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MiTAC A790 EQT Test

Report

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Rev: A

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MITAC INTERNATIONAL CORP.

Change Sheet

Project Name		MiTAC IBU A790 EQT Test Report			A790-C02
Rev	Date	Page	Section	Description	
A	2007/01/22	All	All	Initial release	

TABLE OF CONTENTS

A. Scope.....	4
B. Purpose.....	4
C. Test Description	4
Table of Testing Summary Results	6
B-test Passed Major Specification List	7
1. Humidity Test.....	18
2. Cold/Warm Start Test.....	20
3. High Temperature Test (Operating)	23
4. High Temperature Test (Non-Operating).....	24
5. Low Temperature Test (Operating)	25
6. Low Temperature Test (Non-Operating)	26
7. Thermal Shock Test.....	27
8. Shock Test.....	28
9. Vibration Test.....	30
10. Free Drop Test.....	35
11. Package Drop Test	39
12. Rain shower Test (IPX4).....	42
13. Dust Test (IP5X)	44
14. Altitude Test	46
15. Impact Test	48

A. Scope

This plan describes the test plan/procedure to be followed EQT Test for system evaluation.

B. Purpose

1. Provide a formal functional demonstration of the product design reliability.
2. Identify any design discrepancies.
3. Ensure quality and reliability assurance of trial samples which are designed and fabricated in accordance with the customer's product specifications.
4. B-Test for first pilot run-in MITAC.

C. Test Description

Reference Document for Testing Specifications:

1. MiTAC B/C Test General Procedure
2. Quality Evaluation Testing and Inspection Specification for Personal Computers
3. Product Specifications

Testing Program:

	Name	Sort	Source	Revision
1.	Windows	OS	Microsoft	EWinXP+SP2
2.	QAPlus/FE	Diagnostics	DIAGSOFT	8.0
3.	AMIDiag	Diagnostics	American Megatrends Inc.	6.20
4.	Prime95	CPU loading	GIMPS	V23.8.1
5.	Speedy	VGA Loading	J. Lin	
6.	3D Mark	VGA Benchmark	MadOnion.com	2003
7.	Battery Mark	Battery Benchmark	ZD	4.0.1
8.	Shutdown	Power cycling	MiTAC	V2.9
9.	Reset	Power cycling	MiTAC	400
10.	SFT	Factory test	MiTAC	
11.	X-Test	Transmission test	MiTAC	
12.	KBC Watch	Utility	MiTAC	

Testing Lab:

1. MiTAC Technology Corp. Reliability Lab
2. MiTAC International Corp. Reliability Lab
3. Industrial Technology Research Institute, Electronics Research & Service Organization (ERSO)
4. Automotive Research & Testing Center (ARTC)
5. MiTAC International Corp. Hwa-ya Acoustic Validation Lab.

[Up to index](#)

Test Equipments List

	Name	Vendor	Model
	Vibration Tester	King Design	900F2K-25N80
	Environment Chamber	KSON	TS-E6L-100
	Environment Chamber	KATO	SSE77CRW
	Temp. & Humidity Chamber	Giant Force	GTH-800-40-1P
	Low Temperature Chamber	Giant Force	GWER-058-D1-S
	Still Temperature Chamber	MiTAC	
	Drop Tester	HUNG TA	Type 810
	Shock Tester	YOSHIDA SEIKI	ASQ-700
	Altitude	TABAI ESPEC	MZH-11

[Up to index](#)

Table of Testing Summary Results

NO.	Test Item	Quantity	Schedule	Result	Remark
1.	Humidity Test	2	8/2~8/11	Fail	
2.	Cold/Warm Start Test	8	7/25~7/26	Pass	
3.	High Temperature Test (Operating)	4	7/26~7/29	Pass	
4.	High Temperature Test (Non-Operating)	2	7/31~8/6	Pass	
5.	Low Temperature Test (Operating)	4	7/26~7/29	Pass	
6.	Low Temperature Test (Non-Operating)	2	9/11~9/16	Pass	
7.	Thermal Shock Test	2	7/25~7/26	Pass	
8.	Shock Test	2	8/8	Pass	
9.	Vibration Test	2	8/7	Pass	
10.	Free Drop Test	2	8/9	Tracking	
11.	Package Drop Test	1	8/9	Pass	
12.	Rain shower Test (IPX4)	2	8/2~8/3	Pass	
13.	Dust Test (IP5X)	2	8/1~8/2	Pass	
14.	Altitude Test	2	7/31~8/1	Pass	
15.	Impact Test	2	8/3	Pass	

[Up to index](#)

B-test Passed Major Specification List

	Pass specification	Test Item
Temperature	IEC68-2-1, 2,14/MIL-STD-810F, Method 501.4,502.4 Operating: 0 to 55 (tested) -20 to 55 (optional) Non-operating: -40 to 70 (tested)	16. High Temperature Test (Operating) 55 , 4 cycles, 96 hours 17. High Temperature Test (Non-Operating) 70 , 7 cycles, 168 hours 18. Low Temperature Test (Operating) -20 , 3 cycles, 96 hours 19. Low Temperature Test (Non-Operating) -40 , 4 cycles, 96 hours
Humidity	IEC68-2-30/MIL-STD-810F, 507.4 5% to 95% RH, non-condensing.	3. Humidity Test 95% RH, 20~60 , 5 cycles, 240 hours
Cold Start	-20	12. Cold Start Test
Shock	IEC68-2-27/MIL-STD-810F, 516.5 Operating: 15g, 11ms, half sine wave. Non-operating: 50g, 11ms, half sine wave.	21. Shock Test
Vibration	IEC68-2-6 Sinusoidal wave vibration: Operating: 10~57.5Hz/0.075mm, 57.5~500Hz/1.0g Non-operating: 10~57.5Hz/0.15mm, 57.5~500Hz/2.0g Random: Operating: MIL-STD-810F, 514.5-high way truck vibration exposure Non-operating MIL-STD-810F-514.5C-17 General minimum integrity exposure 0.040 G ² /Hz from 20 to 1000 Hz, -6 dB/Octave from 1000 to 2000 Hz 60 minutes for each axis	22. Vibration Test
Drop	IEC68-2-32/MIL-STD-810F, 516.5 3 feet (91.5cm) height free drop, 8 cycles; Test surface: steel (Only for 12.1" and 14.1")	23. Free Drop Test
Enclosure	IEC529 IPX4 IP5X	26. Rain shower Test (IPX4) 28. Dust Test (IP5X)
Altitude	IEC68-2-13/MIL-STD-810F, 500.4 Operating: 15,000ft Non-operating: 40,000ft Altitude change rate: 2000ft/min	31. Altitude Test

[Up to index](#)

BUG List

Current Bug:

Critical (C): 0

Major (M): 0

Minor (m): 0

Priority Weight Score = $-(30 * C + 10 * M + 2 * m) = -(30 * \underline{0} + 10 * \underline{0} + 2 * \underline{0}) = -\underline{0}$

Project Score = $100 + \text{Priority Weight Score} = \underline{100}$

Test Pass/Fail Criterion:

Over 90: pass

Below 90: fail

Bug Priority definition:

Critical: Primary and high ratio bug.

1. Safety issue (fire, smoke, electric shock, scald)
2. Can't install OS.
3. No display
4. Can't power on.
5. High rate and universal shutdown, unstable in machine run-in.
6. Etc.

Major: Major function error.

1. External port no function.
2. LCD display abnormal.
3. Index light abnormal.
4. Speaker quality issue.
5. Etc.

Minor: single case (exclude safety issue)

[Up to index](#)

Open Bugs List

No.	Open Date	REV			Bug Description	Analysis	Bug Status	Bug Priority	Bug Owner	Root cause	Countermeasure	Verification	Close Date
		PCB	BIOS	KBD									

(C: Critical, M: Major, m: minor)

Tracking Bugs List

No.	Open Date	REV			Bug Description	Analysis	Bug Status	Bug Priority	Bug Owner	Root cause	Countermeasure	Verification	Close Date
		PCB	BIOS	KBD									
1	8/3	RBA	R1.01 T9	R1.01 T8	At cold start test, sometimes power on the system will hung up and without post screen	S/W issue	Tracking	Major	H/W S/W	S/W issue	Update Solomon BIOS to solve this bug	Test five sample at high and low temperature and pass the test	9/12
2	8/3	RBA	R1.01 T9	R1.01 T8	At warm start test, sometimes power on the system will hung up and without post screen	S/W issue	Tracking	Major	H/W S/W	S/W issue	Update Solomon BIOS to solve this bug	Test five sample at high and low temperature are pass the test	9/12
3	8/1	RBA	R1.01 T9	R1.01 T6	High temperature 55 degree test (insert all Device) , 12-1 USB Port function lose , must reinstall OS	Chipset Driver issue	Tracking	Major	S/W Driver	Chipset Driver issue	Update Driver R1.01T11	Update Driver R1.01T11 didn't happen again	8/21

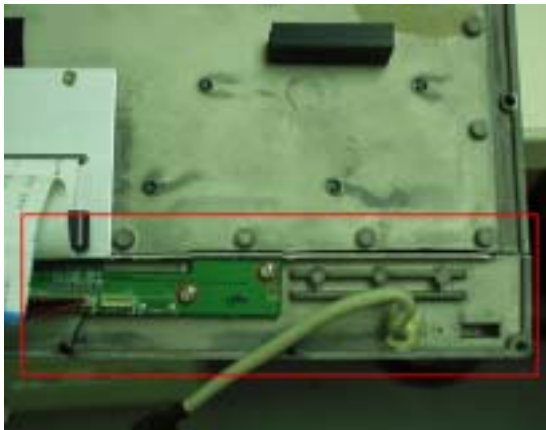
Close Bugs List

1	8/25	RBA	R1.01 T7	R1.01 T6	After humidity test touch screen peel off	N/A	Open	Major	ME	Material problem	Use 3M #4930 .twin adhesive, and didn't add RTV glue	After ME rework, it's pass the test	10/13
2	8/21	RBA	R1.01 TC	R1.01 TB	-20 cold start test system will hung up at post about 2~3 min Failure Rate: 100%	S/W issue	Close	Major	S/W	S/W issue	Update SYS Bios, R1.01tG to fix this problem	Update SYS Bios, R1.01tG pass the test	9/8
3	8/19	RBA	R1.01 TC	R1.01 TB	12-3 did Drop test VGA cable damaged at the eight times	Fabricate problem	Close	Major	IE	Fabricate problem	Add VGA cable Fabricate method to MPI	QE tracking	9/4

4	8/17	RBA	R1.01 TC	R1.01 TB	14-1 did drop test, C part broken (near the LED board) at the seventeen times	A790 did 26 times drop test, and C part is not strong enough	Close	Major	ME	A790 did 26 times drop test, and C part is not strong enough	Modify C part structure	ME Modify C part structure pass 26 times drop test and PM change drop spec from 26 times on plywood surface to 8 times on steel surface	9/22
5	8/19	RBA	R1.01 TC	R1.01 TB	12-2 and 12-6 sensor HDD temperature value is always 0 degree Failure rate: 2/12	I/O BD had loss L42 (For ADM1022 POWER used) so HDD heater will have incorrect function	Close	Major	QE	I/O BD had loss L42 (For ADM1022 POWER used) so HDD heater will have incorrect function	QE will tracking this issue	QE will tracking this issue	8/25
6	7/25	RBA	R1.01 T8	R1.01 T6	High temperature 55 degree test. Battery VoltAD drop to 8.4V , and can be discharge	Battery parameter issue	Close	Major	Power	Battery parameter is wrong	Change gas gauge data pack configuration from C6 to C2 Change Misc configuration from 1B30 to 0B31	RDVD verify 2 pieces sample and pass the test	8/24
7	8/19	RBA	R1.01 TC	R1.01 TB	High temperature 55 degree test (insert all Device or running heavy loading) , sometimes system will hung up when close hyper terminal or turn off the computer	KBC watch caused this issue	Close	Major	S/W	KBC watch caused this issue	User will not get this program	User will not get this program	9/20
8	8/6	RBA	R1.01 T7	R1.01 T6	Rain shower test fail because C part some glue is not add very well	Operator negligence	Close	Major	IE	Operator negligence	IE Add this attention item to MPI	QE tracking	8/15
9	7/20	RBA	R1.01 T7	R1.01 T5	SATA HDD didn't support G-sensor	S/W issue	Close	Major	S/W	S/W issue	Update SYS Bios, R1.01tA	SYS Bios, R1.01tA, can fix this problem	7/28

10	7/5	RBA	R1.01 T5	R1.01 T4	AUXG09 Panel at 55 degree op test, Will appear black area at bottom side	ME issue	Close	Major	ME	ME issue	Because AUXG09 panel will phase out, so we discuss didn't care this issue	N/A	7/30
11	8/19	RBA	R1.01 TC	R1.01 TB	Some screw nut at I/O and PCMCIA board will loosed during vibration or shock test	Didn't Add glue to fix screw nut	Close	Major	Sys QE	Didn't add glue to fix screw nut	Add glue to fix screw nut and release MPI	Add glue to fix screw nut	9/2

(C: Critical, M: Major, m: minor)



Close Bug 4: After drop test, C part broken



Close Bug 6: Some screw nut at I/O and PCMCIA board will loosed during vibration or shock test



Close bug 8: Rain shower test fail because C part some glue is not add very well



Close bug 1: Touch screen peel off

CONFIGURATION TABLE

1. M/B Configuration Table

MODEL: M/B BD: 411119000041, I/O BD: 411119000001-R1A, PCMCIA BD: 411119000010-RAA				
NO	LOCATE	UNIT	DETAIL DESCRIPTION	REMARK
1.	U504	CPU	Yonah LE80539 L2400 7602B493 SL8VW 1.66/2M/667	M/B BD
2.	U505	North Bridge	Intel 945GM Chipset (Calistoga) Q82945GM SL822 3602A689	M/B BD
3.	U5 U6	PCMCIA Controller	TI PCI 1520 + TPS2224A TI PCI 1520ZHK 7D 8H1217130 63A8T4J TI TPS224A 59KAF2E	PCMAIA BD
4.	J502 J503	DRAM	Infineon HYS64T64020HDL-3.7-A A6V55112046 Assembled in Portugal 512MB 2R*16 PC2-4200S-444-11-A0 (Chip: Infineon HYB18TS51216DAF-3.7 BEE11007 0550)	
5.	U11	AUDIO	Realtek ALC260 61365Q1 L606E	PCMAIA BD
6.	U506	South Bridge	Intel NH82801GBM F5533247 SL8YB	M/B BD, Philippines
7.	U508	SYS BIOS	SST 49LF008A 33-4C-NHE 0619277-B	M/B BD
8.	U509	KB BIOS	F2140BTE1DV H8S/2140BV	M/B BD
9	U513	Clock Generator	ICS 630159-0603 9LPR310BGLF	M/B BD
10	U521	Super I/O	SMSC SIO10N268-NU A0531-A943 8H1217130	I/O BD
11	U501	ISA Bridge	Winbond W83628G 48GE2544695025A	I/O BD
12	U514	Giga LAN	BROADCOM BCM5752KFB2G HS0614 P12 777609 E1A	I/O BD
13	U10	1394B Controller	TI 61A8L4W TSB82AA2 G4	PCMCIA BD
14	U17	1394B PHY chip controller	TI 5BAY86TG4 TSB81BA3	PCMCIA BD

2. Peripherals configuration

Part name	DETAIL DESCRIPTION	Remark
PANEL	A790-9 AU B141XG09 V3	H/W:0A F/W: 1
	A790-7 Toshiba LTD 121EC5S (12.1XGA) Panel, Toshiba Matsushita Display Technology LCD, 2005-07-08	Twinwill rework high brightness
CD-ROM	A790-9 Panasonic DVD Dual UJ850	H/W: 1.00 FW: 1000
	A790-7 Panasonic Combo UJDA770	HW: 1.00 FW: 1.02
HDD	A790-9 Toshiba MK1234GAX HDD2D16 E ZK01S DC+5V 1.0A	F/W: 010 A0/AC001A
	A790-7 Toshiba MK4032GSX HDD2D34 C ZK01 T DC+5V 1.0A SATA HDD	Firmware rev. AS211G
WLAN	Intel PRO/Wireless 3945ABG network connection FCC ID: PD9WM3945ABG IC: 1000M-3945ABG	Made in Malaysia
Modem	Conexant Systems, France S.A.S Model: Askey CNX-RD02-D330	
Touch pad	Synaptic TM214 / ALPS	
Touch screen	12.1" Pan-Jit STD Touch screen	
BATTERY	Li-ion RECHARGEABLE BATTERY PACK DC 11.1V 9600mAh REV: A	Sony cell
AC ADAPTER	EPS 90W,Model: F10903-A AC adapter Input: 100-240V~1.2A 50-60Hz Fuse Rating: T3.15A/250V DC Output: 19.0V==4.75A	

3. Software configuration

Part name	DETAIL DESCRIPTION	Remark
SYS BIOS Rev.	R1.01TI	
KB BIOS Rev.	R1.01TH	
Chipset	8.1.1.1001	Intel
VGA Driver	6.14.10.4543	Intel 945GM
Audio Driver	5.10.0.5273	Realtek ALC260
Modem Driver	7.47.00.50	Askey
LAN Driver	9.52.0.0	Broadcom
WLAN	10.5.1.59	Intel 3945

Proset	10.5.0.1	Intel
Touch screen	5.0	Penmount (WHQL)
OSD	1010	MTC

*All PCBA, chip, Firmware and driver revision must be recorded in above lists.

[Up to index](#)

1. Humidity Test

1. Purpose:

The purpose of this method is to determine the resistance of materiel to the effects of a warm, humid atmosphere.

2. Test Place: MiTAC Reliability Lab.

3. Test Date: 11 days (08/02/2006~08/11/2006)

4. Test Quantity: 2 Sets (12-5、 14-5)

5. Reference Document:

Acceptance Specification for the product under test
MIL-STD-810F- 507.4 Humidity

6. Test Program:

QA+Pro8.0
Speedy+1AVI file+1VCD+X-Test

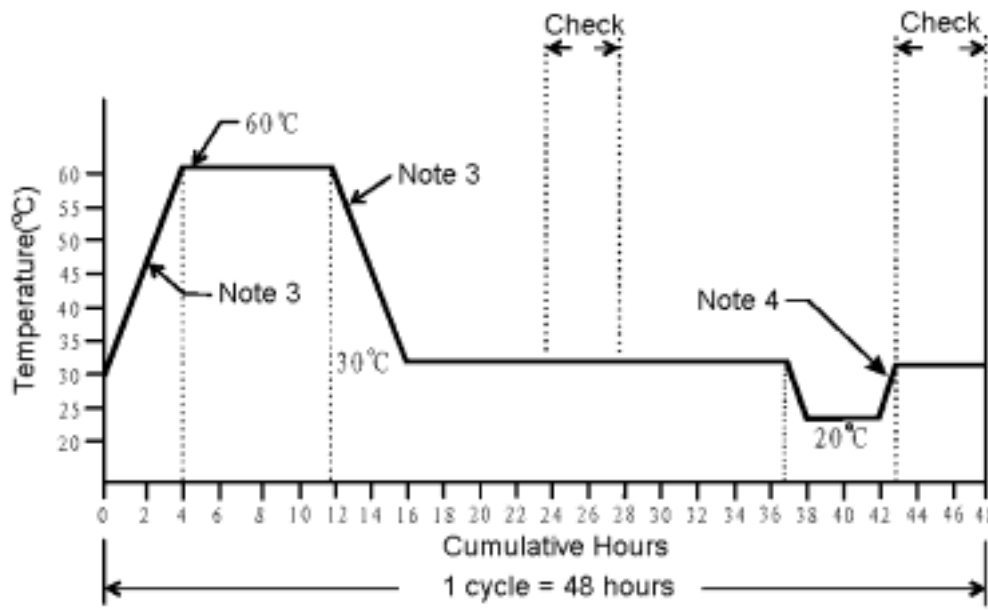
7. Test Conditions and Requirements:

Each unit will be fully inspected to meet engineering and quality specification.

With the machine installed in the chamber in its required configuration, power on machines and run test program. Adjust the temperature to 23 ± 2 and $50 \pm 5\%$ RH, and maintain for 24 hours.

Shutdown down the machine and adjust the chamber temperature to 30 and the RH to 95%. Start the repeat cycle as below.

Step	Time (HR)		Temp. (deg.C)
1.	0000....0400	4	30....60
2.	0400....1200	8	60
3.	1200....1600	4	60....30
4.	1600....3630	20.5	30
5.	3630....3800	1.5	30....20
6.	3800....4200	4	20....30
7.	4200....4230	0.5	30
8.	4230....4800	5.5	30



Expose the machines 5 cycles. Conduct test item performance checks during the periods shown and document the results.

At the end of the required number of cycles, adjust the temperature and humidity conditions to standard ambient conditions.

In order to prevent unrealistic drying, within 15 minutes after 7-4 is completed, conduct an operational performance check, if applicable, and document the results.

Perform a thorough visual examination of the test item and document any conditions resulting from humidity exposure. Run Diagnostics for 1 cycle to make sure all function normal.

Requirements

Must have no physical defect and functional failure

8. Test Note:

- Note1: During temperature change, use a tolerance of not greater than 3 .
- Note2: Maintain the relative humidity at 95±4% at all times except that during the descending temperature periods the relative humidity may drop to as low as 85%.
- Note3: Use a rate of temperature change between 30 and 60 of not less than 8 per hour.
- Note4: Do not use a temperature increase in this portion of the curve that is less than 10 per hour.

9. Test Equipment:

Environment Chamber, "KATO", Model: SSE77CRW
 Temp. & Humidity Chamber, "Giant Force", Model: GTH-800-40-1P

10. Test result: Pass

[Up to index](#)

2. Cold/Warm Start Test

1. Purpose:

This test is performed to verify the P.U.T. can boot properly under low temperature.

2. Test Place: MITAC Reliability Lab.

3. Test Date: 2 days (07/25/2006~ 07/26/2006)

4. Test Quantity: 8 Sets (# 12-2~12-5, # 14-2~14-5)

5. Reference Document:

Acceptance Specification for the product under test
MiTAC B&C-Test General Procedure

6. Test Program:

QA+Pro

7. Test Conditions and Requirements:

Make sure all functions of P.U.T are normal.

Put the P.U.T into environment chamber and set to -20 degree C (cold start) and 55 degree C (warm boot), soaking for at least 5 hours, the interval between step 1 and step 2 is 3 hours.

Step 1:

Full system configuration (All option unit are installed) and without battery, boot with AC adapter.

Step 2:

Full system configuration (All option unit are installed) and without AC adapter, boot with battery.

Turn on the power switch, if boot to Windows successfully then shutdown it immediately.

(1) Number of test times 10 times

(2) Interval time of test: 30 minutes

(3) After finish the reboot test, run QA+Pro for 1 cycle to make sure all function normal.

Requirements:

Must be free of problem on boot function and display

HDD Heater Test.

(1) Put the P.U.T into -20 degree C environment chamber and soaking for at least 5 hours without AC and Battery power, the interval between step1 and step2 is 3 hours.

(a) Step 1: Full system configuration (All option unit are installed) and without battery.
Plug in AC adapter, HDD heat up only with AC power.

(b) Step 2: Full system configuration (All option unit are installed) and without AC

adapter. Insert battery, HDD heat up only with Battery power.

(c) P.U.T must always can normally boot, after HDD heater heat up 35 min. Heat slope is about 0.7 deg. C/min. Turn on the power switch, if boot to Windows successfully then shutdown it immediately.

(c-1) Number of test times 10 times.

(c-2) Interval time of test: 10 minutes.

(c-3) After finish the reboot test, run QA+Pro8.0 for 1 cycle to make sure all function normal.

(2) Put the P.U.T into -20 degree C environment chamber directly, the interval between step1 and step2 is 3 hours.

(a) Step 1: Full system configuration (All option unit are installed) and without battery. Plug in AC adapter, HDD heat up only with AC power.

(b) Step 2: Full system configuration (All option unit are installed) and without AC adapter. Insert battery, HDD heat up only with Battery power.

(c) P.U.T must always can normally boot, after soaking 1hr. Turn on the power switch, if boot to Windows successfully then shutdown it immediately.

(c-1) Number of test times 10 times.

(c-2) Interval time of test: 10 minutes.

(c-3) After finish the reboot test, run QA+Pro8.0 for 1 cycle to make sure all function normal.

Requirements:

Must be free of problem on boot function and display.

(1) P.U.T temperature not above 2 degree C, P.U.T can't boot.

(3) Set up "Warm Light" to remind user that P.U.T is not safe to boot.

8. Test Equipment:

Low Temperature Chamber, "Giant Force", Model: GWER-058-D1-S

9. Notice: If the test result is fail, increase the temperature by every step 5 , and notify RD immediately to determine the failure is caused by components limitation or machine defect.

10. Test Result: Pass

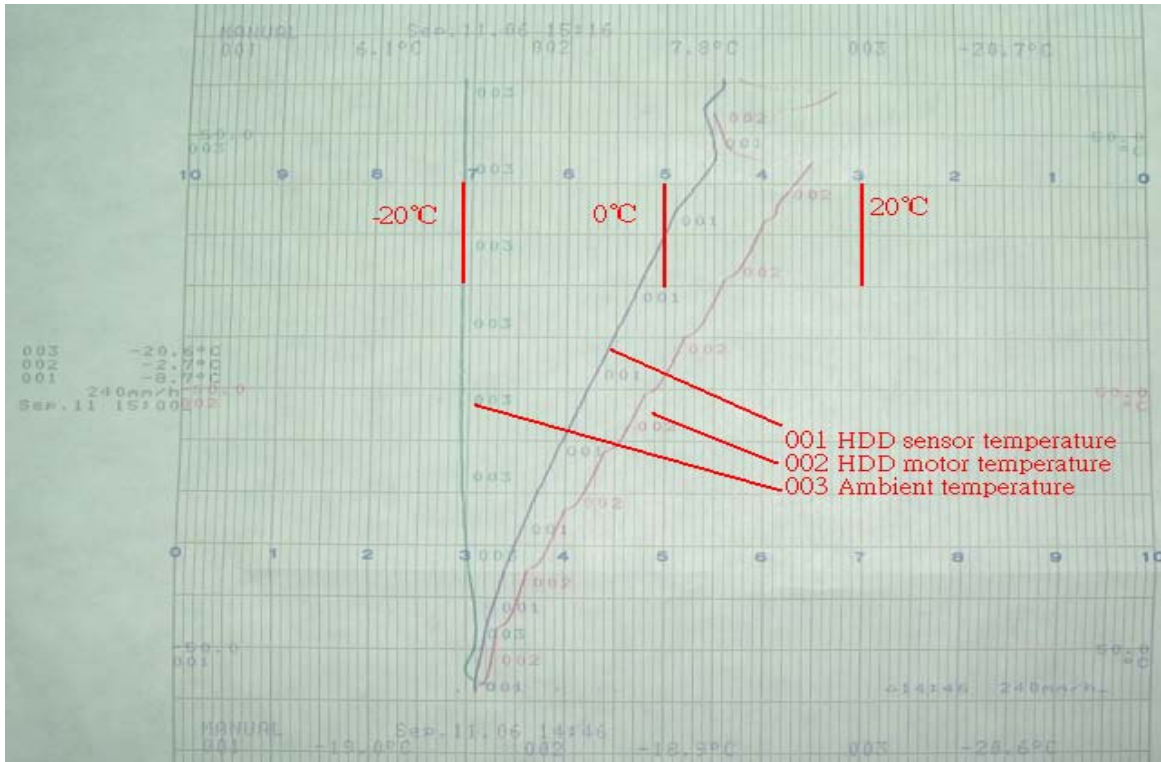
Cold Start / Warm Start Test:

	Cold Start			Warm Start	
	With AC	With Battery		With AC	With Battery
14-4	Pass	Pass	14-2	Pass	Pass
14-5	Pass	Pass	14-3	Pass	Pass
12-4	Pass	Pass	12-2	Pass	Pass
12-5	Pass	Pass	12-3	Pass	Pass

HDD Heater Test:

	-20 degree C (Cold Start)		25 degree C enter -20 degree C (cold Start)	
	With AC	With Battery	With AC	With Battery
14-4	Pass	Pass	Pass	Pass
14-5	Pass	Pass	Pass	Pass
12-4	Pass	Pass	Pass	Pass
12-5	Pass	Pass	Pass	Pass

Remark: Heater up takes about 25~30 minutes from -20 to 5 . HDD can boot at 5 degree-C then system into OS and heater function into phase II stage Heater will on at 3 degree-C. Heater will off at 5 degree-C.



[Up to index](#)

3. High Temperature Test (Operating)

1. Purpose:

The purpose of this test is to measure the stability of the P.U.T. in the long time high temperature run-in.

2. Test Place: MiTAC Reliability Lab.

3. Test Date: 4 days (07/26/2006 ~ 07/29/2006)

4. Test Quantity: 4 Sets (12-2、12-3、14-2、14-3)

5. Reference Document:

Refer to IEC 68-2-2 / MIL-STD-810F-501.4 Procedure II
MiTAC B&C-Test General Procedure

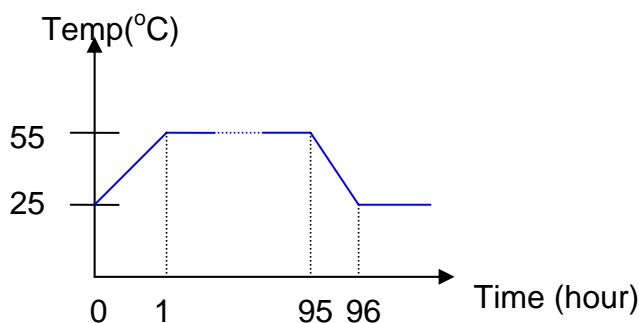
6. Test Program:

Speedy+1 AVI file+1VCD+Prime 95+X-Test+KBC Watch
MemTest86+ v1.65
RST

7. Test Conditions and Requirements:

Make sure all functions of P.U.T are normal.

Put the P.U.T into environment chamber and set to 55 for 96 hours, run the test program.



Record the CPU temperature and throttle status when the P.U.T. run stably.

Requirements

Must have no physical defect and functional failure

8. Test Equipment:

Wooden Chamber

9. Test result: **Pass**

[Up to index](#)

4. High Temperature Test (Non-Operating)

1. Purpose:

The purpose of this test is to measure the stability of the P.U.T. in the long time high temperature storage.

2. Test Place: MiTAC Reliability Lab.

3. Test Date: 7 days (07/31/2006 ~ 08/06/2006)

4. Test Quantity: 2 Sets (12-6、14-6)

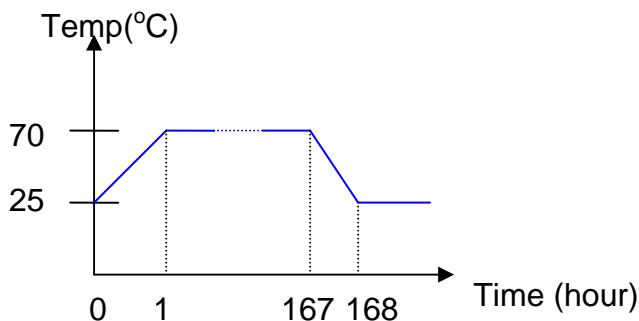
5. Reference Document:

Refer to IEC 68-2-2 / MIL-STD-810F-501.4 Procedure I
MiTAC B&C-Test General Procedure

6. Test Conditions and Requirements:

Make sure all functions of P.U.T are normal.

Put the P.U.T into environment chamber and set to 70 for 168 hours.



Requirements

Must have no physical defect and functional failure

7. Test Equipment:

Wooden Chamber

8. Test result: **Pass**

[Up to index](#)

5. Low Temperature Test (Operating)

1. Purpose:

The purpose of this test is to measure the stability of the P.U.T. in the long time low temperature run-in.

2. Test Place: MiTAC Reliability Lab.

3. Test Date: 4 days (07/26/2006 ~ 07/29/2006)

4. Test Quantity: 4 Sets (12-4、12-5、14-4、14-5)

5. Reference Document:

Refer to IEC 68-2-2 / MIL-STD-810F-502.4 Procedure II
MiTAC B&C-Test General Procedure

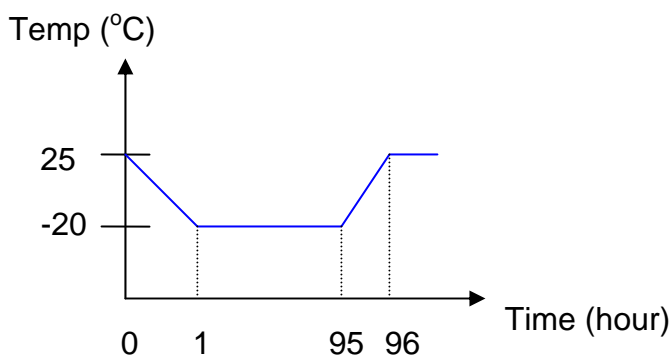
6. Test Program:

3DMark2003
Speedy+1 AVI file+1VCD+Prime95+X-Test
MemTest86+ v1.65

7. Test Conditions and Requirements:

Make sure all functions of P.U.T are normal.

Put the P.U.T into environment chamber and set to -20 for 96 hours, run the test program.



Requirements

Must have no physical defect and functional failure

8. Test Equipment:

Environment Chamber, "KATO", Model: SSE77CRW

9. Test result: Pass

[Up to index](#)

6. Low Temperature Test (Non-Operating)

1. Purpose:

The purpose of this test is to measure the stability of the P.U.T. in the long time low temperature storage.

2. Test Place: MiTAC Reliability Lab.

3. Test Date: 4 days (09/11/2006 ~ 09/16/2006)

4. Test Quantity: 2 Sets (12-1、 14-1)

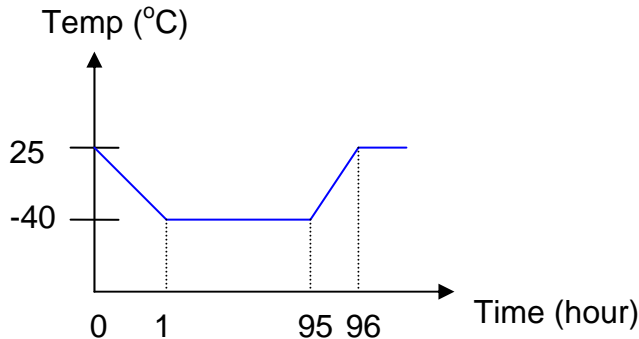
5. Reference Document:

Refer to IEC 68-2-2 / MIL-STD-810F-502.4 Procedure I
MiTAC B&C-Test General Procedure

6. Test Conditions and Requirements:

Make sure all functions of P.U.T are normal.

Put the P.U.T into environment chamber and set to -40 for 96 hours.



Requirements

Must have no physical defect and functional failure

7. Test Equipment:

Environment Chamber, "KATO", Model: SSE77CRW

Temp. & Humidity Chamber, "Giant Force", Model: GTH-800-40-1P

8. Test result: Pass

[Up to index](#)

7. Thermal Shock Test

1. Purpose:

Temperature shock tests are conducted to determine if equipment can withstand sudden changes in the temperature of the surrounding atmosphere, without experiencing physical damage or deterioration in performance.

2. Test Place: MIC Lab

3. Test Date: 2 days (07/25/2006~ 07/26/2006)

4. Test Quantity: 2 Sets (12-1、 14-1)

5. Reference Document:

MIEMOTOROLA Material or Methods Specification 12M05049A04—5.5

6. Test Conditions and Requirements:

With the power source to the unit removed, put P.U.T. to chamber.

Adjust the temperature of the cold step to -40 degrees Celsius, and the hot step to +71 degrees Celsius.

The thermal shock test cycles between hot and cold chambers almost instantaneously (less than 2 minutes).

After chambers have stabilized at setup temperatures and soak for 2 hours. Then change the test temperature to another extreme point (change time \leq 2 minutes) and allow to temperature soak for another 2 hours. Repeat this 4-hour cycle 3 times, for a total of 12 hours.

Requirements: No electrical or mechanical degradation allowed after return to room temperature.

7. Test Result: **Pass**

[Up to index](#)

8. Shock Test

1. Purpose:

To test the robustness of the system to withstand shock that could occur during normal usage and shipping of the system.

2. Test Place: MIC Reliability Lab

3. Test Date: 1 day (08/08/2006)

4. Test Quantity: 2 Sets (12-6、 14-6)

5. Reference Document:

Acceptance Specification for the product under test
MIL-STD-810F-516.5

6. Test program: QA+Pro8.0

7. Test Conditions and Requirements:

Fixture

- (1) Fix notebook with two wooden spacers on the top and bottom of notebook
- (2) The display is in closed position.

Operating Shock

- (1). Sine wave shock, 15G, 11ms duration
- (2). Shock in button direction, and the cycle is 3 times.

Non-Operating Shock

- (1). Sine wave shock, 50G, 11ms
- (2). There shall be one shock input in each axis of three mutually perpendicular axes for a total of six shock inputs.

Requirements:

Darning the operating shock test HDD protect function can't be work.

Must be free of mechanical structure, operational, functional, display errors, and the performance of key parts have to be normal

8. Test Equipment:

YOSHIDA SEIKI, "Shock Tester", Model: ASQ-700

9. Test Result and Record

[Up to index](#)

12-6	Visual Check	Function Check			
Operating Shock		M/B	G-sensor	HDD	CD-ROM
Before Shock	Pass	Pass	Pass	Pass	Pass
During Bottom Shock	Pass	Pass	Pass	Pass	Pass
After shock	Pass	Pass	Pass	Pass	Pass
Non-operating Shock					
Before Shock	Pass	Pass	Pass	Pass	Pass
After Bottom Shock	Pass	Pass	Pass	Pass	Pass
After Top Shock	Pass	Pass	Pass	Pass	Pass
After Front Shock	Pass	Pass	Pass	Pass	Pass
After Rear Shock	Pass	Pass	Pass	Pass	Pass
After Right Shock	Pass	Pass	Pass	Pass	Pass
After Left Shock	Pass	Pass	Pass	Pass	Pass

14-6	Visual Check	Function Check			
Operating Shock		M/B	G-sensor	HDD	CD-ROM
Before Shock	Pass	Pass	Pass	Pass	Pass
During Bottom Shock	Pass	Pass	Pass	Pass	Pass
After shock	Pass	Pass	Pass	Pass	Pass
Non-operating Shock					
Before Shock	Pass	Pass	Pass	Pass	Pass
After Bottom Shock	Pass	Pass	Pass	Pass	Pass
After Top Shock	Pass	Pass	Pass	Pass	Pass
After Front Shock	Pass	Pass	Pass	Pass	Pass
After Rear Shock	Pass	Pass	Pass	Pass	Pass
After Right Shock	Pass	Pass	Pass	Pass	Pass
After Left Shock	Pass	Pass	Pass	Pass	Pass

[Up to index](#)

9. Vibration Test

1. Purpose:

To test the robustness of the system to withstand vibration that could occur during normal usage and shipping of the system.

2. Test Place: MiTAC Reliability Lab.

3. Test Date: 1 day (08/07/2006)

4. Test Quantity: 2 Sets (12-6、 14-6)

5. Reference Document:

Acceptance Specification for the product under test

IEC68-2-6

MIL-STD-810F-514.5

6. Test Program: Play MPEG file from HDD.

7. Test Conditions

Fixture

Step-1: Fix notebook with four fixtures to fix around four corners of Notebook to carry out the vibration experiment.

Step-2: Fix notebook and Car mount or Shock mount Test with four fixtures to fix around four corners of Notebook to carry out the vibration experiment.

(1) The display is in closed position for non-operating random vibration.

(2) The display is in opened position for operating random vibration.

Operating – Sinusoidal Vibration:

(1) Test frequency and amplitude as follow

Frequency	Amplitude (Zero to Peak)
10-57.5 Hz	0.075mm
57.5-500 Hz	1G

(2) Sweep rate: 1 oct/min

(3) Sweep Cycle: 5 cycles (1cycle is 10->500->10Hz, 56 minutes)

Operating – Random Vibration:

*MIL-STD-810F-514.5C-1 US. highway truck vibration exposure

(1). X axis (Longitudinal): Test frequency and PSD as follow:

Frequency	PSD G ² /Hz
10 Hz	0.00650
20 Hz	0.00650
30Hz	0.00040

120 Hz	0.00020
121Hz	0.00300
200Hz	0.00300
240Hz	0.00150
340Hz	0.00003
500Hz	0.00015

Grms= 0.74, Duration: 60 minutes

(2). Y axis (Transverse): Test frequency and PSD as follow:

Frequency	PSD G ² /Hz
10 Hz	0.00013
20 Hz	0.00065
30 Hz	0.00065
78Hz	0.00002
79Hz	0.00019
120Hz	0.00019
500Hz	0.00001

Grms= 0.204, Duration: 60 minutes

(3). Z axis (Vertical): Test frequency and PSD as follow:

Frequency	PSD G ² /Hz
10 Hz	0.01500
40 Hz	0.01500
500 Hz	0.00015

Grms= 1.04, Duration: 60 minutes

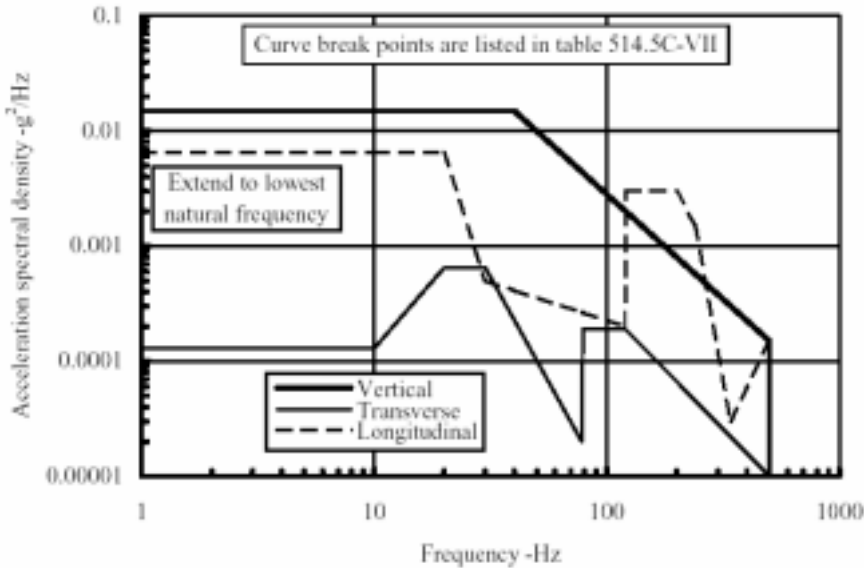


FIGURE 514.5C-1. U. S. highway truck vibration exposure.

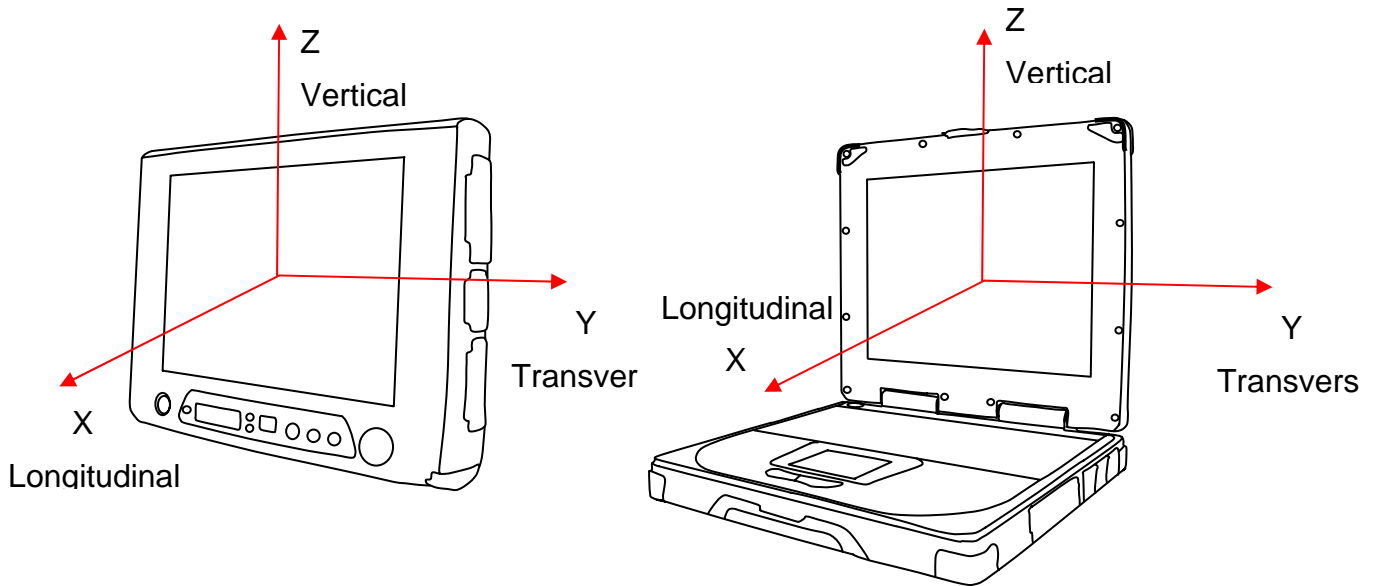
Non-operating – Sinusoidal Vibration:

(1) Test frequency and amplitude as follow

Frequency	Amplitude (Zero to Peak)
10-57.5 Hz	0.150mm

57.5-500 Hz	2G
-------------	----

- (2) Sweep rate: 1 oct/min
- (3) Sweep Cycle: 5 cycles (1cycle is 10->500->10Hz, 56 minutes)



The Definition of Axis

Non-operating – Random Vibration:

*MIL-STD-810F-514.5C-17 General minimum integrity exposure

- (1). 0.040 G²/Hz from 20 to 1000 Hz. -6 dB/Octave from 1000 to 2000 Hz.
- (2). 60 minutes for each axis

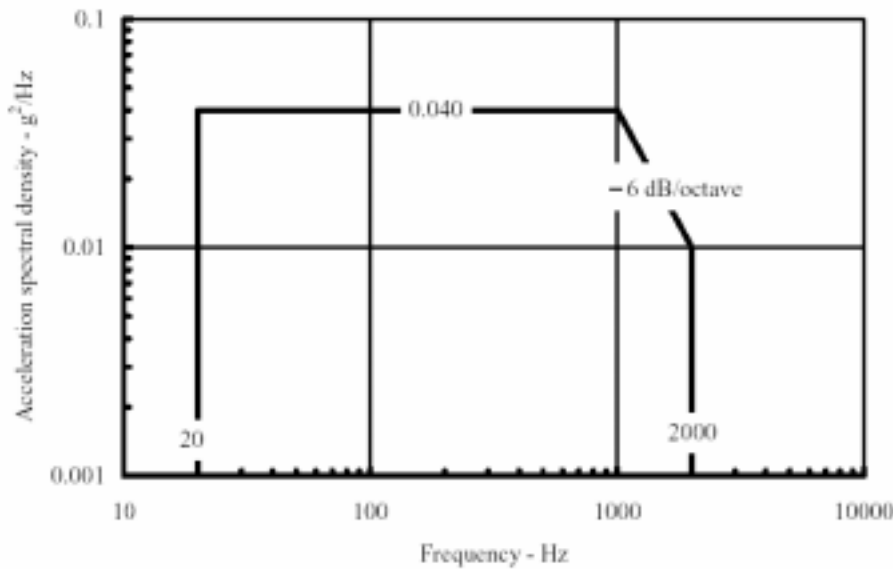


FIGURE 514.5C-17. General minimum integrity exposure.

Requirements:

Darning the test HDD protect function can't be work.

Must be free of mechanical structure, operational, functional, display errors, and the performance of key parts have to be normal. Disassemble the system, check the screw is loose or not and the solder is broken or not.

8. Test Equipment:

Vibration Tester, "King Design", Model: 900F2K-25N80

9. Test Result and Record:

Step-1: For notebook only.

12-6	Visual Check	Function Check		
		M/B	HDD	CD-ROM
Before Operating Vibration	Pass	Pass	Pass	Pass
During Operation Sine – X	Pass	Pass	Pass	Pass
During Operation Random - X	Pass	Pass	Pass	Pass
During Operation Sine – Y	Pass	Pass	Pass	Pass
During Operation Random - Y	Pass	Pass	Pass	Pass
During Operation Sine – Z	Pass	Pass	Pass	Pass
During Operation Random - Z	Pass	Pass	Pass	Pass
Before Non-Operating Vibration	Pass	Pass	Pass	Pass
After Non-Operation Sine - X	Pass	Pass	Pass	Pass
After Non-Operation Random - X	Pass	Pass	Pass	Pass
After Non-Operation Sine - Y	Pass	Pass	Pass	Pass
After Non-Operation Random - Y	Pass	Pass	Pass	Pass
After Non-Operation Sine - Z	Pass	Pass	Pass	Pass
After Non-Operation Random - Z	Pass	Pass	Pass	Pass
14-6	Visual Check	Function Check		
		M/B	HDD	CD-ROM
Before Operating Vibration	Pass	Pass	Pass	Pass
During Operation Sine – X	Pass	Pass	Pass	Pass
During Operation Random - X	Pass	Pass	Pass	Pass
During Operation Sine – Y	Pass	Pass	Pass	Pass
During Operation Random - Y	Pass	Pass	Pass	Pass
During Operation Sine – Z	Pass	Pass	Pass	Pass

During Operation Random - Z	Pass	Pass	Pass	Pass
Before Non-Operating Vibration	Pass	Pass	Pass	Pass
After Non-Operation Sine - X	Pass	Pass	Pass	Pass
After Non-Operation Random - X	Pass	Pass	Pass	Pass
After Non-Operation Sine - Y	Pass	Pass	Pass	Pass
After Non-Operation Random - Y	Pass	Pass	Pass	Pass
After Non-Operation Sine - Z	Pass	Pass	Pass	Pass
After Non-Operation Random - Z	Pass	Pass	Pass	Pass

[Up to index](#)

10. Free Drop Test

1. Purpose:

This test is for determining the ability of the package design to absorb impacts, and the ability of packaging and packing methods to protect the unit.

2. Test Place: MiTAC Reliability Lab.

3. Test Date: 1 day (08/09/2006)

4. Test Quantity: 2 Sets (12-6, 14-6)

5. Reference Document:

Acceptance Specification for the product under test

MIL-STD-810F 516.5

IEC 68-2-32

6. Test Program: Play AVI file from HDD, open word pad file and key in some word, QA+Pro8.0

7. Test Conditions

7-1. Check plastic and electrical functionalities before dropping.

7-2. Close lid to do drop test (Check lid's setting is "Nothing" mode before drop).

7-3. Test step1: Power on system

The drop height is 30cm (1 feet), doing 1 time bottom side free drop to make sure HDD protect function can work normally at the minimal startup height.

7-4. Test step2: Power on system

The drop height is 91.5cm (3 feet), first 5 times must do the drop test with system operating (Play 1 AVI file and open word pad file from HDD) to make sure HDD protect function can work normally.

Drop sequence: Bottom face 1-time and Down edge1 ~ 4 each 1-time, total 5 times.

7-5. Test step3: Power off system

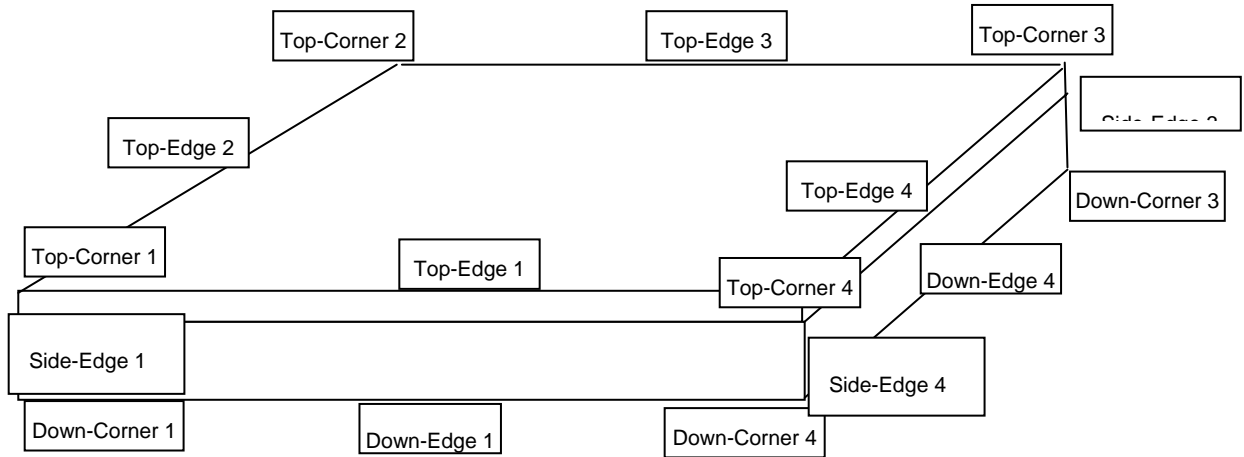
The drop height is 91.5cm (3 feet), other 21 times must do drop test non-operating, from every face, edge and corner (Except of step2 drop test).

Drop sequence: (1). Left, Right, Top, Rear, Front face each 1-time, total 5 times.

(2). Top edge 1~4 times and side edge1~4 times, total 8 times.

(3). Top corner 1~4 times and Down corner 1~4 times, total 8 times.

Combine the Step2 and Step3, The total drop height 91.5 cm is 26 times.



7-6. Test surface: a smooth, hard, rigid, surface of plywood.

7-7. Check plastic and functionalities after each dropping.

8. Requirement

HDD is not damaged and the HDD protect function has been approved
 Plastic, functionalities of system and all contents are not allowed to damage.

9. Test Equipment:

Drop Tester, "HUNG TA", Model: 810

10. Test Result: Tracking

Step1: 30cm height drop

Drop Test sequence			
No.	Sequence	System	Result
1.	Bottom face	Operating	Pass

Step2 & Step3: 91.5cm height drop

Drop Test sequence			
No.	Sequence	System	Result
1.	Bottom face	Operating	Pass
2.	Down Side 1	Operating	Fail
3.	Down Side 2	Operating	Pass
4.	Down Side 3	Operating	Pass
5.	Down Side 4	Operating	Pass
6.	Left face	Non-Operating	Pass
7.	Right face	Non-Operating	Pass

8.	Top face	Non-Operating	Pass
9.	Rear face	Non-Operating	Pass
10.	Front face	Non-Operating	Fail
11.	Top side 1	Non-Operating	Fail
12.	Top side 2	Non-Operating	Pass
13.	Top side 3	Non-Operating	Pass
14.	Top side 4	Non-Operating	Pass
15.	Side1	Non-Operating	Pass
16.	Side2	Non-Operating	Pass
17.	Side3	Non-Operating	Pass
18.	Side4	Non-Operating	Pass
19.	Top Corner1	Non-Operating	Fail
20.	Top Corner2	Non-Operating	Pass
21.	Top Corner3	Non-Operating	Pass
22.	Top Corner4	Non-Operating	Pass
23.	Down Corner1	Non-Operating	Pass
24.	Down Corner2	Non-Operating	Pass
25.	Down Corner3	Non-Operating	Pass
26.	Down Corner4	Non-Operating	Pass

Remark :

1. 12-6 VGA cable damaged at Top-side 2
2. 14-6 C part broken at Top Corner1
3. Front cover and B part will broken depend on Handle location
4. After DVT test PM change drop spec from 26 times on plywood surface to 8 times on steel surface and Pass the test

[Up to index](#)

11. Package Drop Test

1. Test Place: MiTAC Reliability Lab.

2. Test Date: 1 day (08/09/2006)

3. Test Quantity: 1 Set (14-2)

4. Reference Document:

Acceptance Specification for the product under test

MiTAC B&C-Test General Procedure

ISTA Project 2A standard method of drop test for shipping containers.

5. Test Program: AMIDdiag 6.20

6. Test Conditions

Check plastic and electrical functionalities before dropping.

Put system and all content into package, then seal in the way of shipping.

Hold package to the specified height, and then drop it in the specified order.

Check plastic and functionalities after each dropping.

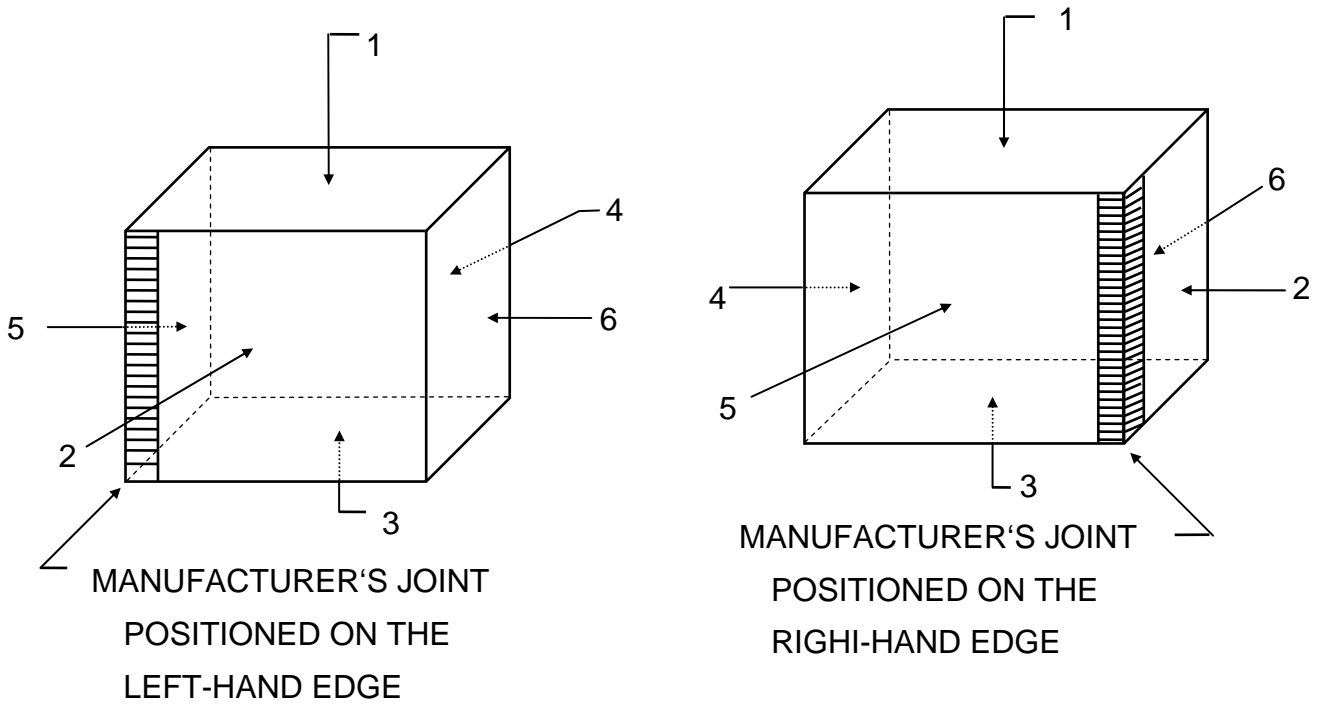
The drop height:

Freight weight	Free drop height
0.45-9.52kg	96.5 cm
9.53-18.59kg	81.3 cm
18.62-27.66kg	61.0cm
27.67-45.36kg	50.8cm

Test at every corner, edge and plane

Drop #	Drop onto	Type of drop
1	2-3-5 corner of package	Corner
2	2-5 edge of package	Edge
3	3-5 edge of package	Edge
4	2-3 edge of package	Edge
5	Face 3 of the package	Flat
6	Face 5 of the package	Flat
7	Face 6 of the package	Flat
8	Face 2 of the package	Flat

9	Face 4 of the package	Flat
10	Face 1 of the package	Flat



Test surface: a smooth, hard, rigid, surface of concrete or steel.

Requirement

Plastic, functionalities of system and all contents are not allowed to damage.

7. Test Equipment:

Drop Tester, "HUNG TA", Model: 810

8. Test Result: Pass

Test check list: Test height is 96.5 cm, drop on steel

Drop #	Drop onto	Type of drop	Result
1	2-3-5 corner of package	Corner	Pass
2	2-5 edge of package	Edge	Pass
3	3-5 edge of package	Edge	Pass
4	2-3 edge of package	Edge	Pass
5	Face 3 of the package	Flat	Pass
6	Face 5 of the package	Flat	Pass
7	Face 6 of the package	Flat	Pass
8	Face 2 of the package	Flat	Pass
9	Face 4 of the package	Flat	Pass
10	Face 1 of the package	Flat	Pass

[Up to index](#)

12. Rain shower Test (IPX4)

1. Purpose:

The test is to prove that the machine can work well in the different severity of rain shower.

2. Test Place: MiTAC Reliability Lab / ERSO.

3. Test Duration: 2 days (08/02/2006~08/03/2006)

4. Test Quantity: 2 Sets. (12-3、 14-3)

5. Reference Document:

IEC529

MIL-810F 506.4 Procedure III

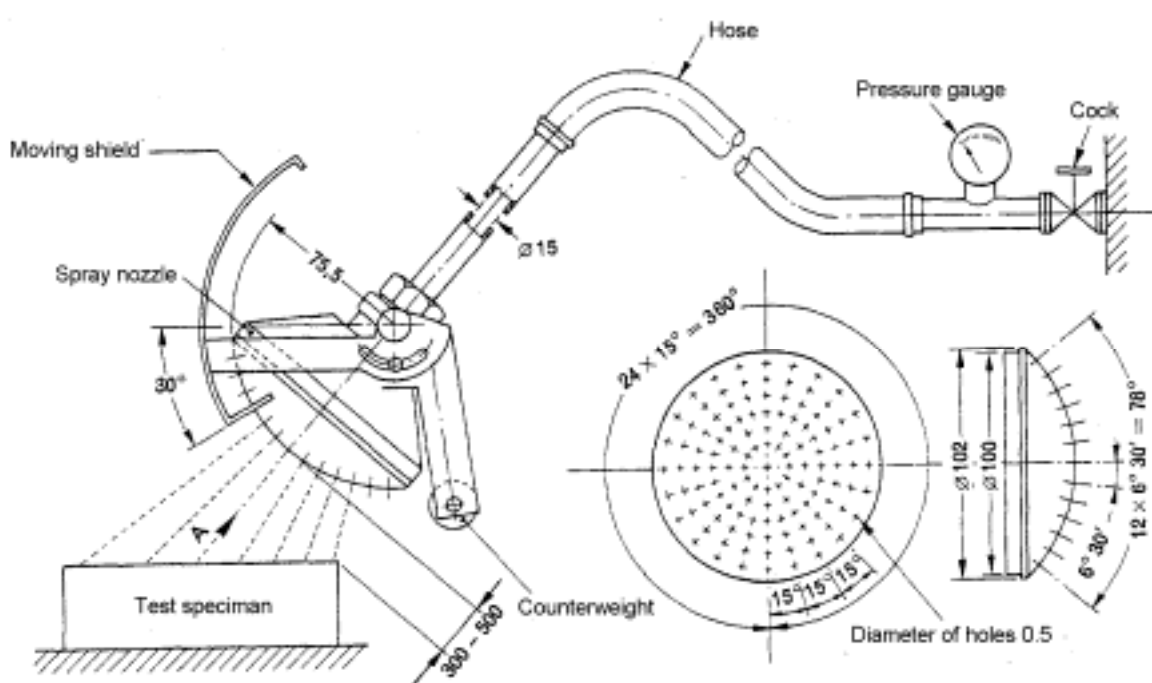
Acceptance Specification for the product under test

6. Test Conditions and Requirements:

Check P.U.T. all cover install properly and check function before test

Put the P.U.T. on test table and run a MEPG file from HDD.

Test setup (spray nozzle):



121 holes of diameter 0.5mm; 1 hole at the center, 2 inner circles of 12 holes at 30 degree pitch, 4 outer circles of 24 holes at 15 degree pitch.

Moving shield: Aluminum, Spray nozzle: Brass

The counterbalanced shield is removed from the spray nozzle and the enclosure is sprayed from all practicable directions.

Water flow rate: 10 liter /min

Test duration: 10 min.

Test requirement: There is no water leaking into the P.U.T. chassis. Touch pad and keyboard can work normally.

7. Test Equipment: TABAI ESPEC EBR-2FW2Y2L2M-22, rain test chamber

8. Test Result: Pass

[Up to index](#)

13. Dust Test (IP5X)

1. Purpose:

The test is to prove that the machine can work well in the different severity of blowing dust.

2. Test Place: ARTC

3. Test Duration: 2 days (08/01/2006 ~ 08/02/2006)

4. Test Quantity: 2 Sets. (12-5, 14-5)

5. Reference Document:

IEC529

Acceptance Specification for the product under test

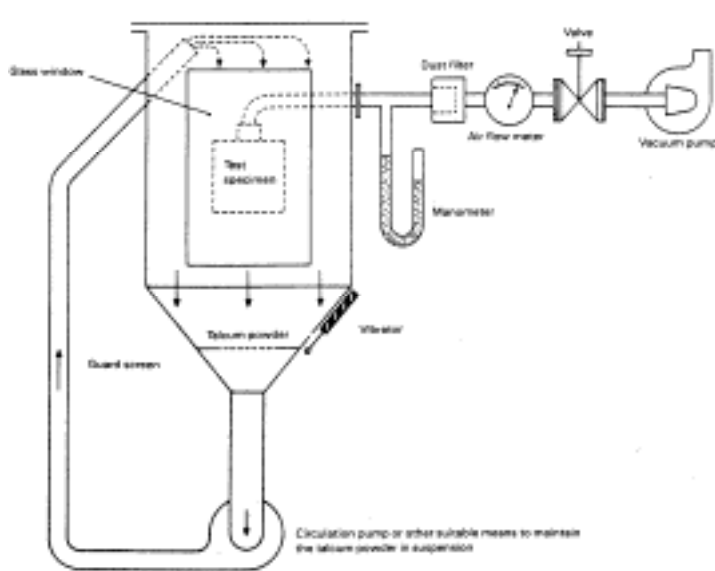
6. Test Conditions and Requirements:

Check P.U.T. all cover install properly and check function before test.

Put the P.U.T. on test table and run a MEPG file from HDD.

The talcum powder used shall be able to pass through a square-meshed sieve the normal wire diameter of which is $50\ \mu\text{m}$ and the nominal width between wires $75\ \mu\text{m}$. The amount of talcum powder to be used is 2 kg per cubic meter of the test chamber volume. It shall not have been used for more than 20 tests.

Test setup



Test duration: 8 hours.

Test requirement: The protection is satisfactory if, on inspection, talcum powder has not accumulated in a quantity or location such that, as with any other of dust, it could interfere with the correct operation of the equipment or impair safety. Touch pad, touch screen and

keyboard can work normally.

7. Test Equipment: WEISS Dust Test Chamber, Type ST 1000 U-S S/N: 233/15947.

8. Test Result: Pass

Remark: there are some dust into the computer, but system still can work normally



[Up to index](#)

14. Altitude Test

1. Purpose

The purpose of this test is to determine if P.U.T can withstand operate under a low pressure environment.

2. Test Place: ERSO

3. Test Date: 2 days (07/31/2006 ~ 08/01/2006)

4. Test Quantity: 2 Sets (12-5, 14-5)

5. Reference Document:

IEC 68-2-3

MIL-STD-810F-500.4 Procedure I

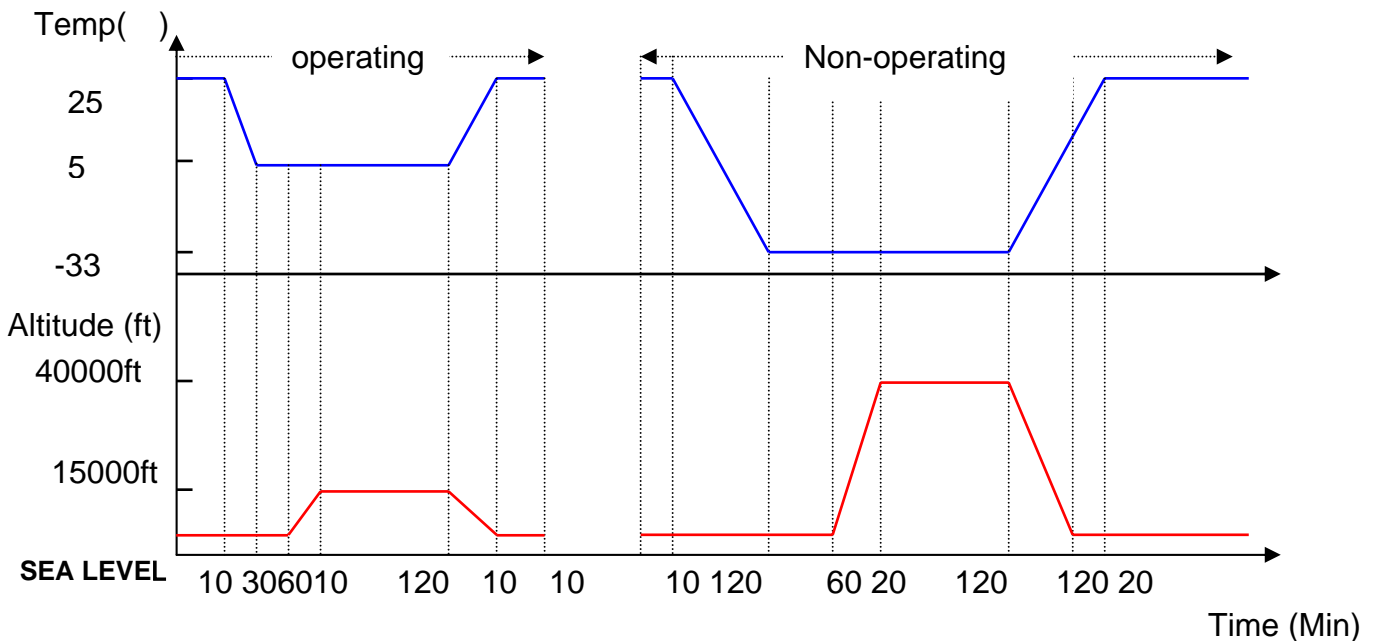
6. Test Program: Speedy + 2AVI

7. Test Conditions:

Operating: 15,000 ft/ 5 degree

Non-operating: 40,000 ft /-33 degree

Altitude change rate: 2000ft/min



8. Test Requirements:

The function should work properly.

9. Test Result: **Pass**

[Up to index](#)

15. Impact Test

1. Purpose: This test is performed to evaluate detrimental effects of an impact to the display, which can result in cracking or breaking.

2. Test Place: MiTAC Reliability Lab.

3. Test Date: 1 day (08/03/2006)

4. Test Quantity: 2 Sets (12-3, 14-3)

5. Reference Document:
Acceptance Specification for the product under test

6. Test Conditions

Test apparatus: Chrome steel ball bearing (1 1/4" Diameter, 130 grams) dropped from variable heights through a vertically positioned PVC pipe (1 5/16" Inside Diameter, 100 cm length).

Impact to be centered on display.

Start with initial drop height set at 30 cm, then increase drop height by 10 cm after each passing drop, until display breaks, or becomes non-functional.

Record height at which the failure occurred, and the highest passing height for each sample tested.

Repeat procedure on all samples to be tested.

Minimum Requirements: At a minimum drop height of 50-cm, no display cracking or breaking is allowed.

7. Test Result: Pass

	30cm	40cm	50cm	60cm	70cm
12-3	Pass	Pass	Pass	Pass	Pass
14-3	Pass	Pass	Pass	Pass	Pass

[Up to index](#)