

Report No.: HC60136/2013

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Date: June 24, 2012

POSIFLEX TECHNOLOGY, INC. NO. 6, WUQUAN RD., WUGU DIST., NEW TAIPEI CITY, TAIWAN, R.O.C.

The following merchandise was submitted and identified by the vendor as:

Product Description: POS SYSTEM

Style/ Item No.: XT-4015/ No.1 ~ No.3

Quantity: Total 3 sets

Testing Period: Jun. 11, 2013 to Jun. 14, 2013

We have tested the submitted sample(s) as requested and the following results were obtained:

(According to client's test specification, please see following sheets in detail.) Test Required:

Highly Accelerated Life Testing

Test Object: HALT is usually used during a product's design stage. It is intended to discover

operation and destructive limits of both temperature and vibration, and to find the

weakness point of products.

Test Results:

Conclusion

The Highly Accelerated Life Testing results are as below. The detailed description of HALT result, please see attached sheet(s).

- 1. Temp LOL: -40°C
- 2. Temp UOL: +80°C
- 3. Rapid Thermal Transitions Stress: -40° C to $+80^{\circ}$ C
- 4. Vibration OL: >55 Grms
- 5. Combined Environment Stress:-40°C to +80°C with 10, 20, 30, 40 and 50 Grms for each cycle.

Signed for and on behalf of SGS TAIWAN Ltd.

Winson Tseng Asst. Manager

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Test Equipment:

Name	Brand	Model	Serial No.
OVS Chamber	QualMark	Typhoon 4.0	40T06060716
OVS Accelerometer	Dytran	3030B5	12838
OVS Thermocouple	Omega	C03-T-60	-
Thermal recorder	YOKOGAWA	DA100-13-1D	91F650122
Thermocouple	Omega	5TC-TT-30-72	-

Lab Environmental Conditions:

(25 ± 3) °C Ambient temperature: Ambient humidity: $(55 \pm 20) \% RH$

Test Setup and Functional Test Description:

The whole test unit, except the hard drive, should be fastened inside the HALT chamber. And the units were functional tested to evaluate the operation condition of the unit as they must be normal operation during HALT process. All units will be fully operational and be monitored for normal or errors by executing the test software "BurnIn Test V5.1 Pro- \(\text{Live Results} \) " under HALT process. Examine whether the operation of test software for execution of specified test items could work normally or not for functional check during HALT process.

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HALT Setup:

OVS Control System Thermocouple Placement:

Channel	Location
Product(Control)	Near Product TC
Air	The case of Frame
Honeywell	2" above access port

Thermocouple Location

for Cold and Hot Temperature Step Stress Test:

Channel	Туре	Location or Description
01	TC	Near Product
02	TC	CPU
03	TC	SB
04	TC	DIMM
05	TC	Near PCB center of Product

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Test Method/ Specification:

1. Cold Temperature Step Stress Test:

Cold Temperature Step Stress was performed on unit No.1. Cold Temperature Step Stress began at a set point temperature of +20°C. The temperature was decreased in 10°C increments with 10 minutes dwells to find the lower operating limit. Once cold thermal step stress was completed, the unit was returned to +20°C and remained there until the temperature stabilized. The UUT was monitored for functionality throughout the cold temperature step stress test.

Test Result:

Set point (°C)	Pass/Fail	Comments
20	Pass	-
10	Pass	- 6 50
0	Pass	-
-10	Pass	_
-20	Pass	_
-30	Pass	-
-40	Pass	_
-50	Fail	 The monitor of UUT can't display normally during this step. Thermal transition to +20°C the UUT functions normally after reboot the UUT.

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Test Result--Continued:

Temperature measurement:

Component Set point	CPU (℃)	SB (°C)	DIMM (°C)	Near PCB center of Product (°C)
20℃	48.5	29.7	36.6	25.3
10℃	40.1	22.1	29.1	17.1
0℃	28.1	11.0	17.9	6.4
-10℃	18.0	1.3	8.1	-3.5
-20℃	8.2	-8.1	-1.4	-12.8
-30℃	-2.0	-18.2	-11.9	-23.2
-40℃	-12.4	-28.2	-22.2	-32.7
-50℃	-23.1	-38.8	-33.2	-43.2
Note: Thermocouple Location as shown in photo 9~12				

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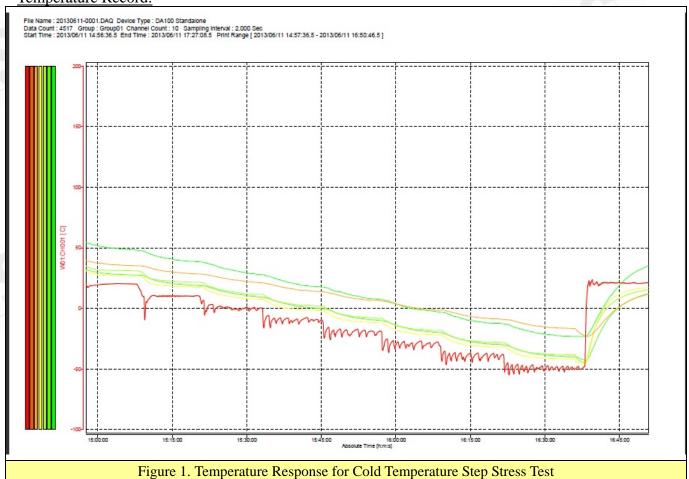
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Temperature Record:



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Test Method/ Specification--continued:

2. Hot Temperature Step Stress Test:

Hot Temperature Step Stress was performed on unit No.1. Hot Temperature Step Stress began at a set point temperature of +20°C. The temperature was increased in 10°C increments with 10 minutes dwells to find the upper operating limit. Once hot thermal step stress was completed, the unit was returned to +20°C and remained there until the temperature stabilized. The UUT was monitored for functionality throughout the hot temperature step stress test.

Test Result:

Set point (°C)	Pass/Fail	Comments
20	Pass	-
30	Pass	- 696
40	Pass	_
50	Pass	_
60	Pass	-
70	Pass	-
80	Pass	_
90	Fail	 The system of the UUT shutdown during this step. Thermal transition to +20°C the UUT functions normally after reboot the UUT.

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Test Result--Continued:

Temperature measurement:

Component Set point	CPU (°C)	SB (°C)	DIMM (°C)	Near PCB center of Product (°C)
20	46.7	28.6	34.0	24.6
30	55.5	37.1	42.1	33.4
40	67.7	47.3	52.2	43.3
50	76.5	57.4	62.2	53.5
60	81.3	66.9	71.2	63.4
70	86.1	76.4	79.9	73.3
80	92.7	86.0	88.3	83.6
90	105.1	96.4	98.1	93.8

Note: Thermocouple Location as shown in photo 9~12

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Temperature Record:

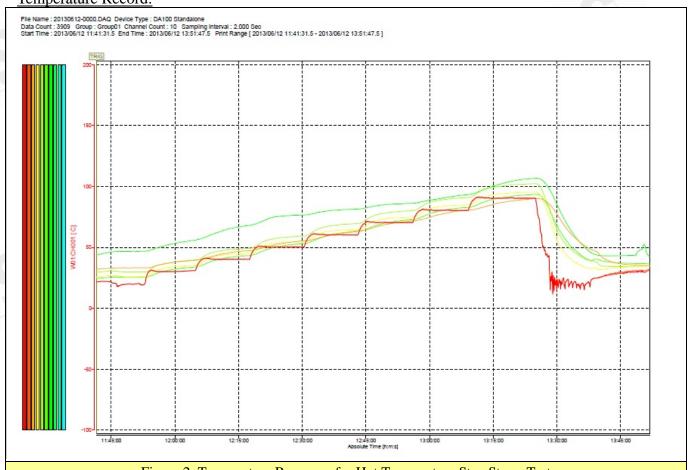


Figure 2. Temperature Response for Hot Temperature Step Stress Test

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Test Method/ Specification--continued:

Rapid Thermal Transitions Stress Test:

Rapid Thermal Transitions Stress was performed on unit No.1. The unit under test was subjected to one temperature cycle from -40° C to $+80^{\circ}$ C at an average thermal transition rate of 60° C per minute. This should be conducted for five cycles. Positive and negative temperature cycle was dwell 10 minutes at each extreme temperature level. The UUT was monitored for functionality throughout the rapid thermal transitions stress test.

Test Result:

<u>rest Result:</u>			
Cycle	Set point (°C)	Pass/Fail	Comments
	-40℃	Pass	
	+80°C	Pass	
2	-40°C	Pass	
<u> </u>	+80°C	Pass	_
3	-40°C	Pass	_
3	+80°C	Pass	-
4	-40°C	Pass	_
4	+80°C	Pass	_
5	-40°C	Pass	- 64
	+80°C	Pass	-6112

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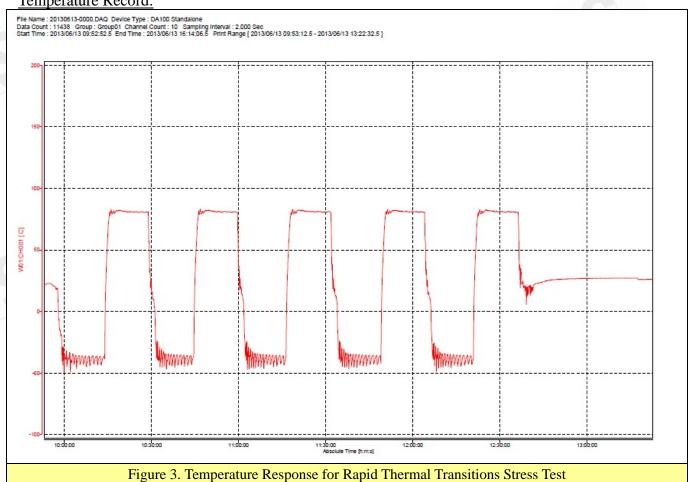
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Temperature Record:



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Test Method/ Specification--Continued:

4. Vibration Step Stress Test:

Vibration step stress was performed on unit No.2. The unit under test was subject to vibration step stress beginning at a set point of 5 Grms and temperature at 20°C with the vibration increasing in 5 Grms with 10 minutes dwells at each level. The bandwidth used to calculate the Grms levels were 10 Hz to 5000 Hz. The UUT was monitored for functionality throughout the vibration step stress test.

Test Result:

Set point (Grms)	Pass/Fail	Comments
5	Pass	
10	Pass	- 3
15	Pass	_
20	Pass	_
25	Pass	_
30	Pass	C(12) -
35	Pass	_
40	Pass	_
45	Pass	- 60
50	Pass	- 2 2
55	Pass	Reach the vibration limit of the equipment.

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Vibration PSD & Auto Spectrum:

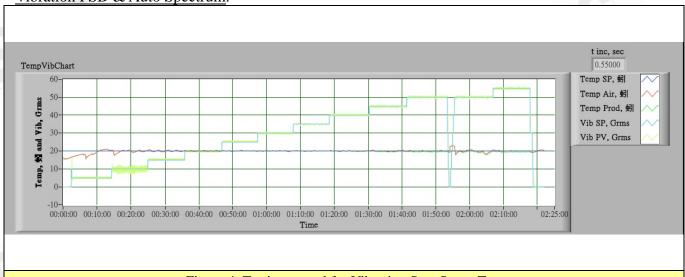


Figure 4. Testing record for Vibration Step Stress Test

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Test Method/ Specification--Continued:

5. Combined Environment Stress Test:

Combined Environment Stress was performed on unit No.3. The thermal cycle was operated from -40° C to $+80^{\circ}$ C at an average thermal transition rate of 60° C per minute combined with vibration. Vibration began at a set point of 10, 20, 30, 40 and 50 Grms from the first to fifth thermal cycle, with a 10 minutes dwell at each extreme temperature level. The UUT was monitored for functionality throughout the combined environment stress test.

Test Result:

Cycle	Temperature	Vibration	Pass/Fail	Comments
1	-40°C	10 Grms	Pass	-28
4	+80℃	10 Grms	Pass	
2	-40℃	20 Grms	Pass	
4	+80°C	20 Grms	Pass	_
	-40℃	30 Grms	Pass	_
3	+80°C	30 Grms	Pass	_
4	-40℃	40 Grms	Pass	_
4	+80°C	40 Grms	Pass	_
	-40℃	50 Grms	Pass	-68
5	+80℃	50 Grms	Pass	

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Temperature Record:

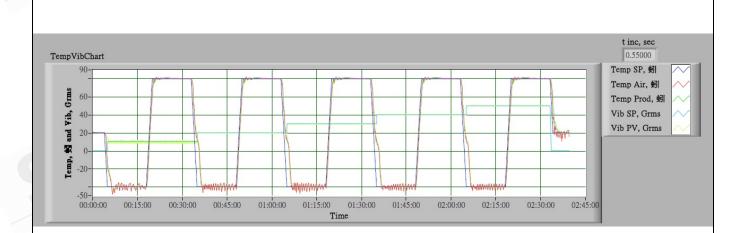


Figure 5. Testing record for Combined Environment Stress Test

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Test Photos:



Appearance of unit under test: XT-4015



Appearance of unit under test: XT-4015



Cold Temperature Step Stress Test Hot Temperature Step Stress Test **Rapid Thermal Transitions Stress Test**



Cold Temperature Step Stress Test Hot Temperature Step Stress Test **Rapid Thermal Transitions Stress Test**



Vibration Step Stress Test



Vibration Step Stress Test

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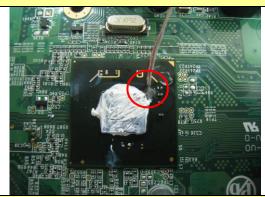
Test Photos--Continued:



Combined Environment Stress Test



8. Combined Environment Stress Test



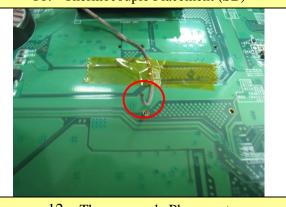
Thermocouple Placement (CPU)



10. Thermocouple Placement (SB)



11. Thermocouple Placement (DIMM)



12. Thermocouple Placement Near PCB center of Product

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Test Photos--Continued:



13. Functional check

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Summary of Operating and Destruct Limits:

Stress Type	Chamber Set Point Level
Temperature LOL	-40°C
Temperature UOL	+80°C
Rapid Thermal Transitions Stress	-40°C to +80°C
Vibration OL	>55 Grms
	-40°C to +80°C with 10, 20, 30, 40 and 50
Combined Environment Stress	Grms for each cycle.

- LOL = Lower Operating Limit; LDL = Lower Destruct Limit; UOL = Upper Operating Limit; UDL = Upper Destruct Limit. For vibration there is an upper limit only.
- Operational Limit (OL) The stress level at which the product is still fully functional, but when the applied stress is increased, the product is no longer functional. The product recovers when the stress is reduced. Also know as a soft failure.
- Destruct Limit (DL) The stress level where one or more of the product's operating characteristics are no longer within specification. The product does not recover once the stresses are reduced. Also, know as a hard failure.

The End of Test Report -

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