



**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)

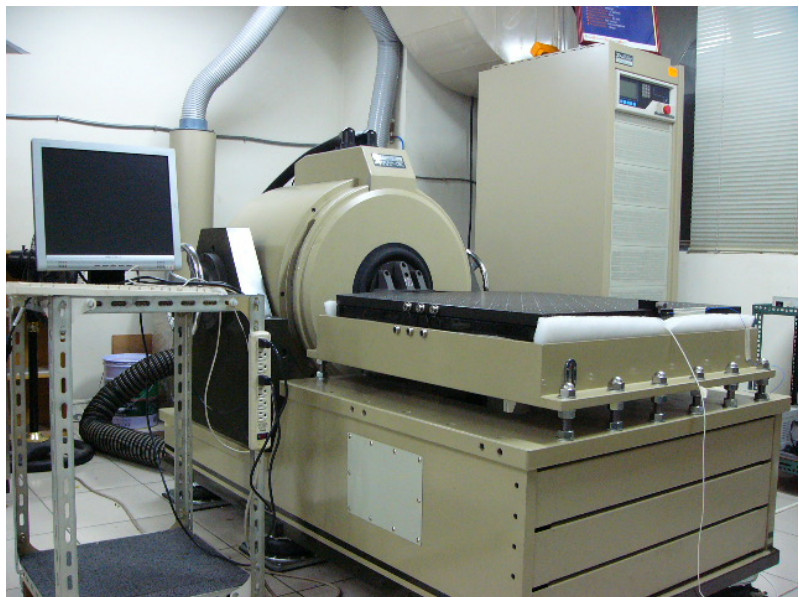
The purpose of the transport vibration test is to determine the protective ability of packaging materials which cushion, enclose and protect the finished products to withstand transportation stresses during shipment and handling.

### 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.

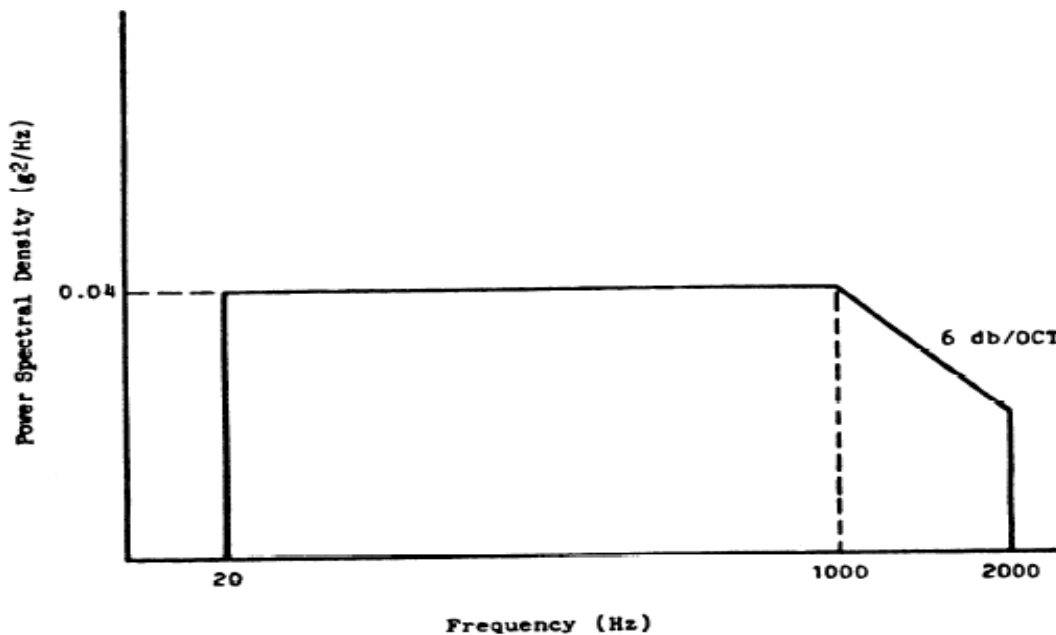


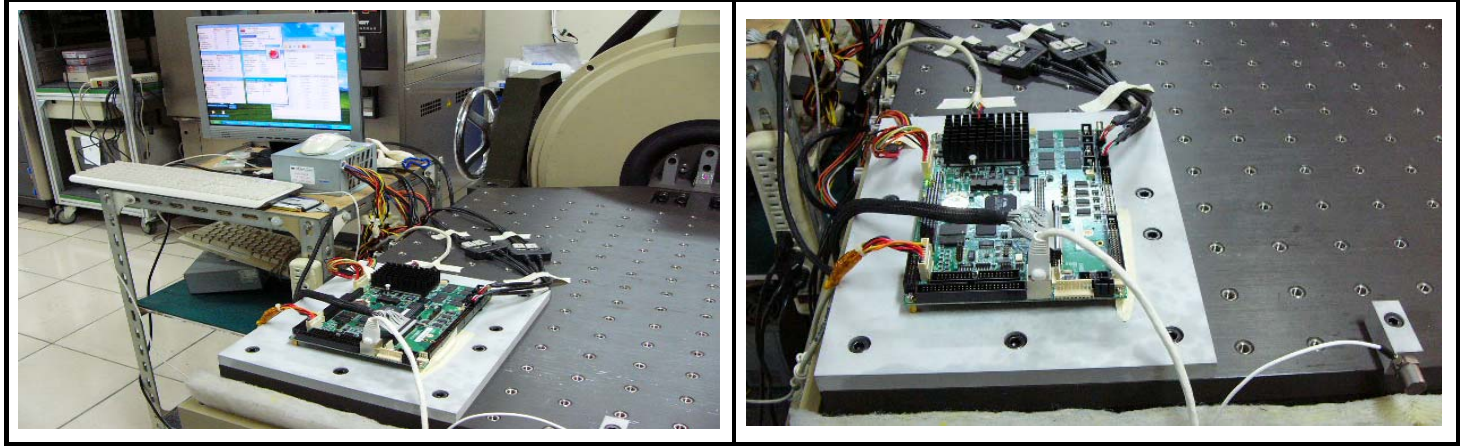
FIGURE 514.4-16 Minimum integrity test-general.

METHOD 514.4



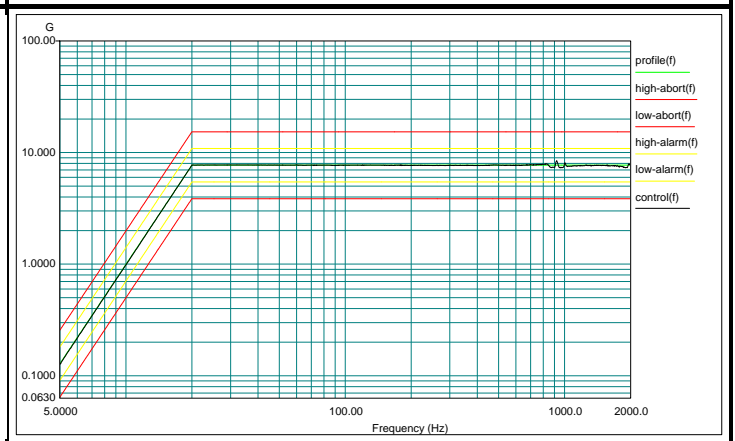
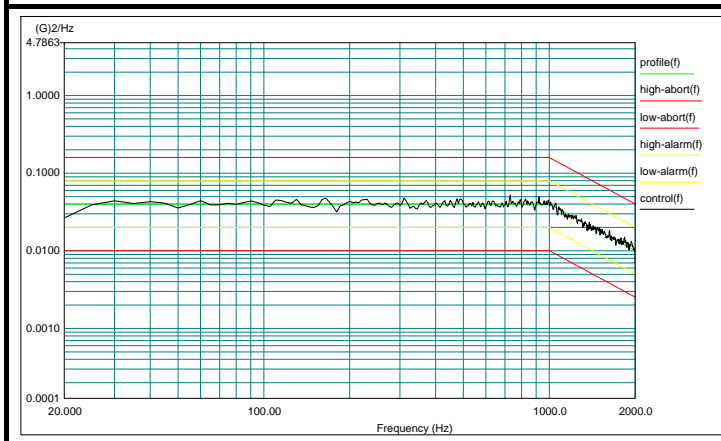
**1.8 Test Result**

**Transverse**



**Transverse- Operating Random Vibration**

**Transverse- Operating Sine Vibration**



<b>Operating Random Mode</b>	<b>Function Test</b>	<b>Physical Check</b>
	<b>System</b>	<b>System</b>
<b>Result</b>	<b>PASS</b>	<b>PASS</b>

<b>Operating Sine Mode</b>	<b>Function Test</b>	<b>Physical Check</b>
	<b>System</b>	<b>System</b>
<b>Result</b>	<b>PASS</b>	<b>PASS</b>



**E042 Vibration Random X.bmp**

**BurnInTest V5.0 Pro - Result Sheet**

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

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

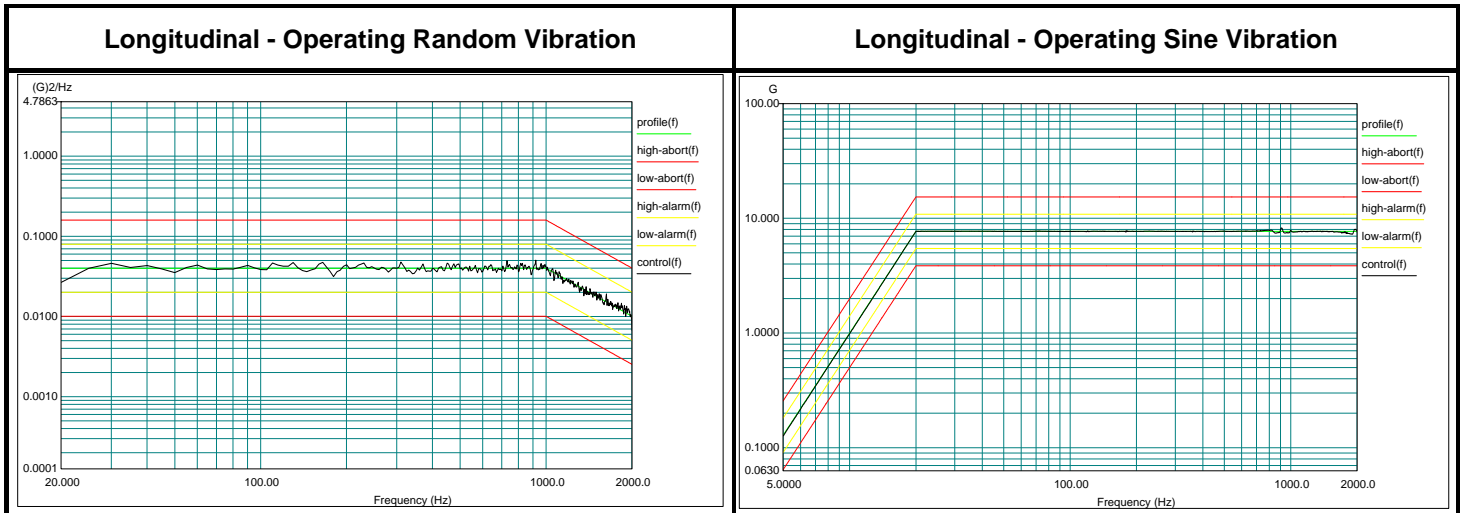
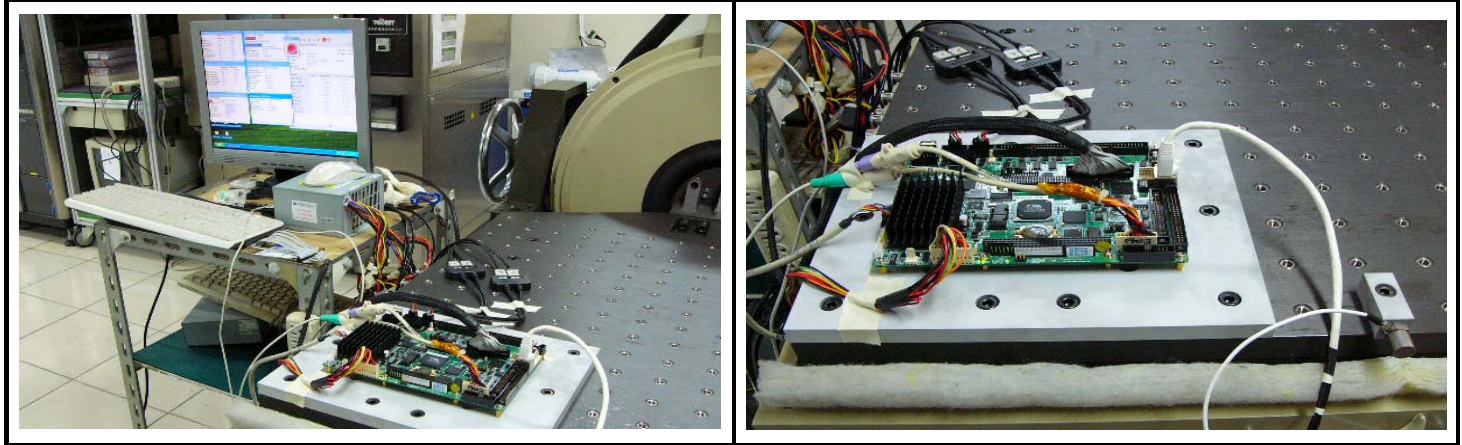
**Notes:**



E042 Vibration Sine  
X.log



**Longitudinal**



<b>Operating Random Mode</b>	<b>Function Test</b>	<b>Physical Check</b>
	<b>System</b>	<b>System</b>
<b>Result</b>	<b>PASS</b>	<b>PASS</b>

<b>Operating Sine Mode</b>	<b>Function Test</b>	<b>Physical Check</b>
	<b>System</b>	<b>System</b>
<b>Result</b>	<b>PASS</b>	<b>PASS</b>



**E042 Vibration Random Y.bmp**

**BurnInTest V5.0 Pro - Result Sheet**

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

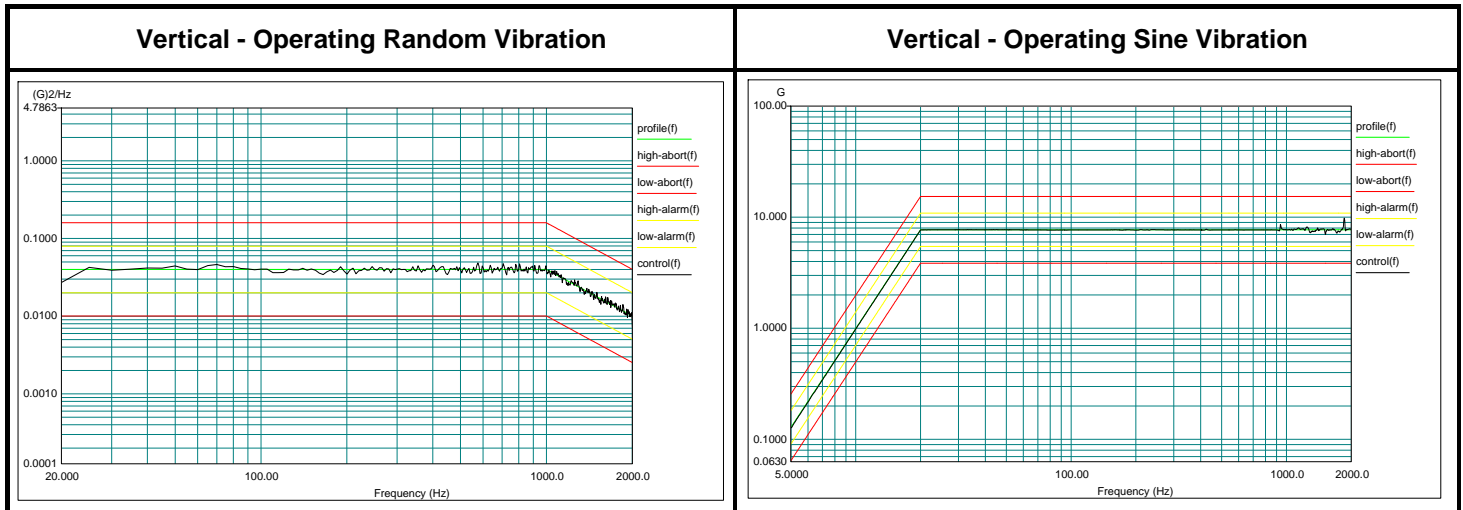
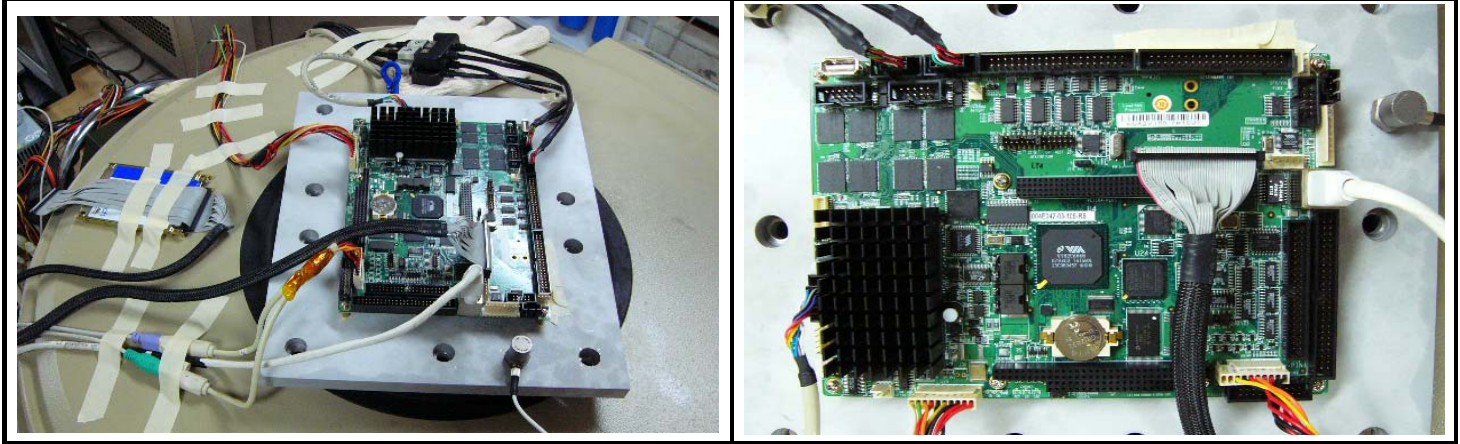
**Notes:**



E042 Vibration Sine  
Y.log



**Vertical**



<b>Operating Random Mode</b>	<b>Function Test</b>	<b>Physical Check</b>
	<b>System</b>	<b>System</b>
<b>Result</b>	<b>PASS</b>	<b>PASS</b>

<b>Operating Sine Mode</b>	<b>Function Test</b>	<b>Physical Check</b>
	<b>System</b>	<b>System</b>
<b>Result</b>	<b>PASS</b>	<b>PASS</b>



**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.

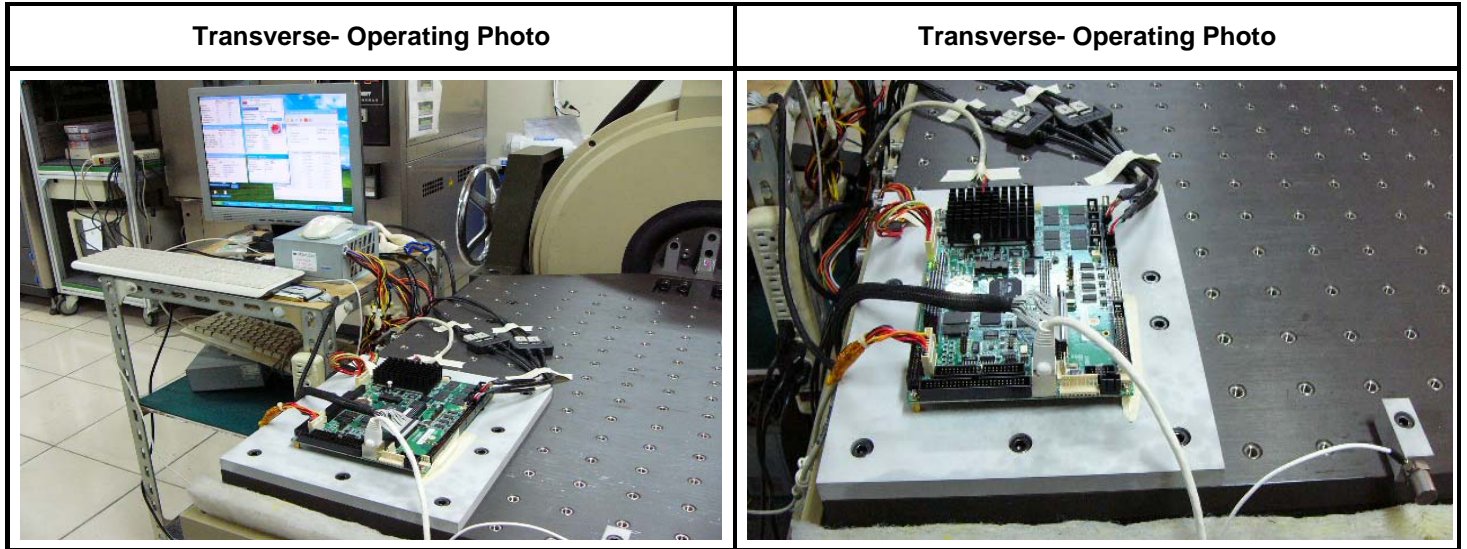
## 2.7 Test Criteria

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.

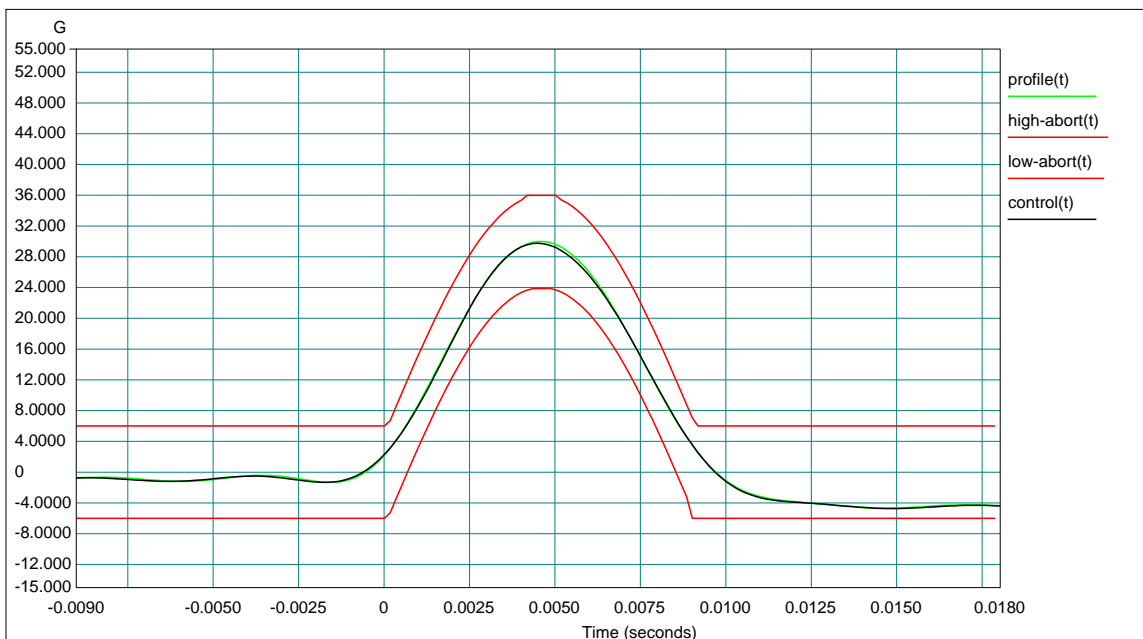


## 2.8 Test Result

### Transverse

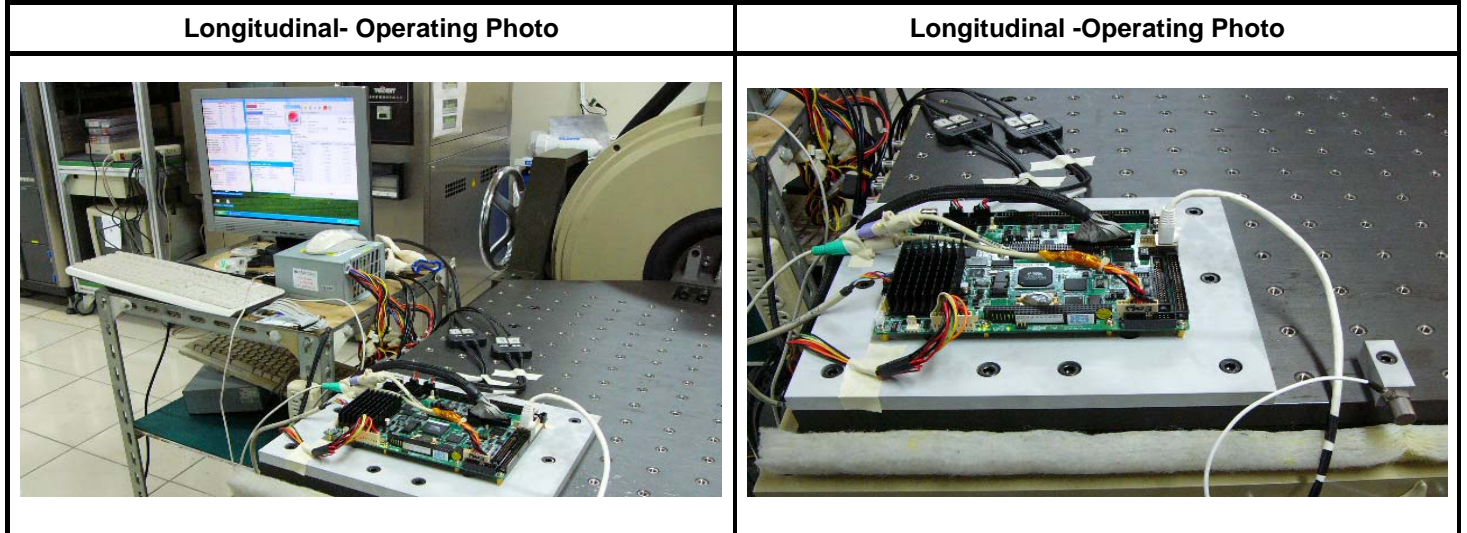


Operation Half-Sine Shock Test		
System	Function Test	Physical Check
<b>Result</b>	<b>PASS</b>	<b>PASS</b>

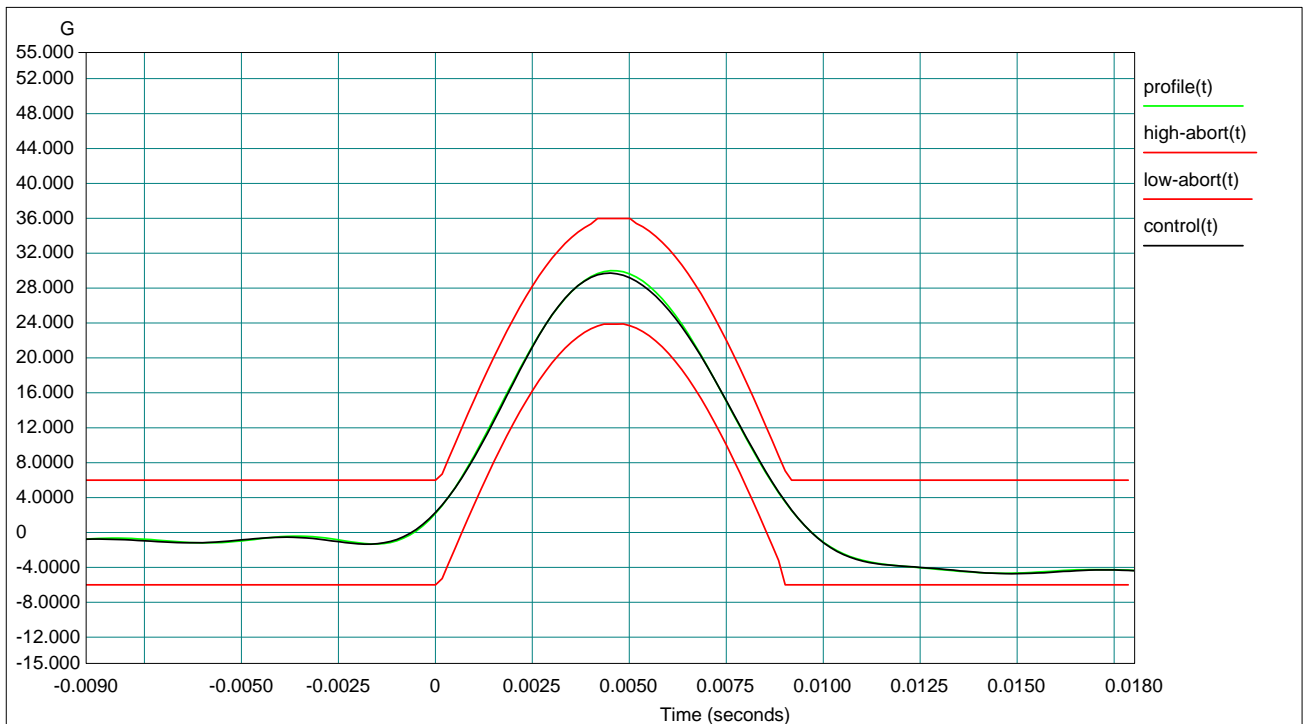




**Longitudinal**



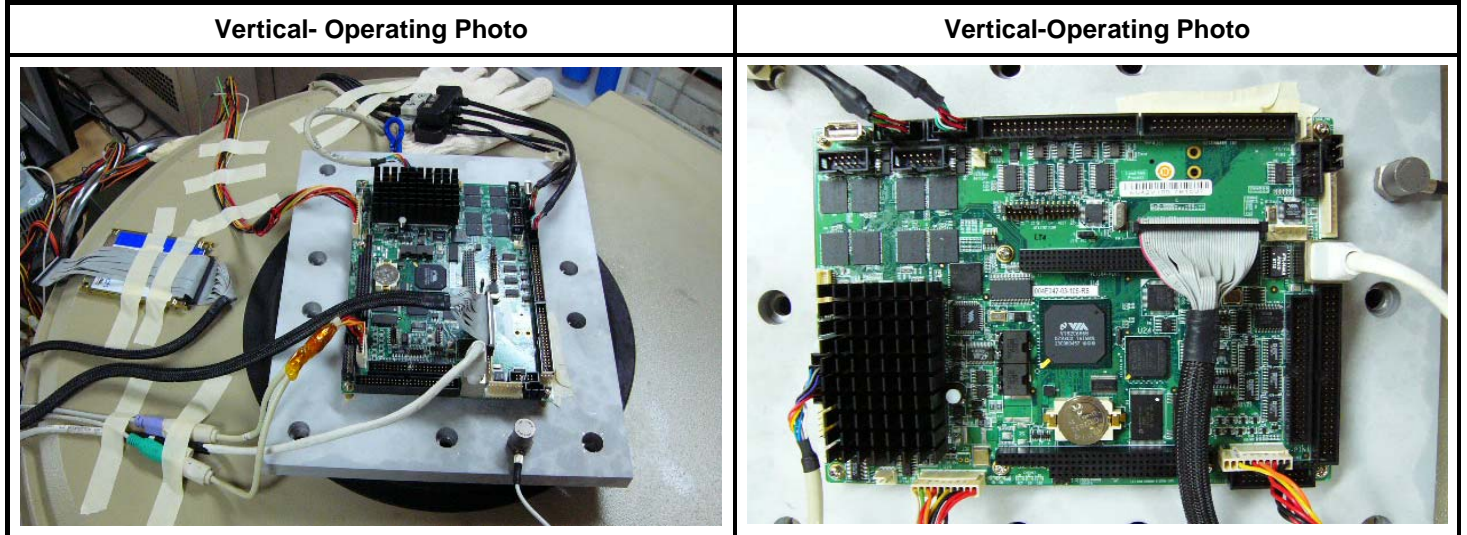
Operation Half-Sine Shock Test		
System	Function Test	Physical Check
Result	PASS	PASS



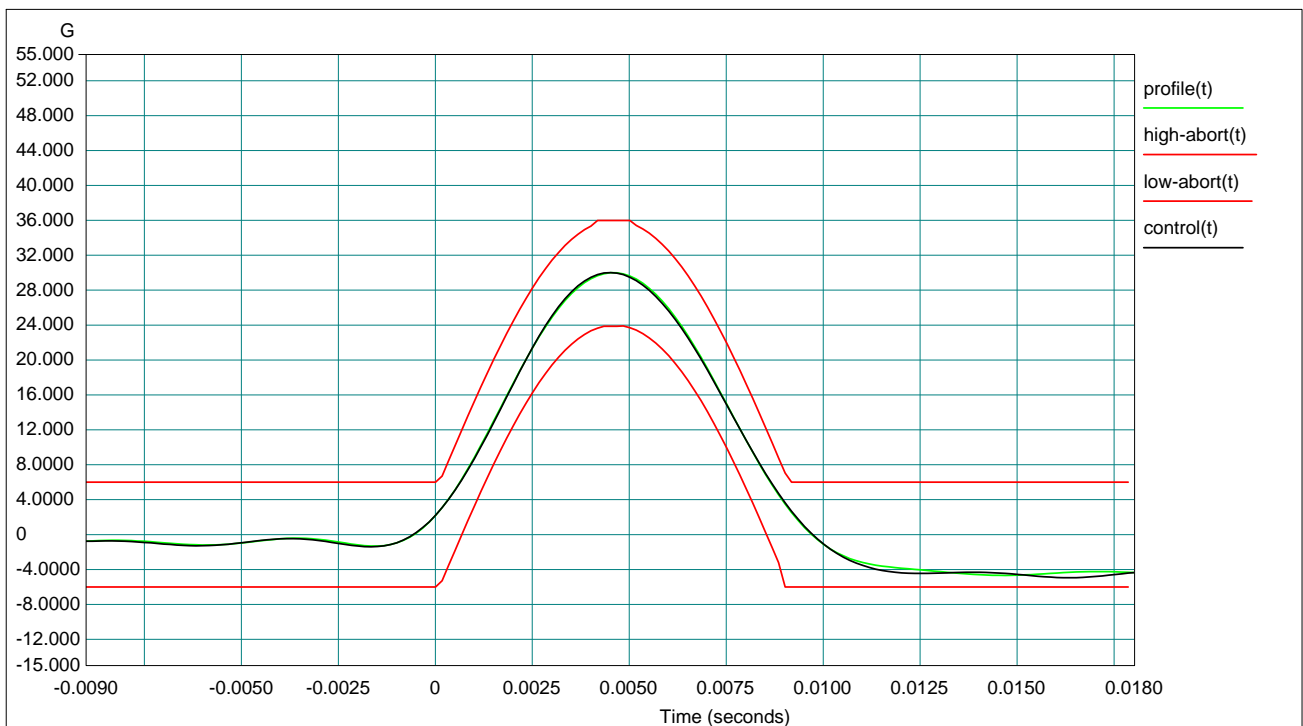




**Vertical**



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**

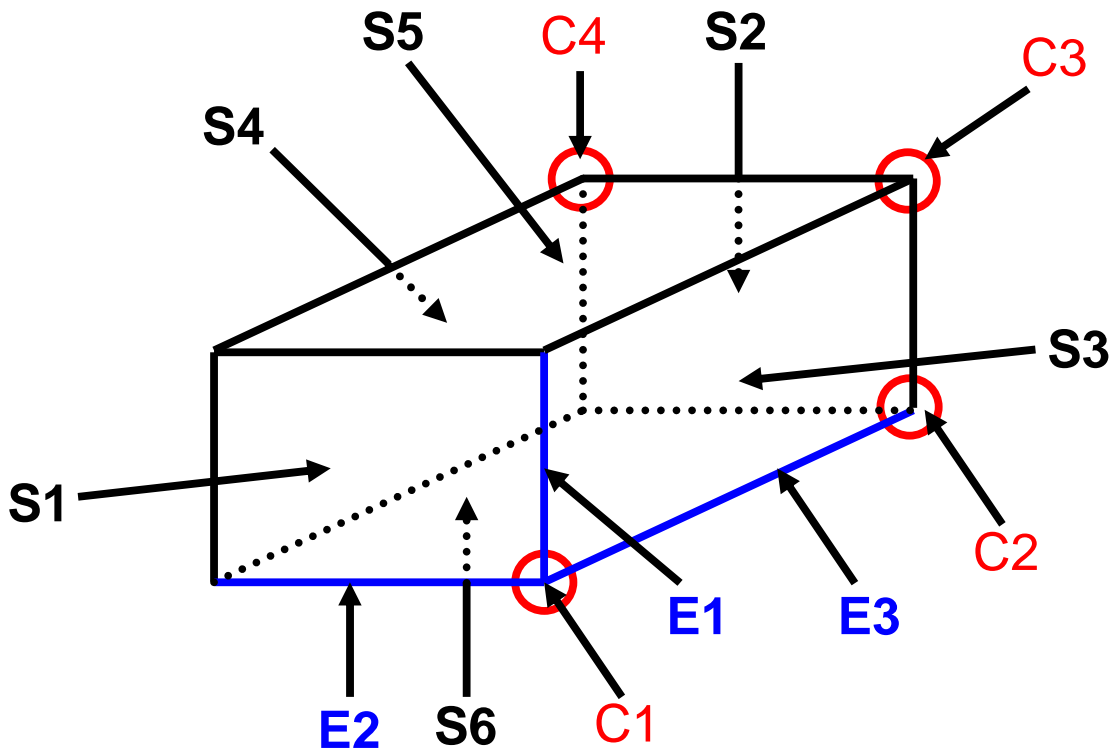


Figure 9-1



### 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	-

