD	594	14.216 Billion	0	No errors
Memory (RAM)	8	5.946 Billion	0	No errors
Disk (C:)	24	2.025 Billion	0	No errors
Disk (D:)	28	2.388 Billion	0	No errors
Network 1	68	547360	0	No errors
USB Plug 1	24	24.700 Million	0	No errors
USB Plug 2	25	26.586 Million	0	No errors
USB Plug 3	27	28.429 Million	0	No errors
USB Plug 4	39	40.188 Million	0	No errors

Notes:


E042 Vibration Random Z.log

E042 Vibration Sine Z.bmp

BurnInTest V5.0 Pro - Result Sheet

Machine Name: YY
Config file: LastUsed.bitcfg
CPU Manufacturer: CentaurHauls
CPU Type: 686 Gen
CPU Speed: 801.7 MHz
Start time: Thu Jan 10 15:00:13 2008
Stop time: Thu Jan 10 16:09:57 2008
Duration: 001h 09m 44s
Temperature: (Min / Current / Max)

Test Name	Cycle	Operations	Errors	Last Error Description
CPU - Maths	795	16.979 Billion	0	No errors
CPU - SIMD	649	15.436 Billion	0	No errors
Memory (RAM)	8	6.418 Billion	0	No errors
Disk (C:)	26	2.193 Billion	0	No errors
Disk (D:)	31	2.616 Billion	0	No errors
Network 1	74	599040	0	No errors
USB Plug 1	25	26.513 Million	0	No errors
USB Plug 2	27	28.536 Million	0	No errors
USB Plug 3	29	30.647 Million	0	No errors
USB Plug 4	42	43.848 Million	0	No errors

Notes:

E042 Vibration Sine Z.log

2. Shock Test

2.1 Objective

The shock test is performed to ensure that material can withstand the relatively infrequent, non-repetitive shocks or transient vibration encountered in handling, transportation and service environments.

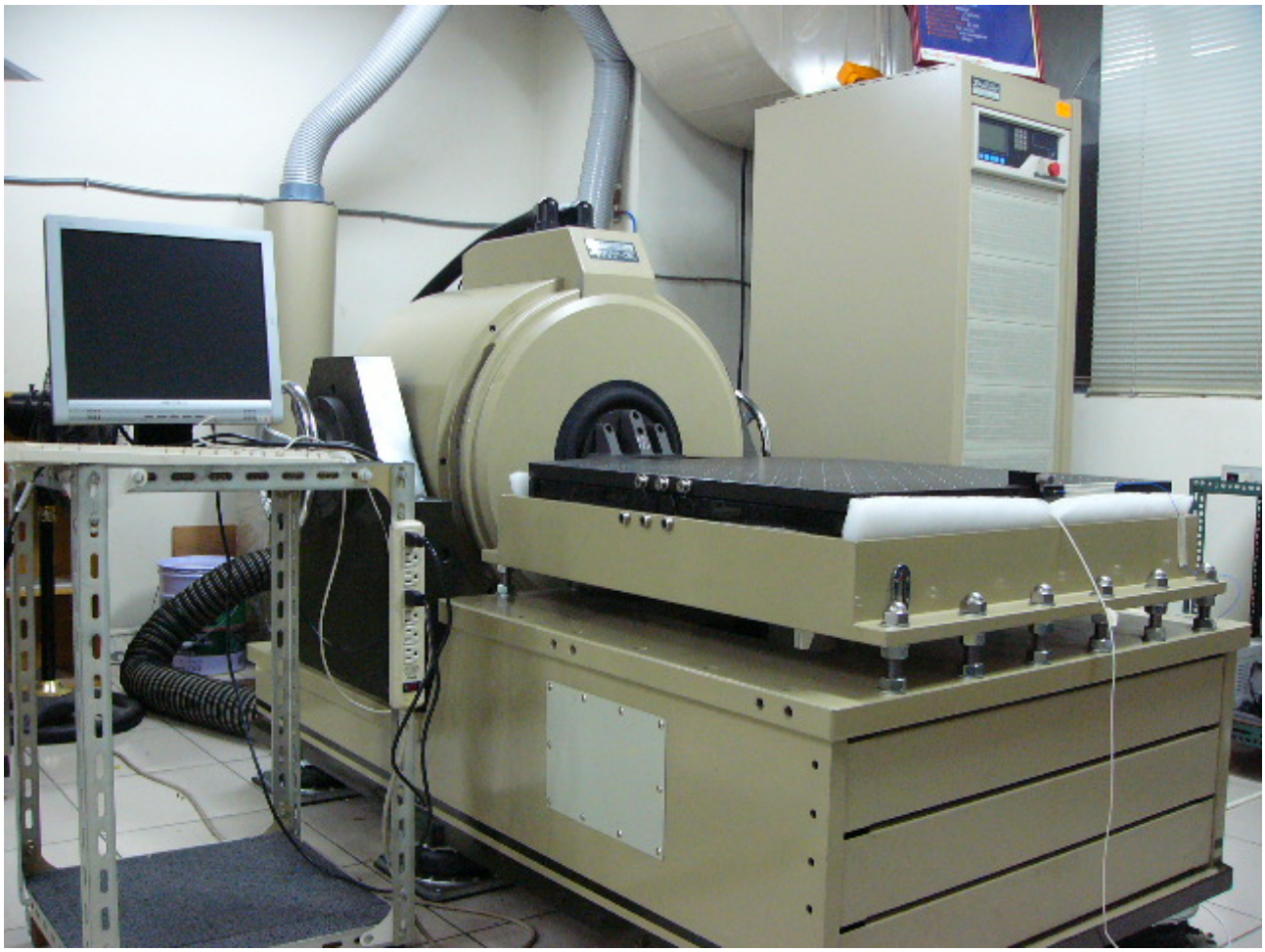
2.2 Test Procedure

1. During 6 faces, 3 shocks per axis: each DUT has to withstand the 6 shocks, to do Half-Sine Wave shock test.
2. The DUT will be installed on shock table in such a way that the shock input is transmitted directly to it. The DUT will be fixture using a predetermined torque value,
3. Place accelerometers on the shock-sensitive components (i.e. HDD, RAM…) in order to measure the response acceleration.

2.3 Test Equipment

KING DESIGN Inc.

KD-9363-EM-1000F2K-50N250



2.4 Test Software

Passmark Burn-in Test Program V5.0 under Microsoft Windows XP SP2.

2.5 Test Location

ICP Reliability & Environment Lab.

2.6 Test Specifications

Reference IEC68-2-27 Testing Procedures

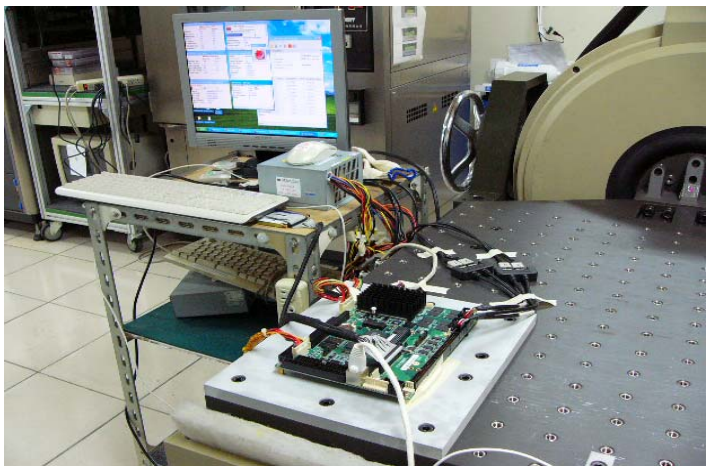
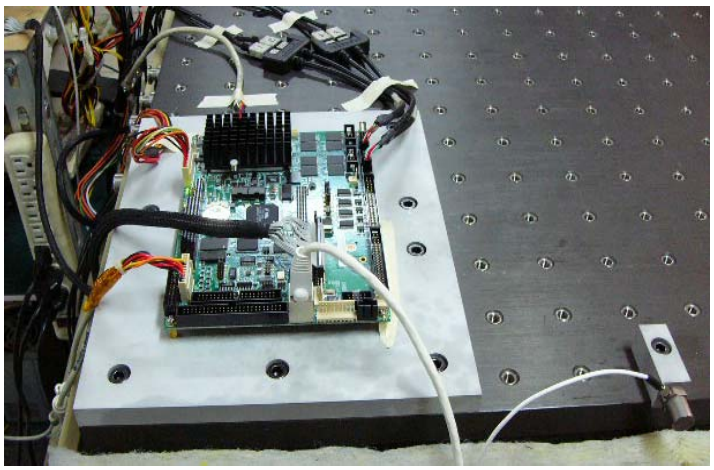
1. Operating Shock Half-Sine Wave Shock
   40 G: 9ms: 18 shocks per axis: Vertical / Transverse / Longitudinal.

2.7 Test Criteria

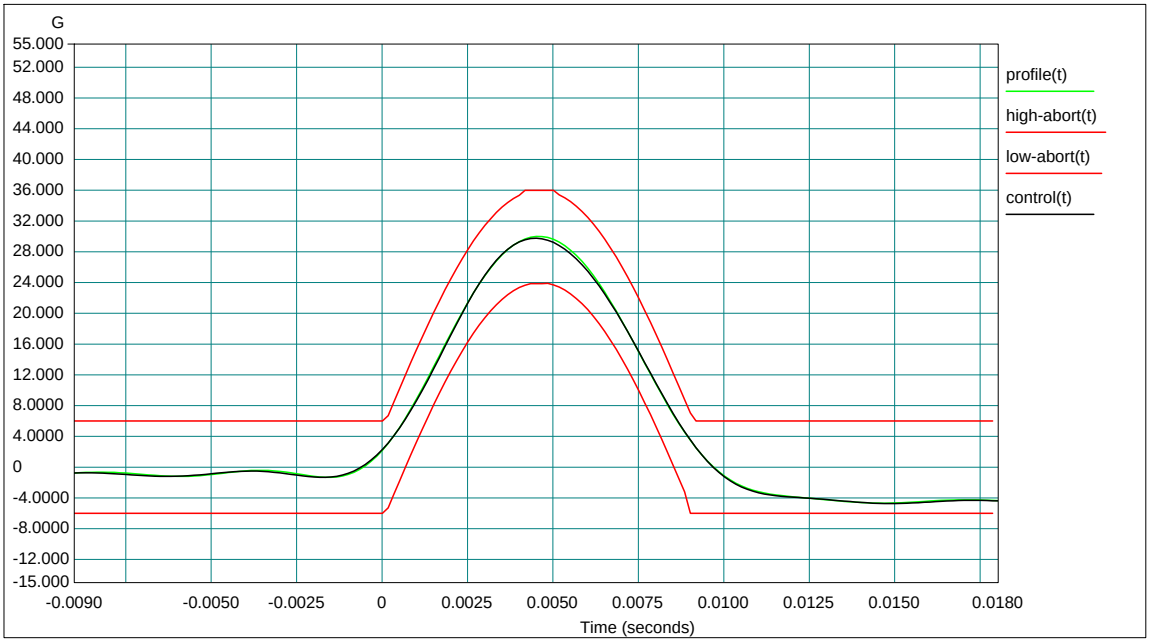
1. A minimum of 1 DUT must be test.
2. After non operation half-sine wave shock test, all DUT should pass the Burn-in test which DUT should without any functional and mechanical malfunction.
3. Diagnostic:
   a) Functional check: The DUT will under go Burn-in testing the HDD, CD-ROM, FDD and main board.
   b) Visual inspection: The DUT will be thoroughly inspected inside and outside for any sign of damage, looseness or loose of components.

2.8 Test Result

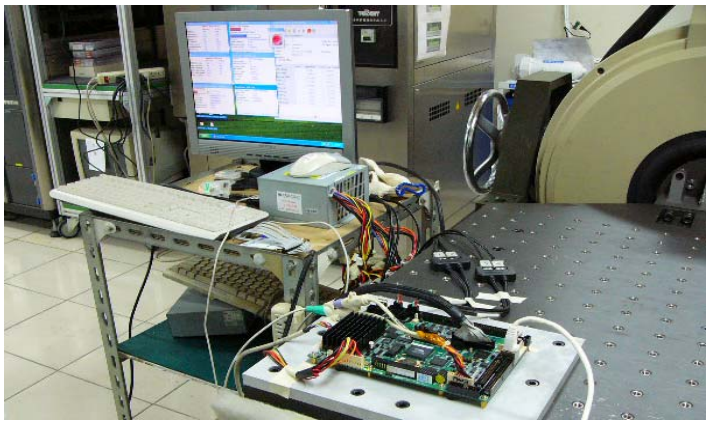
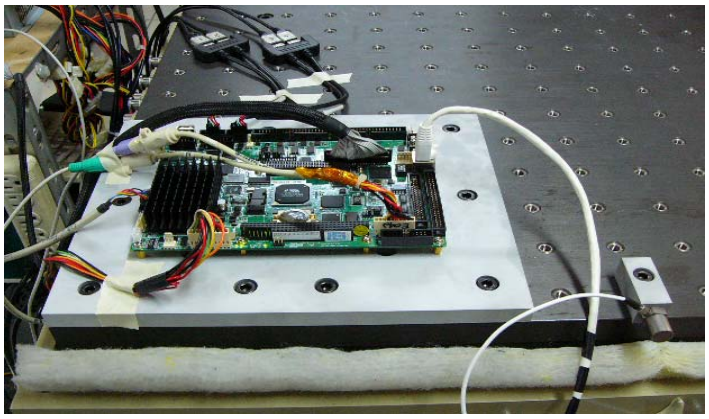
Transverse

Transverse- Operating Photo	Transverse- Operating Photo
	

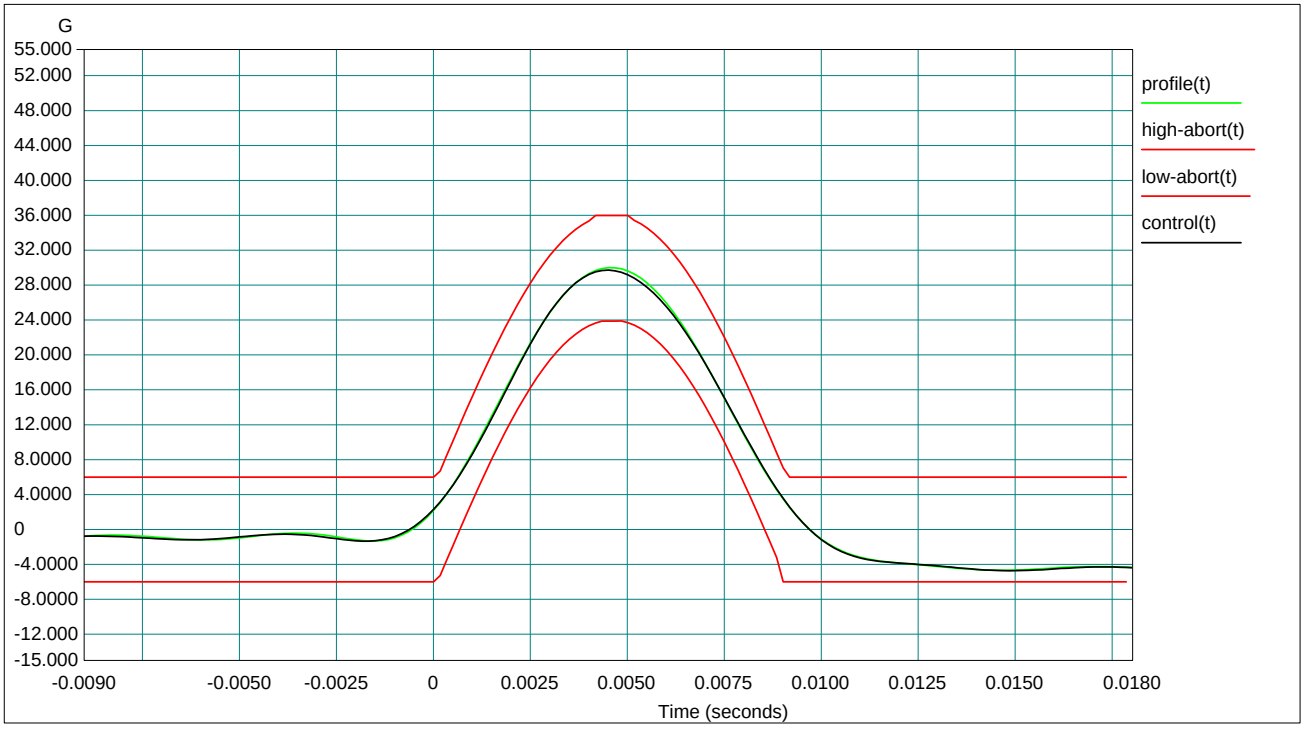
Operation Half-Sine Shock Test		
System	**Function Test**	**Physical Check**
Result	PASS	PASS



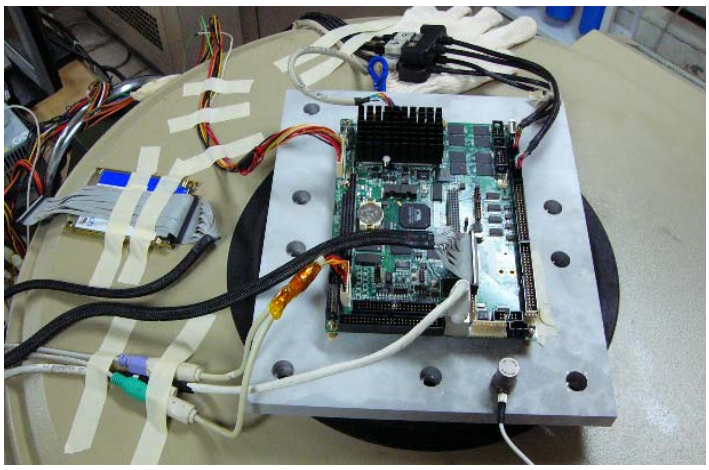
Longitudinal

Longitudinal- Operating Photo	Longitudinal -Operating Photo
	

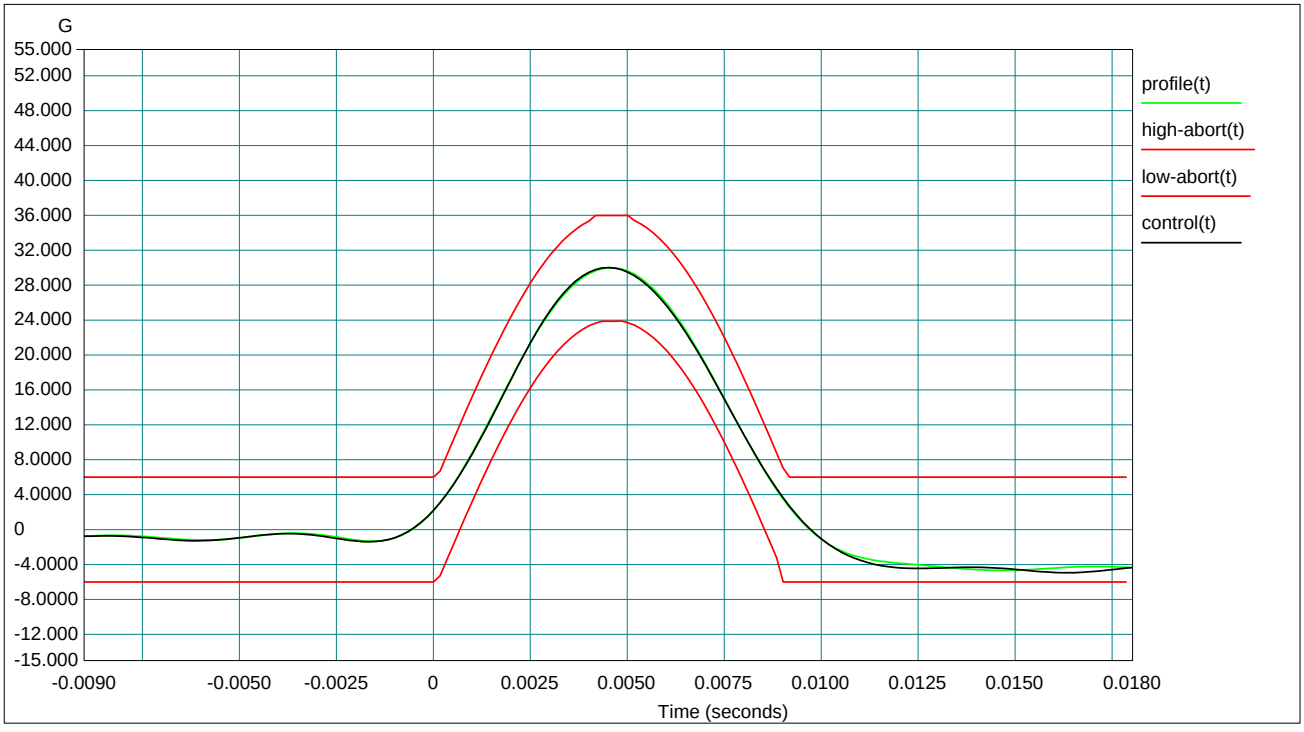
Operation Half-Sine Shock Test		
System	**Function Test**	**Physical Check**
Result	PASS	PASS



Vertical

Vertical- Operating Photo	Vertical-Operating Photo
	

Operation Half-Sine Shock Test		
System	**Function Test**	**Physical Check**
Result	PASS	PASS



3. Drop Test

3.1 Objective

The ones that assessed the products and used movements to produce because of the improper one fell; and the strong toughness under the safety condition that the necessary products are assessed.

3.2 Test Procedure

1. Turn on the DUT to perform function test, then turn off the DUT, package the DUT and place it on the drop tester.
2. To perform corner drops according to Figure 9-1 (C1~C4) on the weakest corner of DUT.
3. To perform flat drops according to Figure 9-1(S1~S6) with impact on the flats.
4. To perform edge drops according to Figure 9-1 (E1~E3) with impact on the edges.
5. To inspect the packaged DUT mechanical structure, and to execute the function test.

3.3 Test Equipment

Mode: KD-128A
Payload: 60 kg
Test Height: 30 – 180 cm
Test volume capacity: 80 x 80 x 80 cm
Test mode: Single arm
Test arm bracket center: 50 cm
Dropping method: By spring
AC power: 220 V / 1 phase

3.4 Test Software

Passmark Burn-in Test Program V5.0 under Microsoft Windows 2000.

3.5 Test Location

ICP Reliability & Environment Lab

3.6 Test Specification

Reference ISTA(International Safe Transit Association) 2A 2001 Testing Procedures

Package Weight		Drop Height			Impact Velocity	
kg	lb	mm	inch		ft/s	m/s
0 ~ 9.55	0 ~ 21	965	38		14.3	4.4
9.55 ~ 18.64	21 ~ 41	813	32		13.1	4.0
18.64 ~ 27.73	41 ~ 61	660	26		11.8	3.6
27.73 ~ 45.45	61 ~ 100	508	20		10.4	3.2
45.45 ~ 68.2	100 ~ 150	305	12		8.0	2.5
> 68.2	> 150	152	6		5.7	1.7
13 Drops: 4 corner,3 edges and 6 surfaces						

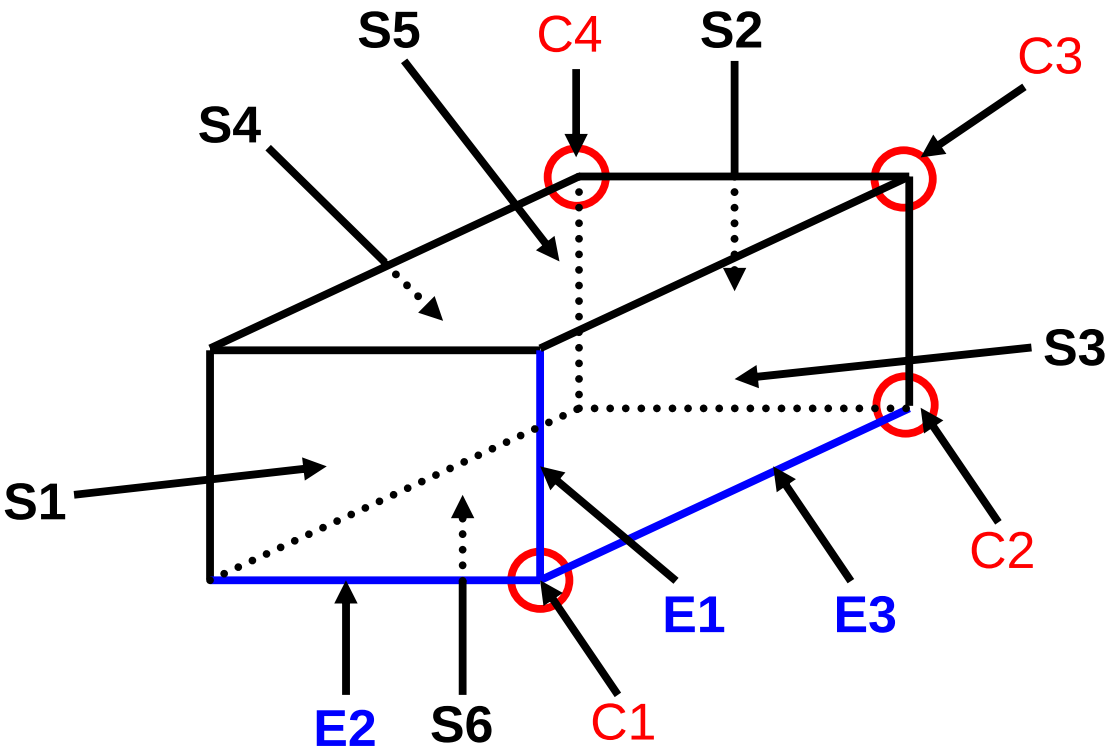


Figure 9-1

3.7 Test Criteria

1. A minimum of 1 DUT must be test.
2. The minimum DUT is based on to cover the multi sourcing of key components that can present weakness regarding mechanical stress: Power supply, Heat sink, Fans, HDD, CD-ROM Add-on card
3. During and after the drop test, all DUT must be pass diagnostic test.
   Diagnostic:
   a) Functional check: The DUT will under go Burn-in test applications testing the HDD, CD-ROM, FDD and main board.
   b) Visual inspection: The DUT must without any mechanical damage and package inside Cushion materials rupture is permitted.

3.8 Test Result

Condition	***Drop High***	***Functional***	***Physical***	***Remark***
		System	***System***	
4 corners	**96.5 Cm**	PASS	PASS	-
3 edges	**96.5 Cm**	PASS	PASS	-
6 surfaces	**96.5 Cm**	PASS	PASS	-

Corner	**Edge**	**Surface**