

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

QA Test Report

ACP-4360MB1301E

(Product Reliability Test)

Report No: 13S157A0

Report Date: November 22, 2013

Jeff Yang

Manager of QA Department

Edison Wang

Approval

Ramon Lin

Test Engineer

台北市內湖區瑞光路 26 巷 20 弄 1 號 5 樓 QA_LAB
QA_LAB, 5F, No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei, Taiwan 114, R.O.C.

TEL: 886-2-2792-7818 FAX: 886-2-2794-7305

www.advantech.com

Version History

Version	Date	Handled by	Comments
A0	2013/11/22	Ramon Lin	Initial version

Document Version Summary

Version	Description
A0	Initial version

Table of Contents

Version History	2
Document Version Summary	3
Table of Contents	4
Tables	5
1. Environment test	7
1.01 High / Low temperature storage test	7
1.02 High / Low temperature operating test.....	9
1.03 Thermal profile test	12
1.04 Power on/off test (ATX Power cycling).....	16
1.05 AC Power cycling test.....	18
1.06 Product operating vibration test	21
1.07 Non-operating sine vibration test.....	25
1.08 Product operating shock test	27
1.09 HDD Rotation vibration test	31
1.10 Connector & Power Switch Durability test.....	33
1.11 Packaged drop test.....	35

Tables

Table 1.03.1.01 Measurement Components Temperature table	13
--	----

Figures

Figure 1.01.1.01 High / Low temperature storage test curve.....	8
Figure 1.02.1.01 High / Low temperature operating test curve	10
Figure 1.05.1.01 Low temperature power ON/OFF test curve	19
Figure 1.05.1.02 High temperature power ON/OFF test curve.....	19
Figure 1.06.1.01 Product operating vibration test curve	22
Figure 1.07.1.01 Non-operating Sine vibration test curve	26
Figure 1.08.1.01 Shock test curve	28
Figure 1.11.1.01 Packaged drop surface	36

1. ENVIRONMENT TEST

1.01 High / Low temperature storage test

Test Date: October 12, 2013 ~ October 14, 2013; November 01, 2013 ~ November 03, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.01.1.01 Test Purpose:

Evaluate whether the functions are maintained in a stable condition on transportation and storage mode in different environment condition.

- High-temperature and relative humidity environment.
- Low-temperature environment.

1.01.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.01.1.03 Test Equipment:

1. Programmable temperature & humidity chamber
K. SON. INS. Tech. Corp.
Model: THS-D4L±100
Date of Calibration: 03/14/2013

1.01.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-----------------|--|
| 1. M/B | ASMB-784 Rev.A1 01-2 (ESE0118874) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |

1.01.1.05 Test Condition:

1. Chamber temperature and humidity setup:
 - 1.1 High temperature and Humidity condition
 - 1.1.1 Test Temperature: 60C
 - 1.1.2 Test Humidity: 95%
 - 1.1.3 Dwell Time: 48Hrs
 - 1.1.4 Temperature gradient: 30C/hr
 - 1.2 Low temperature condition
 - 1.2.1 Test ambient temperature: -40C
 - 1.2.2 Operation dwell Time: 48Hrs
 - 1.2.3 Temperature gradient: 30C/hr
2. OS: Windows7
3. Test software: Running Passmark Burn-in V7.0、MemTest 3.8 and Intel Power Thermal Utility test program (function check after testing)

4. Test Environment Curve Figure 1.01.1.01



Figure 1.01.1.01 High / Low temperature storage test curve

1.01.1.06 Test Procedure:

1. Confirm the quality-confirmation items at the normal temperature and humidity.
2. Set the chamber at 25C & 50% humidity and place the EUT in the chamber.
3. Adjust the chamber temperature to the 60C; the temperature gradient should not over 30C/hr.
4. Wait the chamber temperature reach to the specified temperature and control humidity to the 95%±2% humidity in 2 hours.
5. Proceed to the 48-hour with 60C and 95%±2% humidity state.
6. Adjust temperature to 25C, the temperature gradient should not over 30C/hr. Humidity not control.
7. Hold temperature 25C for 2 hours.
8. Set chamber temperature to -40C; the temperature gradient should not over 30C/hr.
9. Proceed to the 48-hour test with -40C state.
10. Return the temperature to the 25C, the temperature gradient should not over 30C/hr.
11. Hold temperature 25C for 2 hours.
12. Running max loading program for system function check.

1.01.1.07 Evaluation Criteria:

1. After the test, the EUT shall not exhibit any errors under all diagnostics test items.
2. There shall be no abnormalities, which could affect the product-specified functions and performances.

1.01.1.08 Test Result:

1. There is no damage in electronic and mechanical functions.
2. Degradation has not been found.
3. Performance is maintained with no incurable physical damage or degradation.

1.01.1.09 Conclusion:

Passed.

1.02 High / Low temperature operating test

Test Date: October 03, 2013 ~ October 07, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.02.1.01 Test Purpose:

Evaluate whether the functions are maintained in a stable condition in temperature and humidity environment condition.

1.02.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.02.1.03 Test Equipment:

1. Programmable temperature & humidity chamber
K. SON. INS. Tech. Corp.
Model: THS-D4L±100
Date of Calibration: 03/14/2013

1.02.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-----------------|--|
| 1. M/B | ASMB-784 Rev.A1 01-2 (ESE0118874) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |

1.02.1.05 Test Condition:

1. Chamber temperature and humidity setup:
 - 1.1 High temperature and Humidity condition
 - 1.1.1 Test Temperature: 40C
 - 1.1.2 Test Humidity: 80%
 - 1.1.3 Dwell Time: 48Hrs
 - 1.1.4 Temperature gradient: 30C/hr
 - 1.2 Low temperature condition
 - 1.2.1 Test ambient temperature: 0C
 - 1.2.2 Operation dwell Time: 48Hrs
 - 1.2.3 Temperature gradient: 30C/hr
2. OS: Windows7
3. Test software: Running Passmark Burn-in V7.0、MemTest 3.8 and Intel Power Thermal Utility test program
4. Test Environment Curve [Figure 1.02.1.01](#)

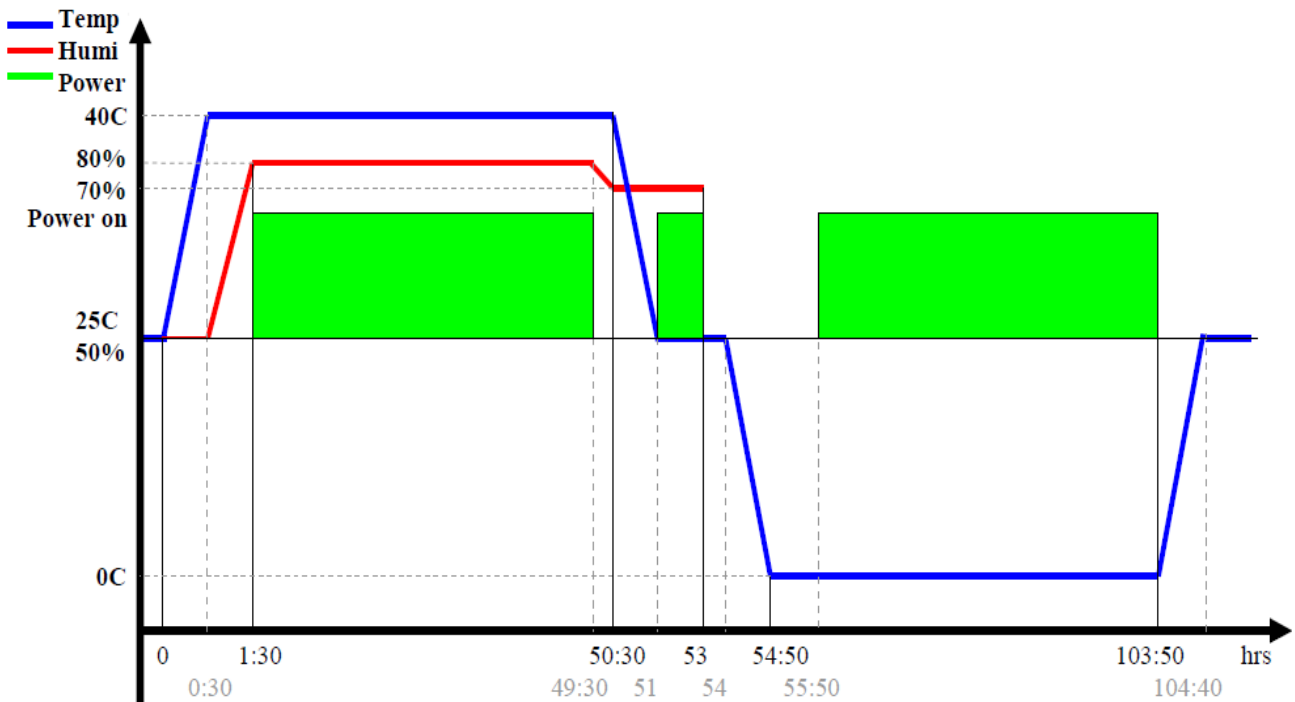


Figure 1.02.1.01 High / Low temperature operating test curve

1.02.1.06 Test Procedure:

1. Confirm the quality-confirmation items at the normal temperature and humidity.
2. During the test, the system will be running specific test program to make the worst case loading of system evaluation.
3. Set the chamber at 25C & 50% humidity and place the EUT in the chamber.
4. Adjust the chamber temperature to the 40C; the temperature gradient should not over 30C/hr.
5. Wait the chamber temperature reach to the specified temperature and control humidity to the 80%±2% humidity in 1 hour.
6. Power on to boot up the EUT and set the worst case loading to the function check.
7. Proceed to the 48-hour function test with 40C and 80%±2% humidity state.
8. Confirm the EUT function after 48-hour test ends and turn off power.
9. Adjust humidity to 70% in 1 hour.
10. Adjust temperature to 25C in 30 minutes and ensure max humidity is 70% (not over 75%) during the temperature adjustment.
11. Power on to boot up the EUT and confirm the quality-confirmation items in 2 hours.
12. Turn off power and keep temperature 25C 1 hour.
13. Set chamber temperature to 0C; the temperature gradient should not over 30C/hr.
14. Maintain operation of the 0C constant for 1 hour as the test temperature conditions.
15. Power on to boot up the EUT and set the worst case loading and confirm the function.
16. Proceed to the 48-hour test with low-temperature state.
17. Confirm the EUT function after 48-hour test ends and turn off power.
18. Return the temperature to the 25C.
19. Running max loading program for system function check

1.02.1.07 Evaluation Criteria:

1. During and after the test, the EUT shall not exhibit any errors under all diagnostics test items.
2. There shall be no abnormalities, which could affect the product-specified functions and performances.

1.02.1.08 Test Result:

1. There is no damage in electronic and mechanical functions.
2. Degradation has not been found.
3. Performance is maintained with no incurable physical damage or degradation.

1.02.1.09 Conclusion:

Passed.

Photo:



1.03 Thermal profile test

Test Date: October 02, 2013 ~ October 03, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.03.1.01 Test Purpose:

Verify whether the component temperatures exceed the specified thermal specification.

1.03.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.03.1.03 Test Equipment:

1. Programmable temperature & humidity chamber
K. SON. INS. Tech. Corp.
Model: THS-D4L±100
Date of Calibration: 03/14/2013
2. Data recorder
YOKOGAWA CO. LTD.
Model: μR1800
S/N: 47XS0063
Date of Calibration: 10/24/2012
3. Thermocouple OMEGA K type AWG No.36
4. Thermal glue Satlon D3/PRIMER 606

1.03.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-----------------|--|
| 1. M/B | ASMB-784 Rev.A1 01-2 (ESE0118874) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |

1.03.1.05 Test Condition:

1. Test temperature: 0C, 40C
2. Test in the chamber with air flow 0.7 m/sec
3. Dwell time: 6Hrs
4. OS: Windows7
5. Test software: Running Passmark Burn-in V7.0、MemTest 3.8 and Intel Power Thermal Utility test program
6. Test item list see [Table 1.03.1.01](#)

1.03.1.06 Test Procedure:

1. Confirm the quality-confirmation items at the normal temperature and humidity.
2. During the test, the system will be running max loading test program to make the worst case loading of system evaluation.

3. Place the EUT into the chamber and set the chamber at 25C
4. Power on the EUT and run the system by max loading test program to make the worst case loading.
5. Adjust the chamber temperature to the 0C; the temperature gradient should not over 30C/hr.
6. Proceed the 0C for 6 hours and record the measurement's temperature of each specified point.
7. Adjust the chamber temperature to the 40C; the temperature gradient should not over 30C/hr.
8. Proceed the 40C for 6 hours and record the measurement's temperature of each specified point.
9. Return the temperature to the normal temperature.

Table 1.03.1.01 Measurement Components Temperature table

NUM	Parts List	Chamber (Tc measurement)		Reference Tc (see remark for Tc calculation if it is not specified in datasheet)	Spec from datasheet
		0°C	40°C		
		°C		°C	°C
1	(CPU)	36.1	70.1	72.72	72.72 (Tc)
2	(PCH1)	24.7	65.5	101	108 (Tj)
3	(U45) IR3553MPBF	35.8	69.7	100	125 (Tj)
4	(DIMMA1) RAM	18.2	55.2	85	70 (Ta)
5	(U20) WGI210AT	25.8	62.1	105	85 (Ta)
6	(U66) SN75DP139RGZR	22.3	60.3	105	85 (Ta)
7	(U40) IR3564B	27.3	63.4	100	125 (Tj)
8	(U23) W83782G	15.9	54.7	90	70 (Ta)
9	(L6)	27.1	63.1	145	125 (Tj)
10	(U22) NCT6776D	17.0	54.6	90	70 (Ta)
11	(U49) ALC892-CG	12.7	52.1	90	70 (Ta)
12	HDD-1	14.4	52.5	60	60 (Tc)
13	HDD-2	15.8	53.1	60	60 (Tc)
14	Air-1	13.4	51.6	N/A	N/A
15	Air-2	5.8	45.5	N/A	N/A
16	Air-3	14.1	52.2	N/A	N/A

Remark:

Ta: Ambient temperature specification

Tc: Device Case temperature specification

Tj: Device Junction temperature specification

Advantech define Reference Tc:

Component data sheet **have** thermal resistance (Rj-c)

$Tc_{max} = Tj_{max} - (Rj-c * Power)$

Component data sheet **have not** thermal resistance (Rj-c)

Advantech define: $Tc = Ta + 20^{\circ}C$

$Tc = Tj - 7^{\circ}C$ (For CPU & NB)

$Tc = Tj * 0.8$

1.03.1.07 Evaluation Criteria:

1. During and after the test, the EUT shall not exhibit any error under all diagnostics test items.
2. The temperature on the measurement points shall not exceed the specified temperature of each component.

1.03.1.08 Test Result:

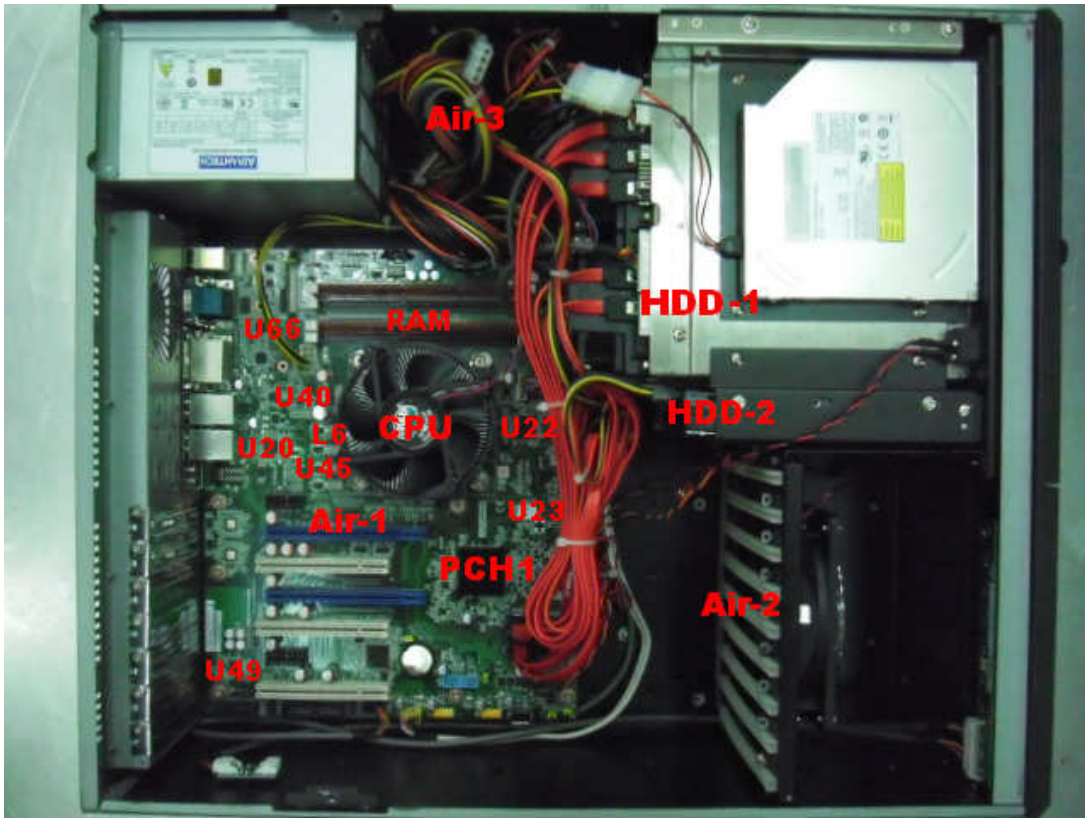
1. The system thermal specification is at 40 degreeC.
2. The temperature of all the measurement points are under themselves' thermal specification when ambient is at 40 degree C.
3. There is no damage in electronic and mechanical functions.

1.03.1.09 Conclusion:

Passed.

Photo:





Test points

1.04 Power on/off test (ATX Power cycling)

Test Date: October 07, 2013 ~ October 09, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.04.1.01 Test Purpose:

Evaluate whether the power ON/OFF functions are maintained in a stable condition in room temperature condition.

1.04.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

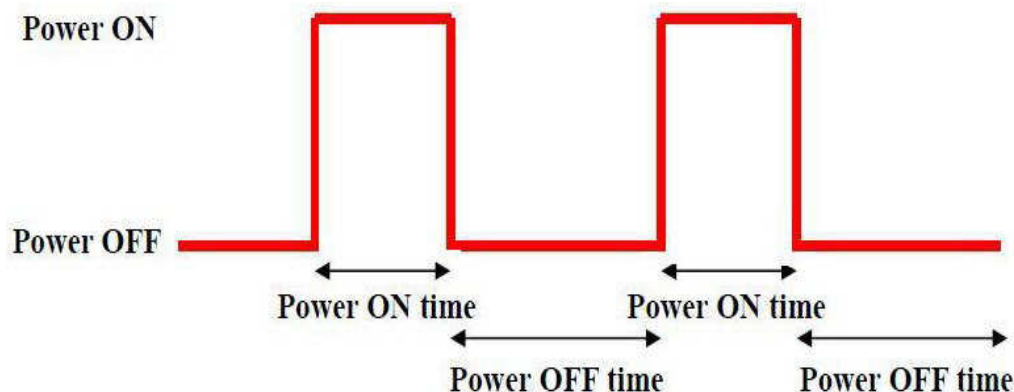
1.04.1.03 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-----------------|--|
| 1. M/B | ASMB-784 Rev.A1 01-2 (ESE0118874) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |

1.04.1.04 Test Condition:

1. Test temperature: Room temperature
2. Total test time: 1000 times
3. Power ON time : 2 minutes, Power OFF time : 30 minutes
4. OS: Windows7
5. Power ON / OFF time interval curve



1.04.1.05 Test Procedure:

1. Confirm the quality-confirmation items at the normal temperature and humidity.
2. Using fixture to power on the system and record the number, then power off at room temperature.
3. The power on time set 2 minutes, and power off time set 30 seconds.
4. Do the power ON/OFF test for 1000 cycles at room temperature.

5. Check the record must be 1000 times as same as fixture's count.

1.04.1.06 Evaluation Criteria:

1. There should be no any time failed during 1000 times testing.
2. After the test, the EUT shall not exhibit any error under all diagnostics test items.

1.04.1.07 Test Result:

1. There is no any time failure during testing.
2. There is no damage in electronic and mechanical functions.
3. Degradation has not been found.
4. Performance is maintained with no incurable physical damage or degradation.

1.04.1.08 Conclusion:

Passed.

1.05 AC Power cycling test

Test Date: October 11, 2013 ~ October 12, 2013 ~ October 15, 2013 ~ October 16, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.05.1.01 Test Purpose:

Evaluate whether the power ON/OFF functions are maintained in a stable condition in different environment condition.

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

1.05.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.05.1.03 Test Equipment:

1. Programmable temperature & humidity chamber
K. SON. INS. Tech. Corp.
Model: THS-D4L±100
Date of Calibration: 03/14/2013

1.05.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

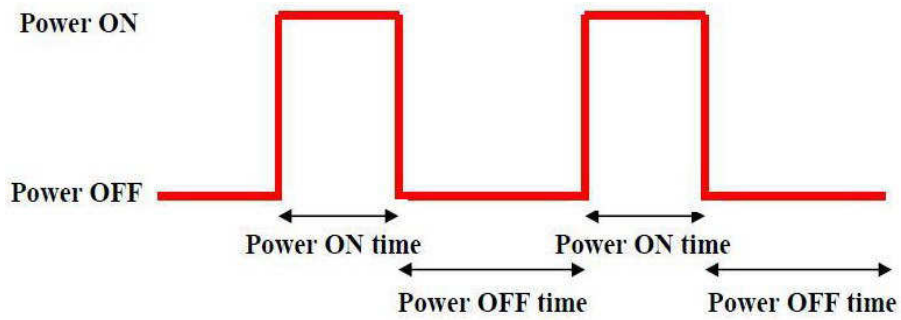
1. M/B ASMB-784 Rev.A1 01-2 (ESE0118874)
2. CPU Intel Core i7-4770 3.4GHz
3. RAM Apacer 2GB PC3-12800 *2
4. HDD WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011)
5. System fan Delta EFB1212SH
6. HDD fan Delta AFB0812SH *2
7. Power supply FSP400-60PFG (400W)
8. BIOS V1.10
9. DVD ROM DS-8A9SH
10. Chassis ACP4360MB1301E-T

1.05.1.05 Test Condition:

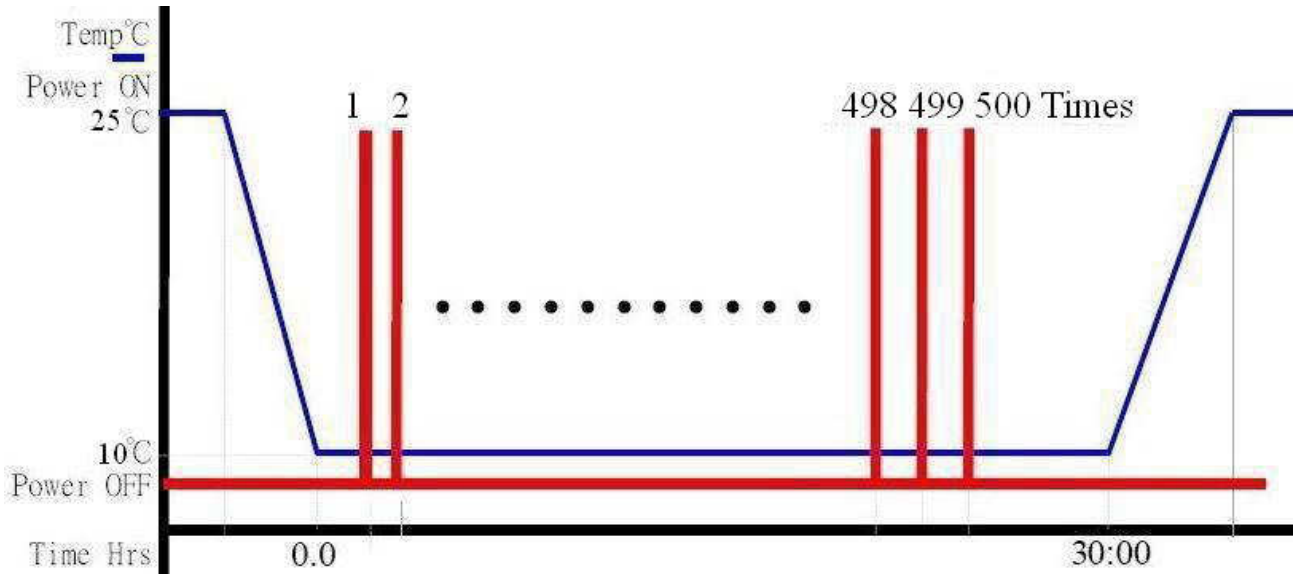
1. Test temperature: 10C, 40C
2. Before doing low temperature test, the EUT storage 4 hours
3. Total test time: each temperature 500 times

Condition	Test Temperature	Power ON time	Power OFF time	Test Times
I	10C	2 minutes	1 minute	500
II	40C	2 minutes	30 seconds	500

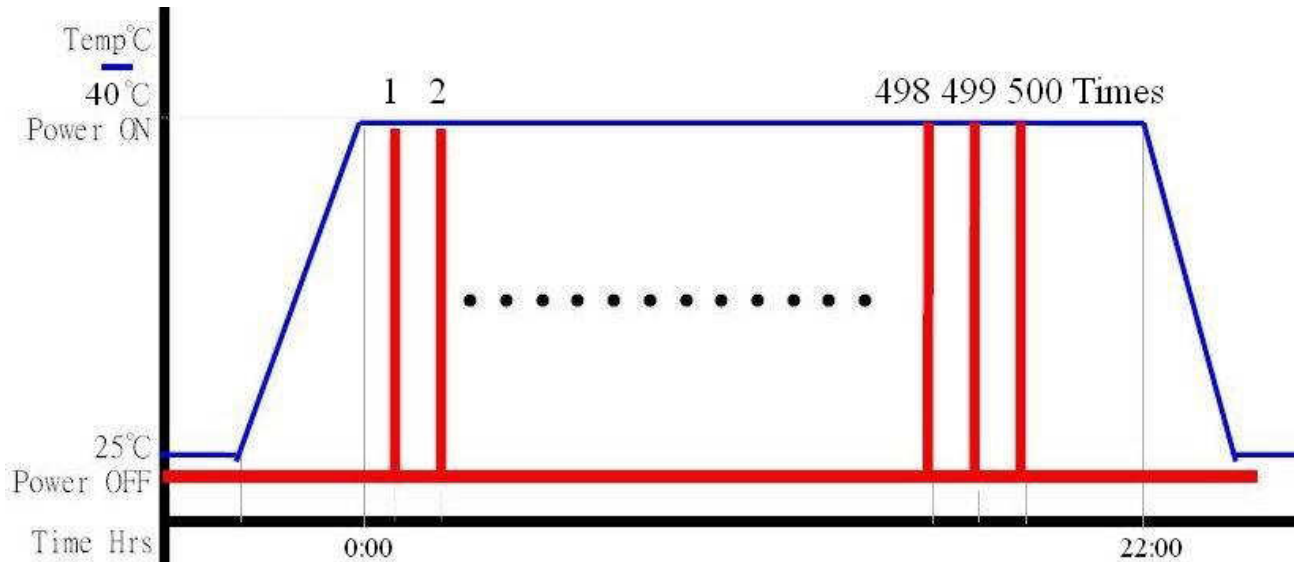
4. OS: Windows7
5. Power ON / OFF time interval curve



6. Test Environment Curve [Figure 1.05.1.01](#), [Figure 1.05.1.02](#)



[Figure 1.05.1.01](#) Low temperature power ON/OFF test curve



[Figure 1.05.1.02](#) High temperature power ON/OFF test curve

1.05.1.06 Test Procedure:

1. Confirm the quality-confirmation items at the normal temperature and humidity.
2. Set the chamber at 25C and place the EUT in the chamber.
3. Adjust the chamber temperature to the 10C and at least storage 4 hrs.

4. Using fixture to power on the system and record the number, then power off at 10C.
5. The power on time set 2 minutes, and power off time set 1 minute.
6. Do the power ON/OFF test for 500 cycles at 10C.
7. Check the record must be 500 times as same as fixture's count.
8. Increase the chamber at a rate of 30C/hr to 25C. Humidity is not controlled.
9. Set the chamber at 25C.
10. Adjust the chamber temperature to the 40C.
11. Using fixture to power on the system and record the number, then power off at 40C.
12. The power on time set 2 minutes, and power off time set 30 seconds.
13. Do the power ON/OFF test for 500 cycles at 40C.
14. Check the record must be 500 times as same as fixture's count.
15. Decrease the chamber at a rate of 30C/hr to 25C.
16. Running max loading program for system function check.

1.05.1.07 Evaluation Criteria:

1. There should be no any time failed during 500 times testing.
2. After the test, the EUT shall not exhibit any error under all diagnostics test items.

1.05.1.08 Test Result:

Test temperature	Result	
	Test times	Test Result
10 °C	500 times	500 times pass
40 °C	500 times	500 times pass

1. There is no any time failure during testing.
2. There is no damage in electronic and mechanical functions.
3. Degradation has not been found.
4. Performance is maintained with no incurable physical damage or degradation.

1.05.1.09 Conclusion:

Passed.

1.06 Product operating vibration test

Test Date: November 19, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.06.1.01 Test Purpose:

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

1.06.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.06.1.03 Test Equipment:

1. Vibration simulator system
KING DESIGN Co. LTD.
Model: 9363EM-800F2K-40N120
S / N: UC107142493
Date of Calibration: 10/09/2013

1.06.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-----------------|--|
| 1. M/B | ASMB-784 Rev.A1 01-2 (AKD0033516) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |

1.06.1.05 Test Condition:

1. Test environment: Room temperature
2. Acceleration: 0.25G
3. Frequency: 5-250Hz
4. Sweep rate: 0.5 Octave / Minute
5. Endurance cycle: 1 cycle (2 sweeps)
6. Test Axis: X, Y and Z axes
7. OS: Windows7
8. Test software: Running Passmark Burn-in V7.0 test program
9. Test Curve [Figure 1.06.1.01](#)

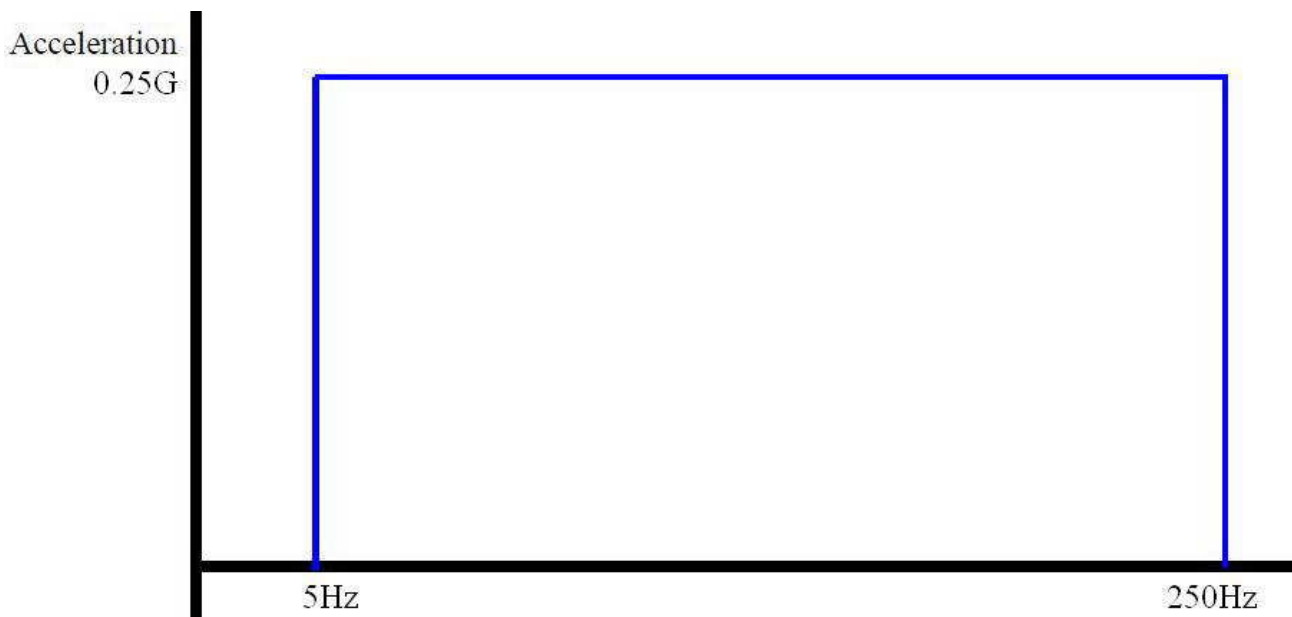


Figure 1.06.1.01 Product operating vibration test curve

1.06.1.06 Test Procedure:

1. Confirm the quality-confirmation items at the normal state.
2. Set up the EUT on vibration table in operation mode and run max loading program.
3. Set the test condition of vibration to the vibration simulator tester.
4. Run the test condition and check the EUT functions during the test.
5. Repeat steps 2 ~ 4 in X, Y and Z three different axis.
6. Inspection EUT mechanical function has met specification.
7. Running max loading program for system function check.

1.06.1.07 Evaluation Criteria:

1. Temporary loss of function is allowed when providing the self-recoverable functions.
2. There should be no abnormalities which could affect the product-specified functions and performances.
3. In appearance, the product should have no damage, deformation, scratches, loosening of screws or other abnormality of the components or case (particularly for the boards and heat sink or plastic parts). 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 product.
4. For the function and performance inspection, there should be no abnormality in the function and performance as specified for the product.
5. There should be no risk of electric shock.
6. There must be no deformation-caused changes in insulating distances and no scattering of broken components.

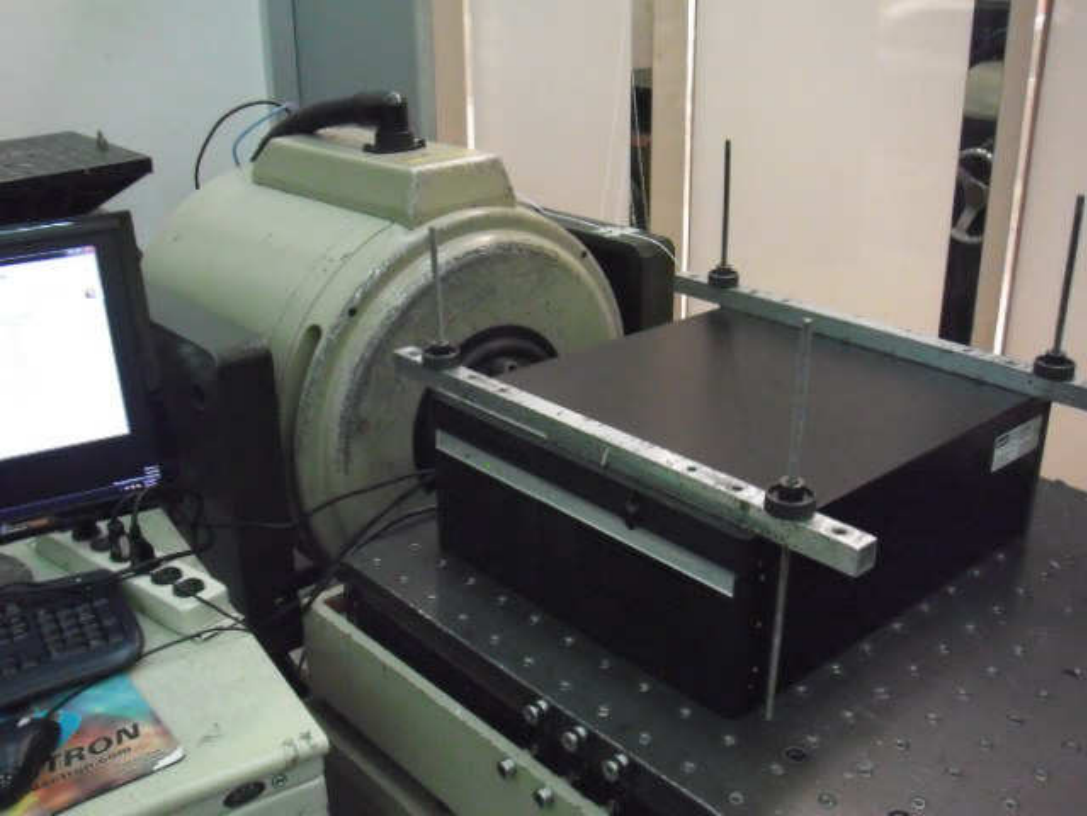
1.06.1.08 Test Result:

1. There is no any time failed during.

1.06.1.09 Conclusion:

Passed.

Photo:



Product operating vibration test for X-axis



Product operating vibration test for Y-axis



Product operating vibration test for Z-axis

1.07 Non-operating sine vibration test

Test Date: November 15, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.07.1.01 Test Purpose:

Evaluate whether the product's mechanical is strength enough in the vibration test.

1.07.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.07.1.03 Test Equipment:

1. Vibration simulator system
KING DESIGN Co. LTD.
Model: 9363EM-800F2K-40N120
S / N: UC107142493
Date of Calibration: 10/09/2013

1.07.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-----------------|--|
| 1. M/B | ASMB-784 Rev.A1 01-2 (AKD0033516) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |

1.07.1.05 Test Condition:

1. Test environment: Room temperature
2. Test displacement amplitude & acceleration: 4.4mm @ 5 ~15Hz; 2G @ 15 ~ 500Hz
3. Test Frequency: 5-500Hz
4. Test Velocity: 1 Octave / minute
5. Test Axis: X, Y and Z axes
6. Test Time: 1 hour per axis
7. OS: Windows7
8. Test software: Running Passmark Burn-in V7.0 test program (function check after testing)
9. Test Curve [Figure 1.07.1.01](#)

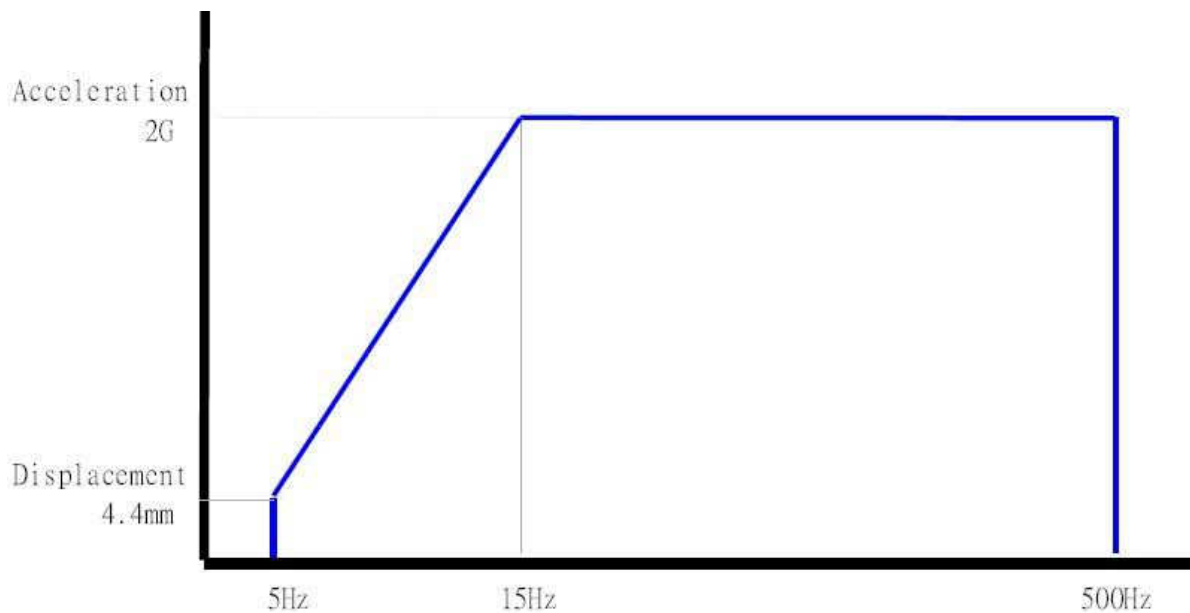


Figure 1.07.1.01 Non-operating Sine vibration test curve

1.07.1.06 Test Procedure:

1. Confirm the quality-confirmation items at the normal state.
2. Set up the EUT on vibration table in non-operation mode.
3. Set the test condition of vibration to the vibration Simulator tester.
4. Run the test condition for 1 hour.
5. Repeat steps 2 ~ 4 in X, Y and Z three different axes.
6. Inspection EUT mechanical function has met specification.
7. Running max loading test program for system function check.

1.07.1.07 Evaluation Criteria:

1. After the test, the EUT shall not exhibit any errors under all diagnostics test items.
2. There shall be no abnormalities which could affect the product-specified functions and performance.
3. In appearance, the product shall have no damage, deformation, scratches, loosening of screws or other abnormality of the components or case (particularly for the boards and heat sink or plastic parts). There shall also not be any obvious changes in the positional dimensions between the parts. All of the above are necessary to assure the reliability of the product.
4. For the functional and performance inspection, there shall be no abnormality in the functions and performance, as specified for the product.
5. There shall be no risk of electric shock.
6. There must be no deformation-caused changes in insulating distances, and no damaged components.

1.07.1.08 Test Result:

1. There is no damage in electronic and mechanical functions.
2. Degradation has not been found.
3. Performance is maintained with no incurable physical damage or degradation.

1.07.1.09 Conclusion:

Passed.

1.08 Product operating shock test

Test Date: October 23, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.08.1.01 Test Purpose:

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

1.08.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.08.1.03 Test Equipment:

1. Vibration simulator system
KING DESIGN Co. LTD.
Model: 9363EM-800F2K-40N120
S / N: UC107142493
Date of Calibration: 10/09/2013

1.08.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-----------------|--|
| 1. M/B | ASMB-784 Rev.A1 01-2 (ESE0118874) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |

1.08.1.05 Test Condition:

1. Test Pulse shape: Half sine wave
2. Test Acceleration: 10G
3. Test Pulse Duration: 11ms
4. Test side: Six sides
5. Test Times: Three times each side
6. OS: Windows7
7. Test software: Running Passmark Burn-in V7.0 test program
8. Test Environment Curve [Figure 1.08.1.01](#)

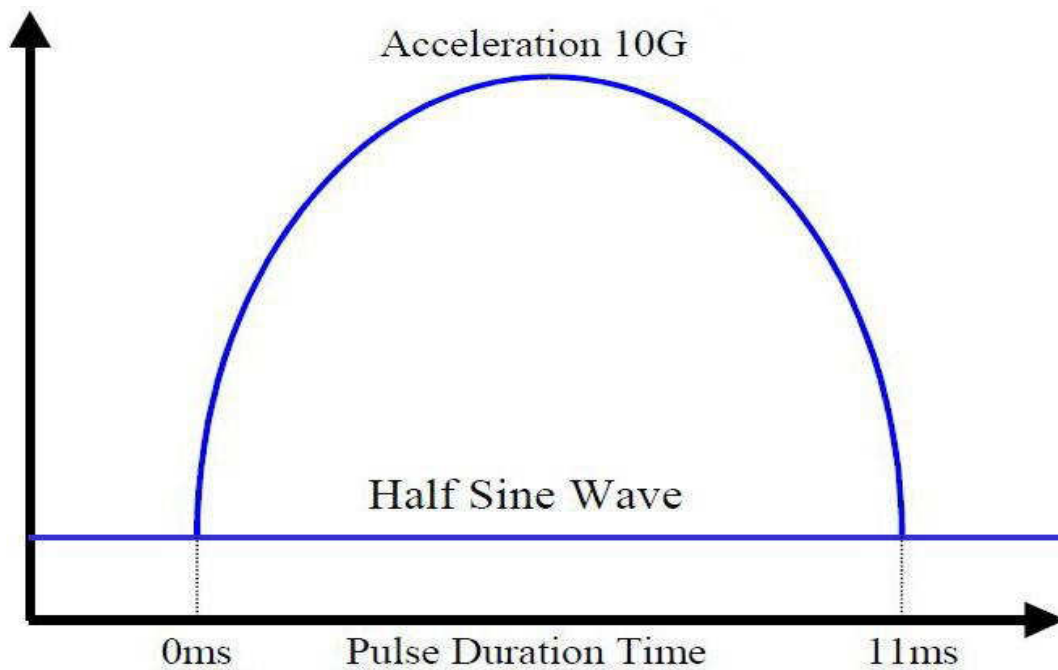


Figure 1.08.1.01 Shock test curve

1.08.1.06 Test Procedure:

1. Confirm the quality-confirmation items at the normal state.
2. Set up the EUT on vibration table in operation mode.
3. During the test, the system will run max loading test program.
4. Set the test condition of shock to the vibration simulator tester or shock tester.
5. Start the shock testing.
6. Shock three times for each face test and confirm the EUT function during the testing.
7. Repeat steps 4 ~ 6 for the three axis with six face shock test.
8. Inspection EUT mechanical function has met specification.
9. Running max loading test program for system function check.

1.08.1.07 Evaluation Criteria:

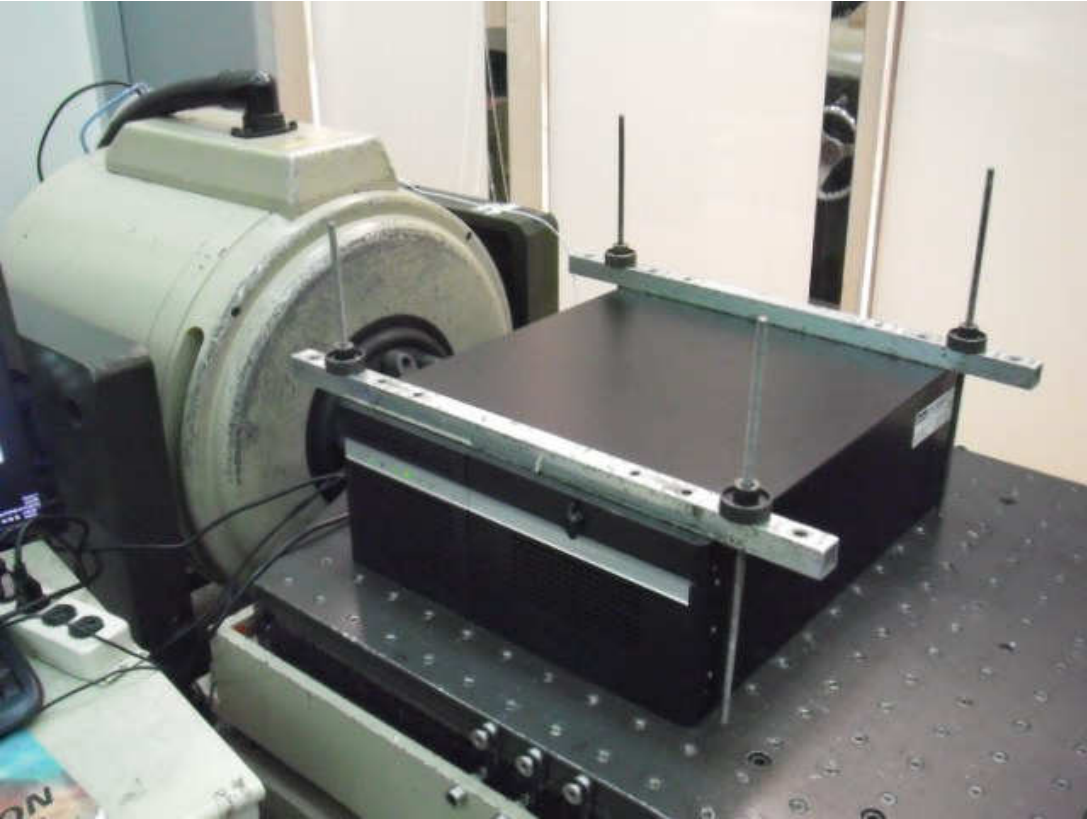
1. During and after the test, the EUT shall not exhibit any errors under all diagnostics test items, including reboot.
2. There shall be no abnormalities which could affect the product-specified functions and performance.
3. In appearance, the product shall have no damage, deformation, scratches, loosening of screws or other abnormality of the components or case (particularly for the boards and heat sink or plastic parts). There shall also not be any obvious changes in the positional dimensions between the parts. All of the above are necessary to assure the reliability of the product.
4. For the functional and performance inspection, there shall be no abnormality in the functions and performance, as specified for the product.
5. There shall be no risk of electric shock.
6. There must be no deformation-caused changes in insulating distances, and no damaged components.

1.08.1.08 Test Result:

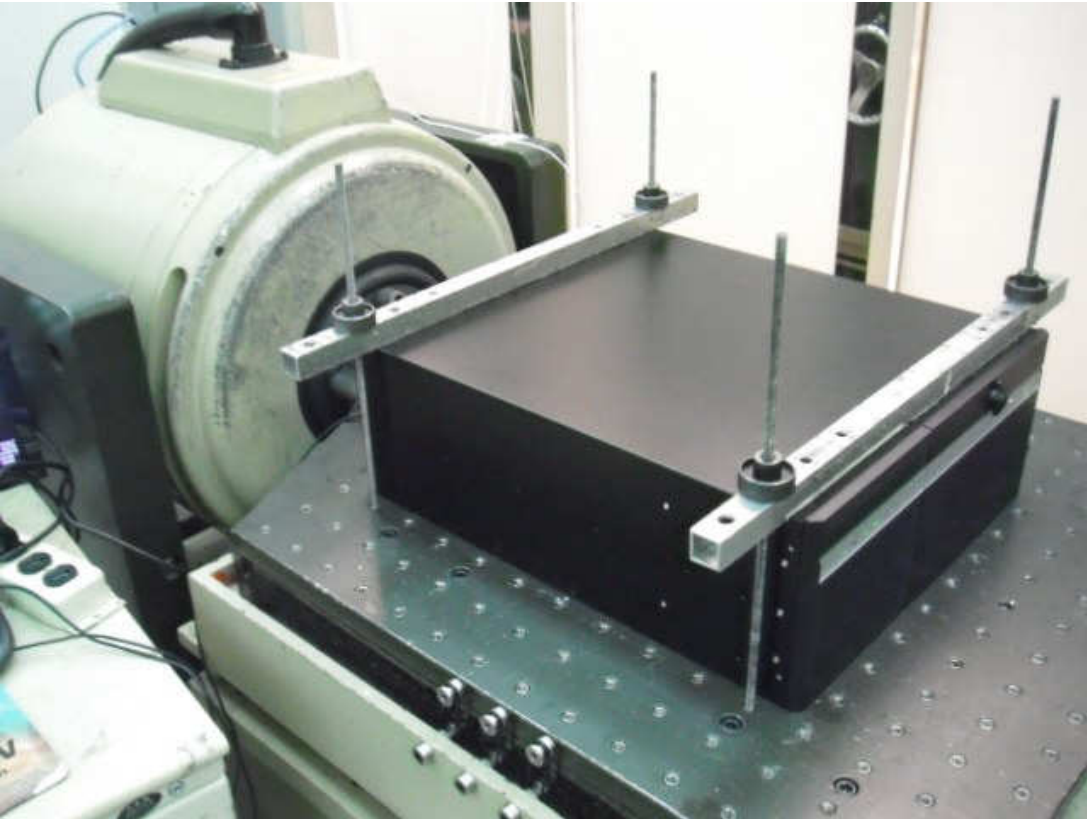
1. There is no damage in electronic and mechanical functions.
2. Degradation has not been found.
3. Performance is maintained with no incurable physical damage or degradation.

**1.08.1.09 Conclusion:
Passed.**

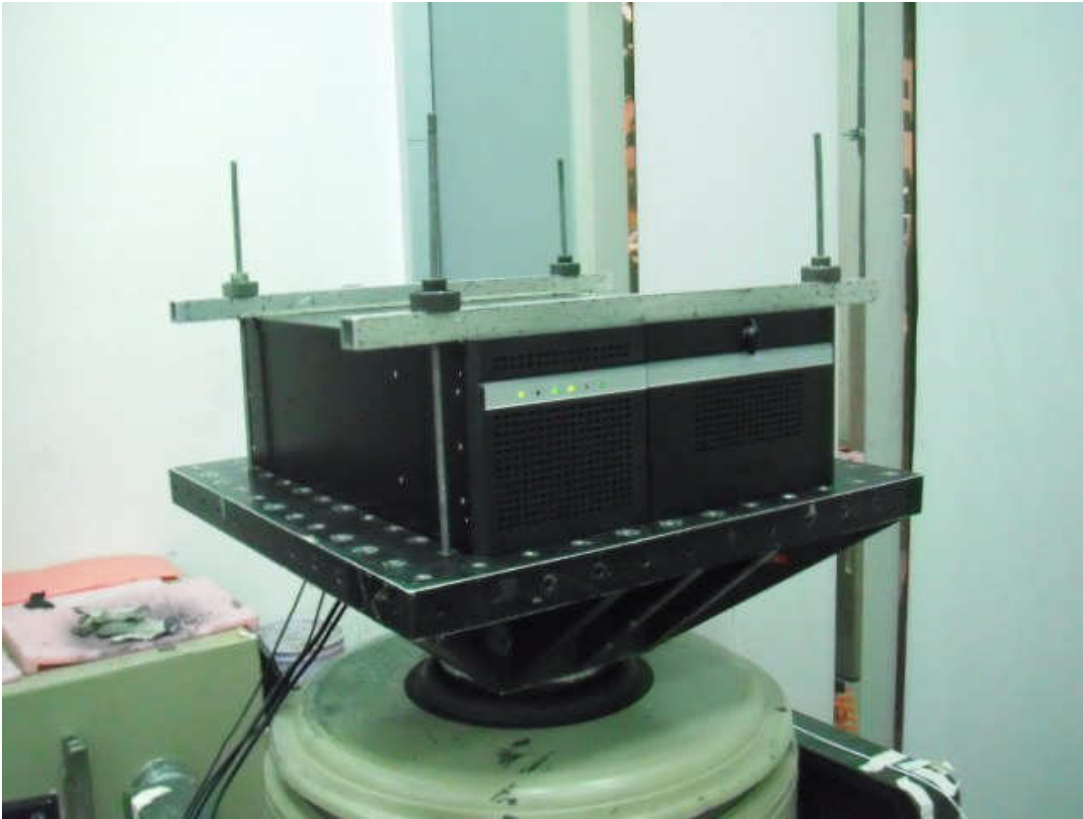
Photo:



Shock test for $\pm X$ -axis



Shock test for $\pm Y$ -axis



Shock test for $\pm Z$ axis

1.09 HDD Rotation vibration test

Test Date: October 22, 2013 ~ October 23, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.09.1.01 Test Purpose:

Test is for the System under normal operating conditions and evaluates the effect of internally generated Rotational Vibration on HDD performance.

1.09.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.09.1.03 Test Equipment:

N/A

1.09.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-----------------|--|
| 1. M/B | ASMB-784 Rev.A1 01-2 (ESE0118874) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ)
Seagate 2TB SATA *6 (ST2000NM0011) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |

1.09.1.05 Test Condition:

1. Test mode:
 - Mode A: Put the HDD outside of system
 - Mode B: Original
2. Test software: IOMeter
3. IOMeter test mode
 - a. 64K 100% Write 100% Sequential
 - b. 1K 100% Write 100% Random
 - c. Test Drive : Disk C

1.09.1.06 Test Procedure:

1. Load IOMeter on the EUT OS driver. (It is a unique HDD or Storage, non test HDD).
2. If possible, does a low level format of all other HDDs
3. Mount the baseline HDD with the SATA cable on "HDD test block" place on the foam block. It should ensure the drive is on no vibration from the system fan reaches the HDD.
4. Run IOMeter program for 5 minutes and Save IOMeter HDD baseline data.
5. Place EUT on the table, install baseline Test HDD in first bay and fill the remaining bays with functional HDD's of the same type.
6. Repeat IOMeter test for 5 minutes and save IOMeter test result data (for each HDD bay). Repeat testing with Test HDD in remaining bays.

7. If EUT can control the fan speed, repeat testing with different fan speed and save IOMeter test result data.

1.09.1.07 Evaluation Criteria:

Class 1 – 90% Minimum of baseline for 1K Random Writes and
 85% Minimum of baseline for 64K Sequential Writes
 Class 2 – 85% Minimum of baseline for 1K Random Writes and
 70% Minimum of baseline for 64K Sequential Writes
 Mix Class 1/Class 2 (Class 2 HDD performance only) - 80%
 Minimum of baseline for 1K Random Writes and 65% Minimum of baseline for 64K
 Sequential Writes

1.09.1.08 Test Result:

1K 100% Write 100% Random	Put the HDD outside of system	Put the HDD inside of system	%
D disk	133.4	132.8	99.6%
E disk	139.3	158.4	113.7%
F disk	134.4	151.2	112.5%
G disk	136.2	129.4	95.0%
H disk	139.1	148.6	106.8%
64K 100% Write 100% Sequential			
D disk	383.2	313.8	81.9%
E disk	373.7	373.6	100.0%
F disk	364.5	364.8	100.1%
G disk	384.3	303.6	79.0%
H disk	361.1	361.1	100.0%

1. Compare with HDD outside the system and inside the system, the degradation of performance in HDD is met Class 2.
2. There is no damage in electronic and mechanical functions.
3. Degradation has not been found.
4. Performance is maintained with no incurable physical damage or degradation.

**1.09.1.09 Conclusion:
 Reference.**

1.10 Connector & Power Switch Durability test

Test Date: October 17, 2013 ~ October 18, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.10.1.01 Test Purpose:

Evaluate connectors and power switch robustness.

1.10.1.02 Test Standard:

Please refer to the following documents:

1. Customer test standard

1.10.1.03 Test Equipment:

N/A

1.10.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

1. M/B	ASMB-784 Rev.A1 01-2 (ESE0118874)
2. CPU	Intel Core i7-4770 3.4GHz
3. RAM	Apacer 2GB PC3-12800 *2
4. HDD	WD 250GB SATA (WD2503ABYZ) Seagate 2TB SATA *6 (ST2000NM0011)
5. System fan	Delta EFB1212SH
6. HDD fan	Delta AFB0812SH *2
7. Power supply	FSP400-60PFG (400W)
8. BIOS	V1.10
9. DVD ROM	DS-8A9SH
10. Chassis	ACP4360MB1301E-T

1.10.1.05 Test Condition:

1. Test environment: Room temperature
2. Connector insert/remove test
 - 2.1 USB: Only test rear & front USB port with 100 times
 - 2.2 HDD tray: 100 times
 - 2.3 LAN Jack: 100 times
 - 2.4 VGA Port: 100 times
 - 2.5 Power Jack: 100 times
 - 2.6 DVI: 100 times
3. Mechanical life test
 - 3.1 Power button: 100 times
 - 3.2 Reset button: 100 times
 - 3.3 Lock: 100 times
 - 3.4 Hinge: 100 times

1.10.1.06 Test Procedure:

1. Confirm the quality-confirmation items are at the normal temperature and humidity.
2. For connector insert/remove test, do 100 cycles test by artificial.
3. For mechanical life test, do 100 cycles test by artificial.
4. Power on the unit, to check function problem and mechanical problem of the connector.

1.10.1.07 Evaluation Criteria:

1. The EUT shall be function workable after the test.

2. There should be no abnormalities, which could affect the product-specified functions and performances.

1.10.1.08 Test Result:

	Test cycles/times	Result	
		Function test	Mechanical
USB Port	100	Passed	Passed
HDD tray	100	Passed	Passed
LAN Jack	100	Passed	Passed
VGA Port	100	Passed	Passed
Power Jack	100	Passed	Passed
DVI	100	Passed	Passed
Power button	100	Passed	Passed
Reset button	100	Passed	Passed
Lock	100	Passed	Passed
Hinge	100	Passed	Passed

1. There is no damage in electronic and mechanical functions.
2. Degradation has not been found.
3. Performance is maintained with no incurable physical damage or degradation.

1.10.1.09 Conclusion:

Passed.

1.11 Packaged drop test

Test Date: October 30, 2013

Test Site: Advantech QA Environment LAB

Performed By: Ramon Lin

1.11.1.01 Test Purpose:

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

1.11.1.02 Test Standard:

Please refer to the following documents:

1. Reference ASTM - D775

1.11.1.03 Test Equipment:

1. Drop tester machine
YOSHIDA SEIKI Co. LTD.
Model: DT-100B

1.11.1.04 Sample Configuration & Quantity Under Test:

Using one ACP-4360MB1301E with the following options installed:

- | | |
|-------------------|-----------------------------------|
| 1. M/B | ASMB-784 Rev.A1 01-2 (ESE0118874) |
| 2. CPU | Intel Core i7-4770 3.4GHz |
| 3. RAM | Apacer 2GB PC3-12800 *2 |
| 4. HDD | WD 250GB SATA (WD2503ABYZ) |
| 5. System fan | Delta EFB1212SH |
| 6. HDD fan | Delta AFB0812SH *2 |
| 7. Power supply | FSP400-60PFG (400W) |
| 8. BIOS | V1.10 |
| 9. DVD ROM | DS-8A9SH |
| 10. Chassis | ACP4360MB1301E-T |
| 11. Carton | 2100000689T010, 680Lx550Wx275Hmm |
| 12. EPE | 2130000483T000 |
| 13. Accessory BOX | 2100000642T000, 304Lx190Wx42H mm |

1.11.1.05 Test Condition:

1. Test environment: Room temperature
2. Test corner: C2-3-5
3. Test edges: E2-3, E2-5, E5-3
4. Test faces: S1, S2, S3, S4, S5, S6
5. Package Weight: 21.2kg
6. Package Dimension: 70.0cm × 56.8cm × 29.4cm (LxWxH)
7. Test Height: 46 cm
8. OS: Windows7
9. Test software: Running Passmark Burn-in V7.0、MemTest 3.8 and Intel Power Thermal Utility test program (function check after testing)
10. Test Drawing:

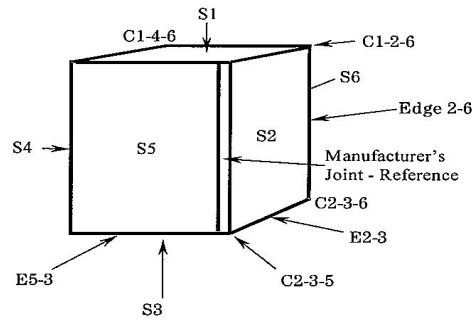


Figure 1.11.1.01 Packaged drop surface

1.11.1.06 Test Procedure:

1. Check the functions and appearance of the EUT.
2. In the position where the product hits the floor; all the dropping sequence should be listed according to the following steps. Also, the EUT should be dropped one time in one orientation.
3. Define package damage corner for the EUT, and set is C2-3-5.
4. The packaged is dropped once on each of the following [Figure 1.11.1.01](#)
5. Dropping corner C2-3-5.
6. Dropping edge E2-3, E2-5, E5-3 (the shorter edge, the middle edge, the longer edge).
7. Dropping surface S5, S6, S4, S2, S1, S3 (front, rear, left, right, top, bottom)
8. Inspection EUT mechanical function has met specification.
9. Running specific test program for system function check.

1.11.1.07 Evaluation Criteria:

1. There should be no abnormalities which could affect the product-specified functions and performance.
2. There should be no damage, wear, and deformation, scratches on the parts, circuit board or the case. Meanwhile, there should be no obvious change in the positional dimensions between the parts, which are all necessary for assuring product reliability.
3. There should be no trouble with the product-specified function and performance.
4. The switch buttons covers, and slot can work properly without any interference.
5. All screws are fastened up appropriately.
6. The heat sink should be fastened in the PCB appropriately.
7. The enclosure or mechanical parts must be smooth without any deformed parts.
8. There should be no risk of electric shock.
9. There must be no deformation-caused changes in insulating distances and no scattering of broken components.

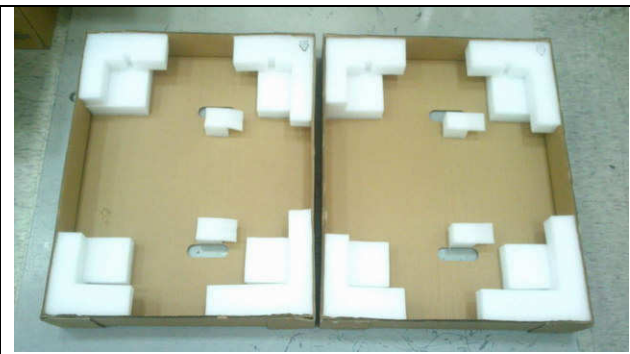
1.11.1.08 Test Result:

1. There is no damage in electronic and mechanical functions.
2. Degradation has not been found.
3. Performance is maintained with no incurable physical damage or degradation.

1.11.1.09 Conclusion:

Passed.

Photo:



Structure photo



Package drop test for corner



Structure photo



Package drop test for edge



Structure photo



Package drop test for face