

ISO-9001 Certified
ISO-14000 Certified
ISO-17025 Certified
ADVANTECH CO., LTD.

Phoebus Test Plan

Version : 1.0

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1. ENVIRONMENT TEST

1.1 Temperature operation & DC margin test

1.1.1 Test Purpose:

Evaluate whether the functions are maintained in a stable condition in DC margin and different environment condition .

- Low-temperature environment.
- High-temperature environment.

1.1.2 Test Standard:

Reference to the IEC 60068-2-1 Testing procedures Test Ab: Cold Test

Reference to the IEC 60068-2-2 Testing procedures Test Bb: Dry Heat Test

1.1.3 Test Equipment:

Programmable Temperature & Humidity Chamber

1.1.4 Sample Configuration & Quantity Under Test:

Using 6 ~ 10 pieces of boards

1.1.5 Test Condition:

1. Chamber temperature setup:

1.1 Low temperature condition

1.1.1 Test ambient temperature: -45

1.1.2 Operation dwell Time: 48Hrs

1.1.3 Temperature gradient: 20 /hour

1.2. High temperature condition

1.2.1 Test ambient temperature: 90

1.2.2 Operation dwell Time: 48hrs

1.2.3 Temperature gradient: 20 /hour

2. DC margin setup

2.1 Low temperature condition:

Regular Voltage 24 hours

Regular Voltage – low limit %, 12 hours

Regular Voltage + high limit %, 12 hours

2.2 High temperature condition:

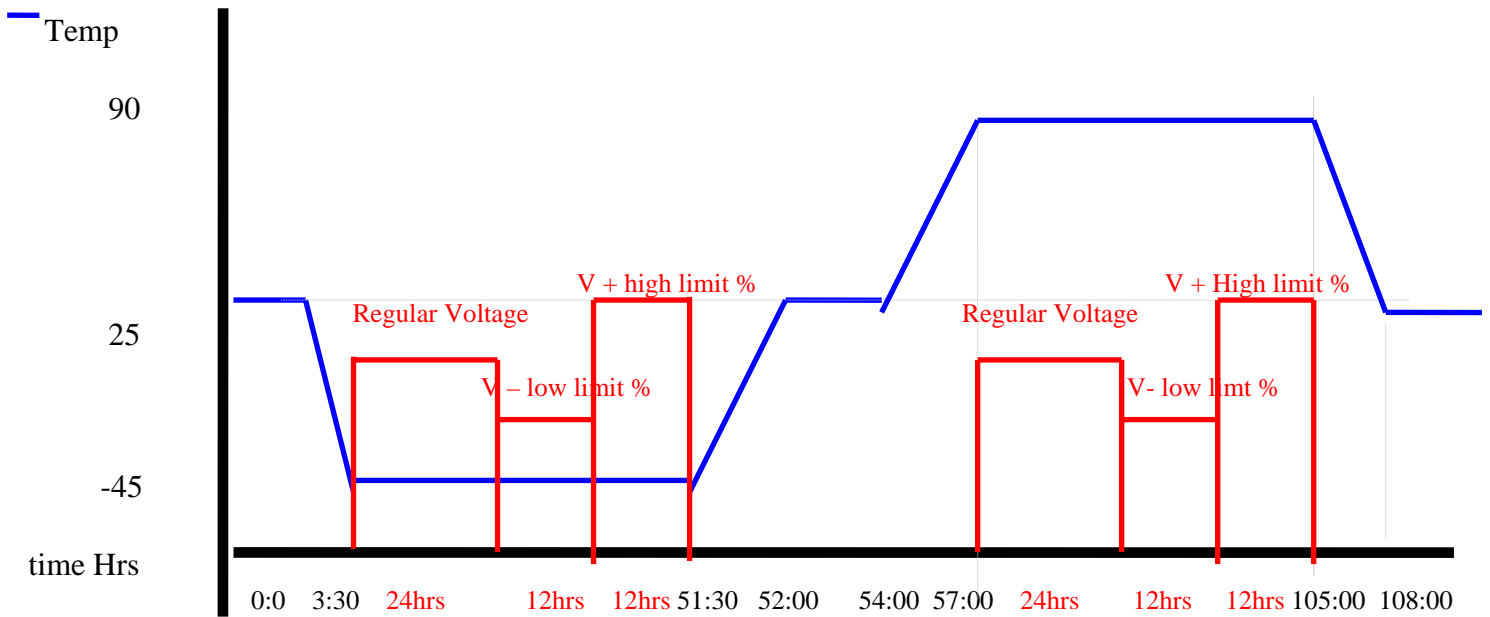
Regular Voltage 24 hours

Regular Voltage – low limit %, 12 hours

Regular Voltage + high limit %, 12 hours

3. Test Software : Running HCT 9.5 in Win2000 or other specific test programs

3. Test Environment Curve :



1.1.6 Evaluation Criteria:

1. The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed under the performance level specified by the manufacturer.
2. There should be no abnormalities, which could affect the product-specified functions and performances

1.2 Temperature storage test

1.2.1 Test Purpose:

Evaluate whether the functions are maintained in a stable condition in different environment condition.

- Low-temperature environment.
- High-temperature & humidity environment.

1.2.2 Test Standard:

Reference to the IEC 60068-2-1 Testing procedures Test Ab: Cold Test

Reference to the IEC 60068-2-56 Testing procedures Test Cb: Damp Heat Steady State Test

1.2.3 Test Equipment:

Programmable Temperature & Humidity Chamber

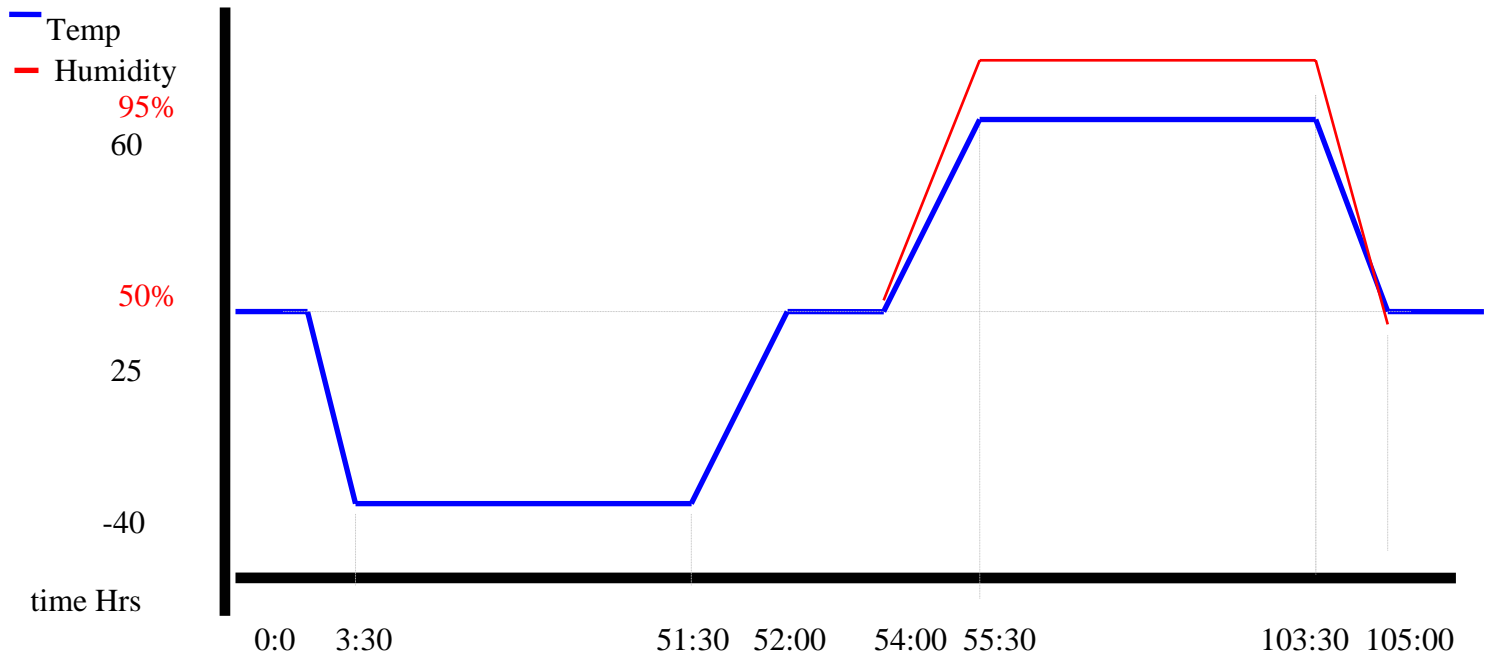
1.2.4 Sample Configuration & Quantity Under Test:

Using 6 ~ 10 pieces of boards

1.2.5 Test Condition:

1. Chamber temperature setup:
 - 1.1 Low temperature condition
 - 1.1.1 Test ambient temperature: -40
 - 1.1.2 Operation dwell Time: 48Hrs
 - 1.1.3 Temperature gradient: 20 /hour
 - 1.2. High temperature & humidity condition
 - 1.2.1 Test ambient temperature: 60
 - 1.2.2 Test ambient humidity : 95%
 - 1.2.3 Operation dwell Time: 48hrs
 - 1.2.4 Temperature gradient: 20 /hour

2. Test Environment Curve :



1.2.6 Evaluation Criteria:

1. The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed under the performance level specified by the manufacturer.
2. There should be no abnormalities, which could affect the product-specified functions and performances

1.3 Thermal profile test

1.3.1 Test Purpose:

Confirm whether the heat generation is satisfactory according to the product safety and part specification.

1.3.2 Test Standard:

Reference to the IEC 60068-2-2 Testing procedures Test Bb: Dry Heat Test

1.3.3 Test Equipment:

1. Programmable Temperature & Humidity Chamber
2. Data recorder
3. Thermocouple OMEGA K type AWG No.36
4. Thermal glue Satlon D3/PRIMER 606
5. IR Camera

1.3.4 Sample Configuration & Quantity Under Test:

Using one piece of board

1.3.5 Test Condition:

1. Test chamber temperature: 25 , 85 , 90
2. Dwell Time: 4Hrs for each temperature degree
3. Temperature gradient: 20C/hour
4. Test Software : Running HCT 9.5 in Win2000 or other specific test programs

1.3.6 Evaluation Criteria:

1. The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed under the performance level specified by the manufacturer.

1.4 Thermal shock test

1.4.1 Test Purpose:

Evaluate whether the functions are maintained in a stable condition in sharp temperature change condition.

1.4.2 Test Standard:

Reference to the IEC 60068-2-14 Testing procedures Test N: Change of temperature Test

1.4.3 Test Equipment:

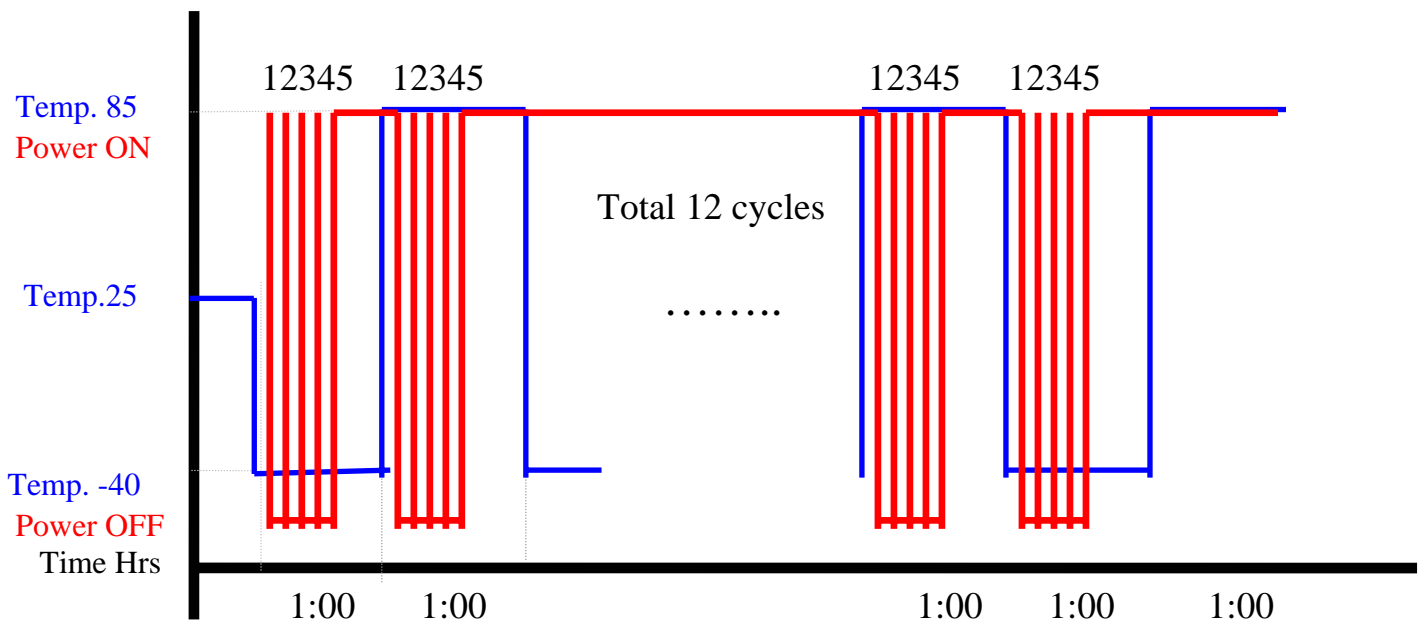
Programmable Temperature & Humidity Chamber

1.4.4 Sample Configuration & Quantity Under Test:

Using 6 ~ 10 pieces of boards

1.4.5 Test Condition:

1. Test High Temperature: 85
2. Test Low Temperature: -40
3. Test dwell time: 1 hour
4. Temperature slope: 10 °/min
5. Test cycle: 12 cycles
6. Test Software : Running Passmark burn-in 4.0 or other specific test programs
7. Test method : During burn-in, system do the power on/off test total 20 times.
(Testing 10 times at -40 ° & 10 times at 85 °)
8. Test Environment Curve:



1.4.6 Evaluation Criteria:

1. The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed under the performance level specified by the manufacturer.
2. There should be no abnormalities, which could affect the product-specified functions and performances
3. During the test, the Power ON/FF test should all pass and no any failure.

1.5 Power cycle test

1.5.1 Test Purpose:

Evaluate whether the EUT power ON/OFF functions keep in normal mode

1.5.2 Test Standard:

Reference to the IEC 60068-2-1 Testing procedures Test Ab: Cold Test\12

Reference to the IEC 60068-2-2 Testing procedures Test Bb: Dry Heat Test\13

1.5.3 Test Equipment:

1. Programmable Temperature & Humidity Chamber
2. Advantech Power ON/OFF tester fixture

1.5.4 Sample Configuration & Quantity Under Test:

Using 6 ~ 10 pieces of boards

1.5.5 Test Condition:

Condition I : Power ON/FF at low temperature

1. Test Temperature : -45

2. Test Times : 72 Hrs

Step: A. System power on , record the count number then system power off.

B. After 1 minutes, system power on again.

C. Recycle step A& B for 1000 times.

D. System power on , record the count number then system power off.

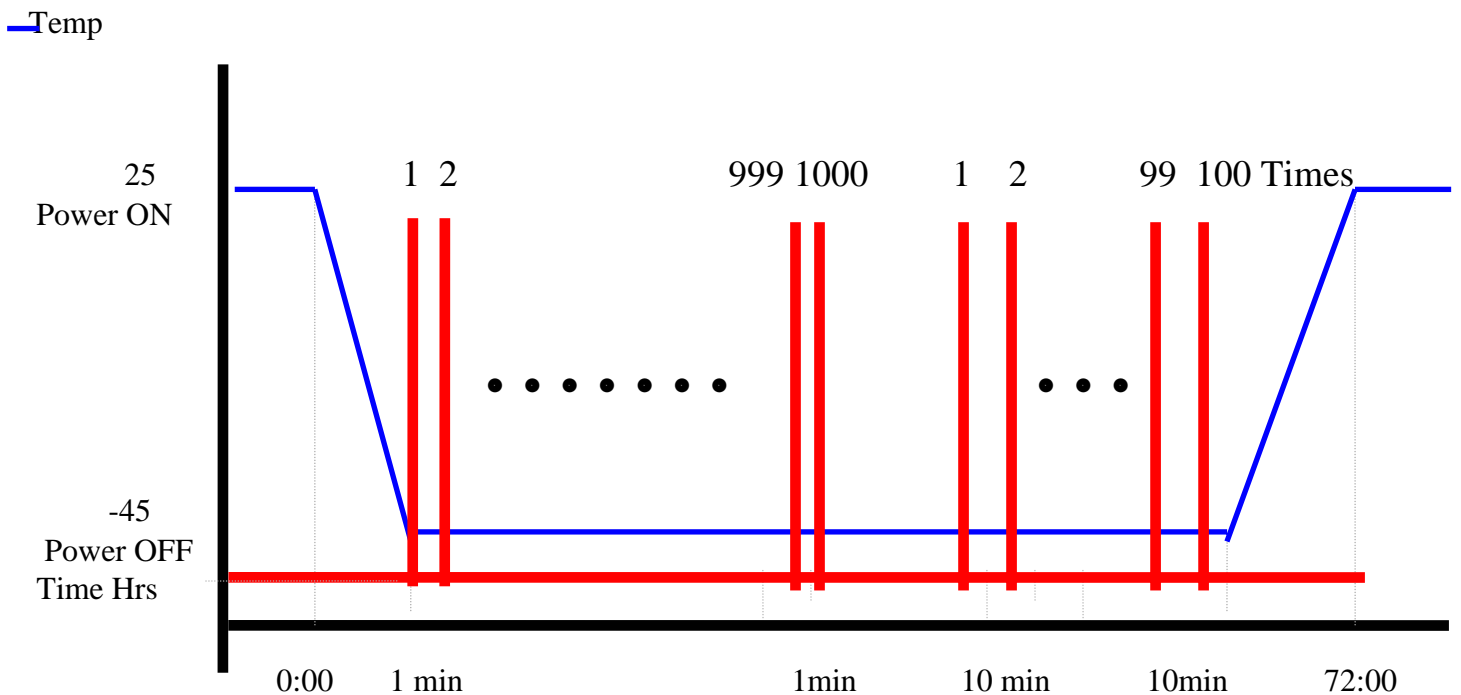
E. After 10 minutes, system power on again.

F. Recycle step D& E for 100 times.

3. Number of test : Total 1100 times

4. Test Software : MS-DOS

5. Test Environment Curve:



Condition II : Power ON/OFF at high temperature

1. Test Temperature : 90

2. Test Times : 24Hrs

Step: A. System power on , record the count number then system power off.

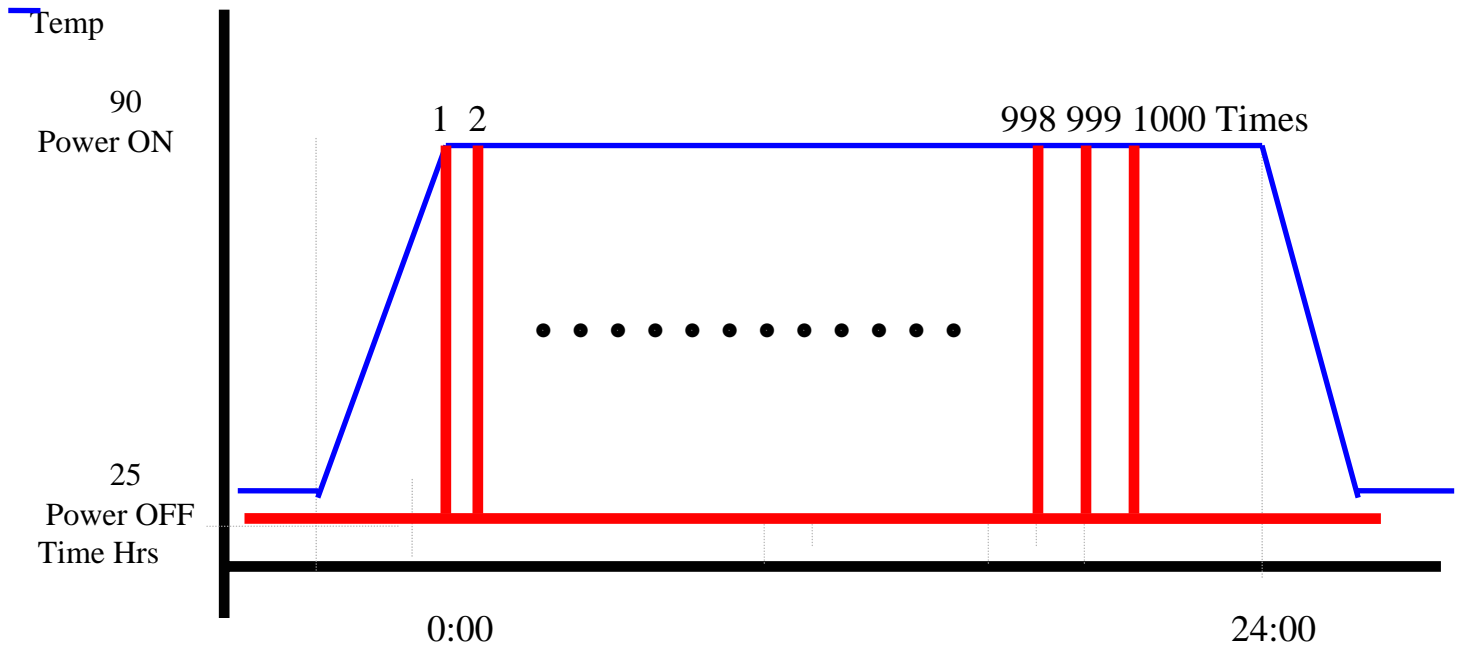
B. After several seconds, system power on again.

C. Recycle step A& B for 1000 times.

3. Number of test : 1000 times

4. Test Software : MS-DOS

5. Test Environment Curve:



1.5.6 Evaluation Criteria:

1. The EUT shall continue to operate as intended after the test. And only can less 2 times failure during 1000 times testing.
2. The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed under the performance level specified by the manufacturer.
3. There should be no abnormalities, which could affect the product-specified functions and performances

1.6 Random vibration test

1.6.1 Test Purpose:

Evaluate whether the EUT functions are maintained in a stable condition when operating the product in the vibration test.

1.6.2 Test Standard:

Reference to the IEC 60068-2-64 testing procedures Fh: Vibration board band random test

1.6.3 Test Equipment:

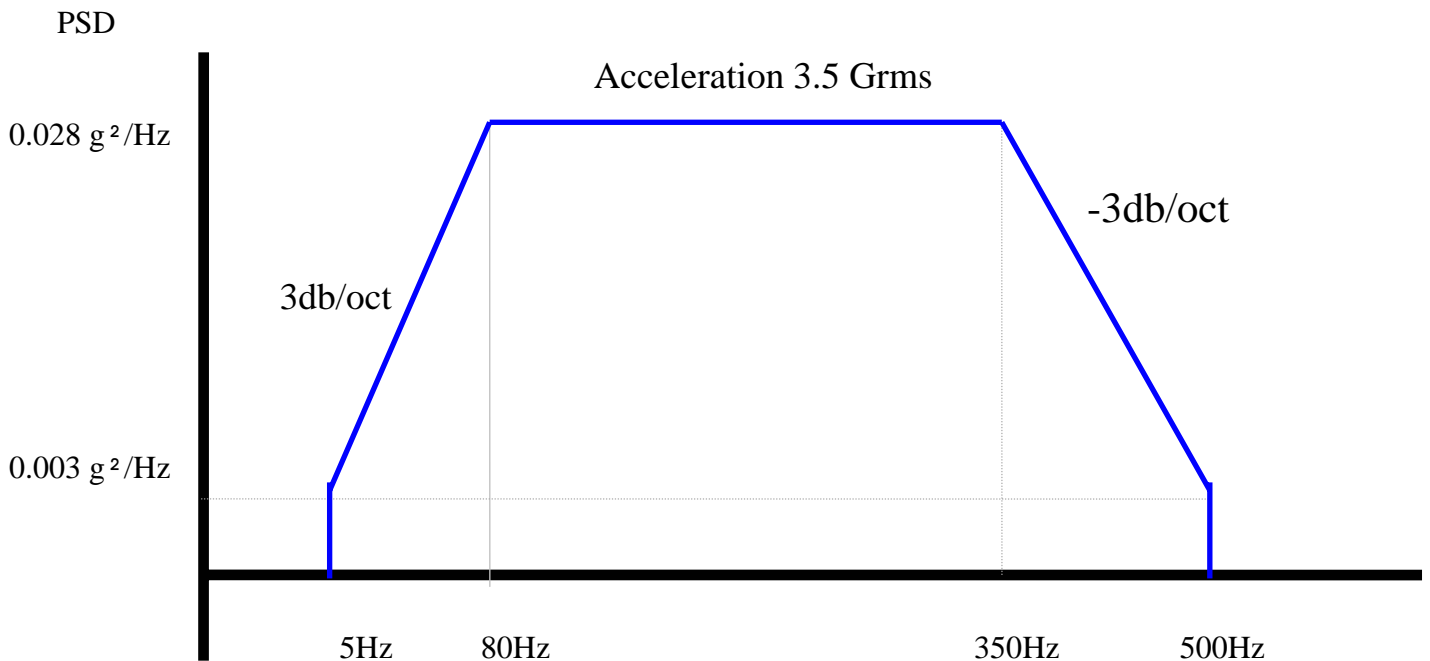
Vibration Simulator System

1.6.4 Sample Configuration & Quantity Under Test:

Using one piece of board

1.6.5 Test Condition:

1. Test PSD: $0.028\text{G}^2/\text{Hz}$, 3.5 Grms
2. System condition : Non-operation mode
3. Test Frequency : 5-500Hz
4. Test Axis : X,Y and Z axis
5. Test Time : 1 hour per each axis
6. Test curve:



1.6.6 Evaluation Criteria:

1. There should be no abnormalities, which could affect the product-specified functions and performances.
2. In appearance, the product should have no damage, deformation, scratches, loosening of screws or other abnormality of the components . In the mean time, there should be no obvious changes in the positional dimensions between the parts, all of above are necessary to assure the reliability of the f the product.
3. For the function and performance inspection, there should be no abnormality in the function and performance as specified for the product.
4. There should be no risk of electric shock.
5. There must be no deformation-caused changes in insulating distances and no scattering of broken components.
6. The DIMM modules must stay in place if they insert in it.

1.7 Package vibration test

1.7.1 Test Purpose:

Evaluate whether the product's functions are maintained in a stable condition during the transportation

1.7.2 Test Standard:

Reference to the IEC 60068-2-64 testing procedures Fh: Vibration board band random test

1.7.3 Test Equipment:

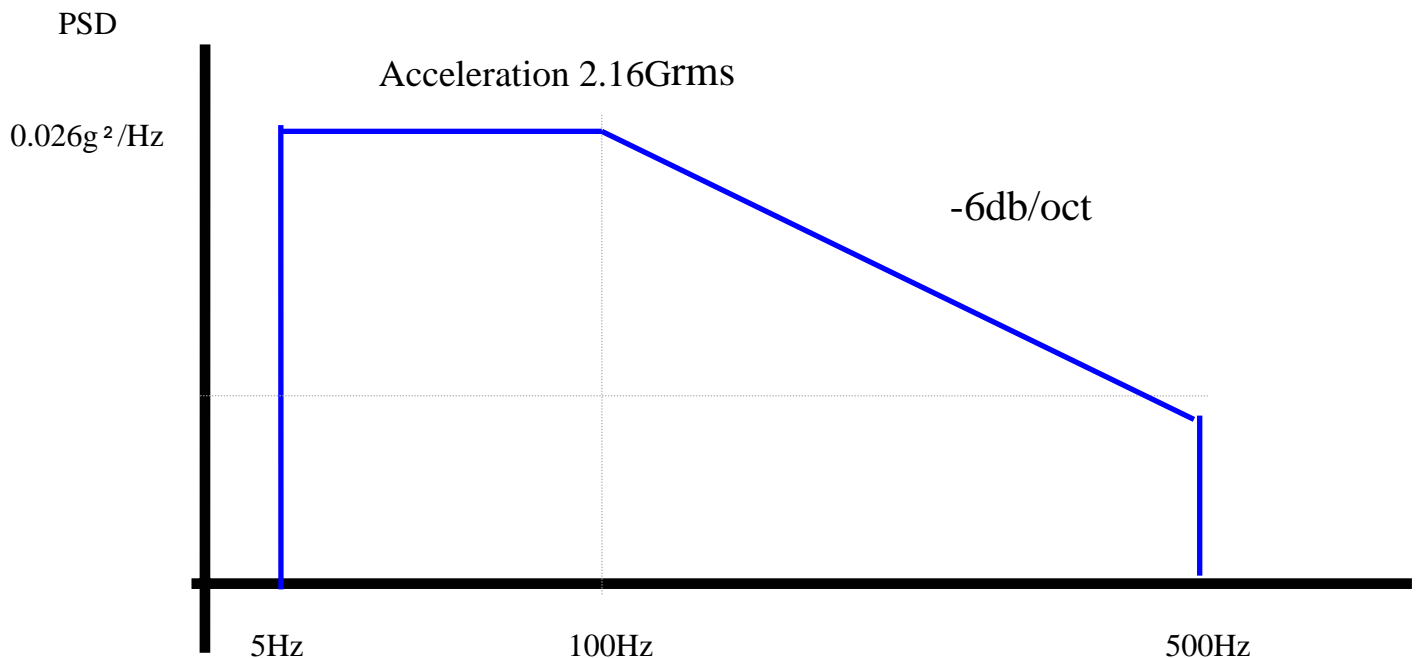
Vibration Simulator System

1.7.4 Sample Configuration & Quantity Under Test:

Using one piece of board

1.7.5 Test Condition:

1. Test PSD : $0.026G^2/Hz$, 2.16Grms
2. Test Frequency : 5-500Hz
3. Test Axis : X,Y,Z three axes
4. Test Time : 30 minutes each axis
5. Test Curve :



1.7.6 Evaluation Criteria

1. There should be no abnormalities, which could affect the product-specified functions and performances.
2. In appearance, the product should have no damage, deformation, scratches, loosening of screws or other abnormality of the components . In the mean time, there should be no obvious changes in the positional dimensions between the parts, all of above are necessary to assure the reliability of the f the product.
3. For the function and performance inspection, there should be no abnormality in the function and performance as specified for the product.
4. There should be no risk of electric shock.
5. There must be no deformation-caused changes in insulating distances and no scattering of broken components.
6. The DIMM modules must stay in place if they insert in it.

1.8 Package Drop test

1.8.1 Test Purpose:

Evaluate whether the product quality can be assured in case the impacts occurred during transportation

1.8.2 Test Standard:

Reference to the Federal Standard 101 Method 5007 Testing procedure B Test Ea : Drop Test

1.8.3 Test Equipment:

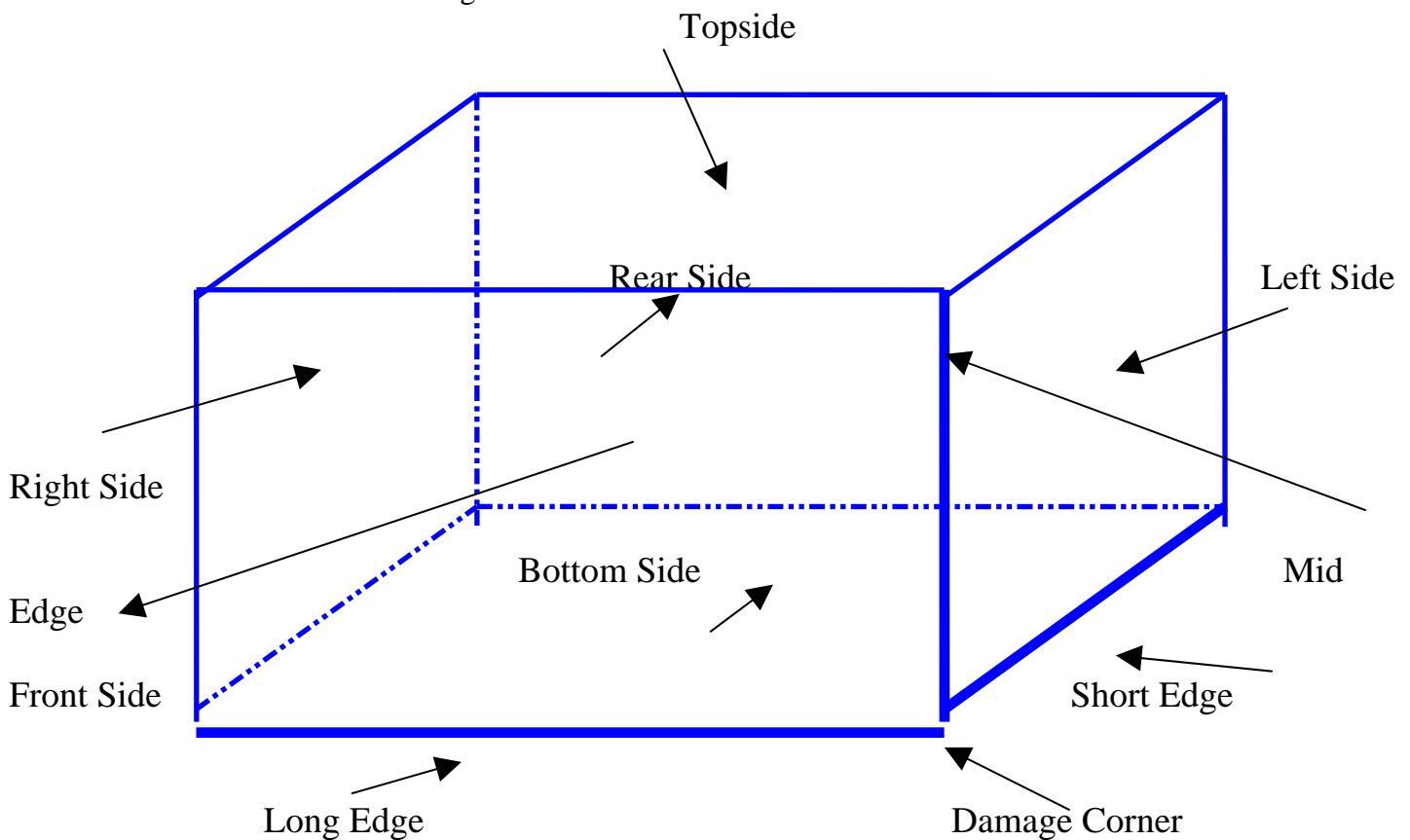
Drop tester machine

1.8.4 Sample Configuration & Quantity Under Test:

Using one piece of board

1.8.5 Test Condition:

1. Test Phase : One corner , three edges, six faces
2. Test High : 100cm
3. Test Drawing :



1.8.6 Evaluation Criteria:

1. There should be no abnormalities, which could affect the product-specified functions and performances.
2. In appearance, the product should have no damage, deformation, scratches, loosening of screws or other abnormality of the components . In the mean time, there should be no obvious changes in the positional dimensions between the parts, all of above are necessary to assure the reliability of the f the product.
3. For the function and performance inspection, there should be no abnormality in the function and performance as specified for the product.
4. There should be no risk of electric shock.
5. There must be no deformation-caused changes in insulating distances and no scattering of broken components.
6. The DIMM modules must stay in place if they insert in it.