RITY8R1

Design Verification Report

Initiated by	Jeffery Chen	**Job Title**	Senior Engineer	**Originate Date**	2014/11/19
Reviewed by	Max Chen	**Job Title**	Supervisor	**Revision**	QQ4-037 Rev.A7
Approved by	Simon Lin	**Job Title**	Manager	**DMR Task Number**	T25403-00
				版本	A1

Product Information

DMR Task Number T25403-00

版本 A1

	Test Unit Information		
Model	RITY8R1		
Description	N/A		
PCB version	A02		
OS	Android 4.3		
Kernel version	3.0.35		
Product phase	N/A		
Produced by	Jeffery		
CPU	Freescale i.MX6 Cortex-A9 Dual lite/Quad 1GHz CPU		
PM IC	N/A		
LAN chipset	Micrel KSZ9031RNX	Connector location	CN1
Touch	PCT-080F-8G-01 (EETI 7900 series)		
LCD Panel Model	8" Innolux ZJ080NA-08A		
Storage Size	Micron eMMC 4GB		
Internal Memory Size	Onboard Up to 1GB(Dual Lite) or 2GB(Quad) DDR3 1066/1333 SDRAM		

Product image

Summary

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版本 A1

Item		Descriptions	Result
	Product Spec Verification	Specification Check	
	LED check	LED indicator check (Power / HDD / LED / Others)	Pass
	Basic Function	USB / COM / Audio Function Test & Check	Pass
	Performance	CPU, Memory, Graphics, LAN	Pass
	Power Consumption	Full load / Idel / Erp mode test	Pass
	Power Margin test	DC power source Upper / Middle / Low limit test	Pass
	Power interruption test	100/200/500/1000ms	Pass
	Room temperature Power on/off test	Room temperature / 4000times for system level	Pass
	High Temperature Test	45℃/24hrs IEC 60068-2-2 Test:Bb	Pass
	Low Temperature Test	-5℃/24hrs IEC 60068-2-1 Test:Ab	Pass
	Temperature cycle test	-5℃~45℃ RH95% 8 cycles IEC 60068-2-14 Test:N	Pass
	Power on cycle test	-5℃ / 1000times IEC 60068-2-1 Test:Ab	Pass
		45℃ / 1000times for system level IEC 60068-2-2 Test:Bb	Pass
	Storage test	-5℃ 24hrs 60℃/ RH95% 24hrs IEC 60068-2-3 Test:Ca	Pass

Random Vibration Operation	1. PSD: 0.00454G²/Hz , 1.5 Grms 2. operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh 7. Storage : eMMC	**Pass**
Random vibration test (Non-operation)	1 Test Acceleration : 2G 2 Test frequency : 5~500 Hz 3 Sweep：1 Oct/ per one minute. (logarithmic) 4 Test Axis : X,Y and Z axis 5 Test time :10 min. each axis 6 System condition : Non-Operating mode 7. Reference IEC 60068-2-6 Testing procedures	**Pass**
Package vibration test	1. PSD: 0.026G²/Hz , 2.16 Grms 2. Non-operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 min. per each axis 6. IEC 60068-2-64 Test:Fh	**Pass**
Bump Test	1. Wave form：Half Sine wave 2. Acceleration Rate：10g for operation mode 3. Duration Time：11ms 4. No. of Shock：Z axis 1000 times 5. Test Axis: Z axis 6. Operation mode 7. Reference IEC 60068-2-29 Testing procedures Test Eb : Bump Test	**Pass**
Package drop test	1 One corner , three edges, six faces 2 ISTA 2A, IEC-60068-2-32 Test:Ed	**Pass**
Thermal	1 Max. Loading at Room Temperature &40℃ 2 Capacitor life time calculation 3 IEC 60068-2-2 Test:Bb	**Pass**

** Notes: Test items and test contents depend on spec.

Product Spec Verification

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Title	RITY8R1	
System Features	Freescale i.MX6 Cortex-A9 Dual lite/Quad 1GHz CPU	
	4~64GB eMMC	
	Up to 1GB or 2GB DDR3 SDRAM	
	Dual Display (LVDS + VGA(Quad core only) or LVDS+HDMI	
	Optional Dual GLAN	
	Support Cash Drawer	
	19~24V DC input	
	Support 2x RS232(TX,RX,CTS,RTS,GND)/422/485, 2x RS232(TX,RX,CTS,RTS,GND)	
	USB Touch Controller EETI 7900 series	
Specifications		**Confirm**
Component		
Mother Board	Freescale i.MX6 Platform (Board Model name:ACP-IMX6POS)	V
CPU	Freescale i.MX6 Cortex-A9 Dual Lite/ Quad 1GHz	V
CPU Cooler (Type)	N/A	N/A
Memory	Onboard Up to 1GB(Dual Lite) or 2GB(Quad) DDR3 1066/1333 SDRAM	V
Power Supply	N/A	N/A
Adapter	DC 19V power input by Power 2.5mm DC Jack	V
System Fan	Fanless	V
Microphone	Option	N/A
Speaker	On back x 2	V
Camera	Supported optional	N/A
Wireless LAN	Supported optional	N/A
Bluetooth	N/A	N/A
Operating System	Linux : Linux Kernel 2.6.x & 3.0.x Android 4X	Android 4.3
Expansion Card	N/A	N/A
Other Component	N/A	N/A
Storage		
Floppy Disk Drive	N/A	N/A
Hard Disk Drive	N/A	N/A
Optical Disk Drive	N/A	N/A
Solid State Drive	N/A	N/A
Other Stoage Device	MSATA by Mini PCI-e interface optional	N/A
Panel		
LCD Panel	8.0" Innolux ZJ080NA-08A 1024 x 600	V
LCD Control Board	Panel built in	V
B/L Inverter/Converter	Panel built in	V
Touch Screen	5-wires Resistive / PCT	PCT
Touch Controller	EETI 7900 series	V
Others		N/A
External I/O		
PS/2 KB & Mouse	N/A	N/A
Serial Port	X2	V
Parallel Port	N/A	N/A
USB Port	USB Type A Double Deck x1	V
1394 Port	N/A	N/A
PCMCIA Port	N/A	N/A
DIO Port	N/A	N/A
Video Port	HDMI x1	V

Audio Port	N/A	N/A
LAN Port	G LAN x1	V
Wireless LAN Antenna	Supported optional	N/A
Switch	Right side with cover	V
Indicator Light	PWR/ LAN/ WIFI	PWR/LAN
Expansion Slots	Mini PCI Express slot x1 Micro SD slot x1 SIM card holder onboard Supported WIFI & 3.5G module	N/A
Others		N/A
Mechanical		
Power Type	DC 19-24V power input	V
Power Connector Type	2.5mm DC Jack	V
Dimension	231.7mm x 149.5mm x 42mm	N/A
Weight	TBD	N/A
Color	Black	V
Fanless	Yes	V
Others	N/A	N/A
Reliability		
EMI Test	CE/FCC Class B	V
Safety	All design for this project have to comply with UL / CB / CCC	N/A
Dust and Rain Test	IP 65 for front panel, IP 41 for back	V
Vibration Test	Base on Customer test standard	V
Mechanical Shock Test	Base on Customer test standard	V
Drop Test	Base on Customer test standard	V
Operating Temperature	0~40 degree	V
Operating Humidity	0% ~ 90% Relative Humidity, Non-condensing	V
Storage Temperature	0~60 degree	V
Other Test	N/A	N/A

LED indicator check

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	OS	Note
☐		
☑	**Android 4.3**	
☐		

7.8.1 Colours of indicator lights

The colours of indicator lights and their meanings shall comply with Table 2.

NOTE IEC 60601-1-8 contains specific requirement for the colour, flashing frequency and DUTY CYCLE of alarm indicator lights.

Dot-matrix and other alphanumeric displays are not considered to be indicator lights.

Table 2 – Colours of indicator lights and their meaning for ME EQUIPMENT

Colour	Meaning
Red	Warning – immediate response by the OPERATOR is required
Yellow	Caution – prompt response by the OPERATOR is required
Green	Ready for use
Any other colour	Meaning other than that of red, yellow or green

Subject	Test Item	Pass	Fail	Note
Power LED indicator (LED indicator must be in the darkroom confirmation)	Power on LED color check	✓		
	Power LED Dark for system off	✓		Can't have Micro-Light lamp
	Power LED Light for system turn on	✓		
HDD LED indicator (LED indicator must be in the darkroom confirmation)	HDD LED Flash for HDD active Read / Write	N/A		
	HDD LED Dark for HDD no active	N/A		Can't have Micro-Light lamp
Ethernet LED indicator	Data Rate , Off => 10Mbits/sec	✓		
	Data Rate , Green => 100Mbits/sec	✓		
	Data Rate , Orange => 1000Mbits/sec	✓		
	Link / ACT , Off => not established	✓		
	Link / ACT , Yellow Off => established	✓		
	Link / ACT , Yellow Blinking => activity	✓		LED blinking is too fast when transmitting data

Basic Function

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Test Engineer	Jeffery	**Date :**	**2014/10/27**	**Result**	Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Subject	Test Item	Pass	Fail	Note
Video Function	*.WMA	N/A		
	*.H.264	✓		
	*.MP4	✓		
Audio Function	*.MP3	✓		
	Microphone	N/A		
	Speaker adjust volume	✓		
	Alarm Colock volume	✓		
LAN Function	Turn On/Off	N/A		
	Network notification	N/A		
	Download file from internet	✓		
	Disconnect policy	N/A		
Transmission	Read / Write Test(Upload/Download/Copy 1GB files)	✓		
Connection	Download file from internet	✓		
Miss Operation	Power off suddenly while OS is booting up.	✓		
	Reset system while OS is booting up.	✓		
USB Port 1	Auto detect (for all channels)	✓		
	Hot plug function is normal (for all channels)	✓		
	System information is correct	✓		
	Read/Write test (Copy 1GB file(s))	✓		Test data by emmc size
	USB 2.0 Removable Devices	✓		
	Remove & Increase USB Device	✓		
	USB Keyboard / USB Mouse / USB HDD	✓		Only show one USB storage information when inserting two USB storages
USB Port 2	Auto detect (for all channels)	✓		
	Hot plug function is normal (for all channels)	✓		
	System information is correct	✓		
	Read/Write test (Copy 1GB file(s))	✓		Test data by emmc size
	USB 2.0 Removable Devices	✓		
	Remove & Increase USB Device	✓		
	USB Keyboard / USB Mouse / USB HDD	✓		Only show one USB storage information when inserting two USB storages

HDMI Port	Display function	✓		
	Audio output	✓		
VGA Port	Display function	✓		
OTG Port	Function check	✓		
Cash drawer Port	Open	✓		24V cash drawer
	Close	✓		
	Status	✓		Open & Close status
COM 1	Function Check for RS-232	✓		Loopback test
	Function Check for RS-422	✓		Loopback test
	Function Check for RS-485	✓		Loopback test
COM 2	Function Check for RS-232	✓		Loopback test
	Function Check for RS-422	✓		Loopback test
	Function Check for RS-485	✓		Loopback test

Performance

DMR Task Number T25403-00

版本 A1

Test Engineer	James	Date :	2014/10/22		Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Application	Test Item	Mbps	Note
NetIQ Chariot 8.0 Throughput	Maximum	333.337	
	Minimum	87.913	
	Average	311.351	
Application	**Test Item**	**Score**	**Note**
AnTuTu Benchmark 4.3.3	System	14556	
	Multitask	2811	
	Runtime	985	
	CPU (multi-thread) integer	1250	
	CPU (multi-thread) float-point	1501	
	CPU (single thread) integer	806	
	CPU (single thread) float-point	900	
	RAM Operation	1379	
	RAM Speed	585	
	Storage I/O	585	
	Database I/O	585	
	2D Graphics Test	668	
	3D Graphics Test	2501	
Performance test lite 1.4	CPU Test	7.3	
3D Mark	Ice Storm Extreme	1870	
	Graphics	1617	
	Phyaics	4139	
	Graphics test1	9.5	
	Graphics test2	5.6	
	Phyaics test	13.1	

Power Consumption

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版本 A1

Test Engineer	James	Date :	2014/10/23		Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Testing Software (MAX. load)

1 *Runing H.264 1080P video*

****If LAN is on board function, all LAN ports have to connect to a switch HUB through CAT5e LAN cable,**

but don't need to do data transfer, or through a cross over cable connect two LAN ports is acceptable

Condition:

Power on - Boot sequency: *Measure the maximum current value of between system power on and boot-up to O.S.*

Idle mode: *Measure the current value when without running any program*

Max. load: *Measure the maximum current value which system under maximum load (CPU: Top speed ,RAM & Graphic: Full loading)*

Condition	Power Consumption (A)			Test Software	Note / Issue ID
	Power on - Boot procedure	Idle mode	Max Load		
+19V	0.55	0.383	0.503	1	
Total	10.45	7.277	9.557		
+24V	0.48	0.345	0.446	1	
Total (Watt)	11.52	8.28	10.704		

Condition	USB Power measurement (mA)						Note / Issue ID
	Voltage (4.75v~5.00v)	Current	Power On			Result	
USB1	4.974	510mA	5.147			Pass	
USB2	4.979	510mA	5.147			Pass	

	CMOS(Coin) Battery Leak Current		
Condition	CMOS backup Battery (must be less than 5 uA)	*0.6*	*(uA)*

Power margin Test

DMR Task Number T25403-00
版本 A1

Test Engineer	James	Date	2014/10/23	Result	Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Power margin Test

Item	Voltage	Spec	Limit	Test Stage	Result	Note/Issue ID
DC power upper limit	25.2V	24V	+5%	DVT	Pass	
DC power middle value	21.6V	(upper limit + low limit) /2		DVT	Pass	
DC power low limit	18.05V	19V	-5%	DVT	Pass	

1. Adjust DC power source to specified voltage with Upper/Low limit.
2. ON/OFF test 10 cycles (1 minute ON and 1 minute OFF constitute 1 cycle)
3. Turn on the system and startup into the OS and make the product to maximum loaded condition with running H.264 1080P video

Power interruption Test

DMR Task Number T25403-00
版本 A1

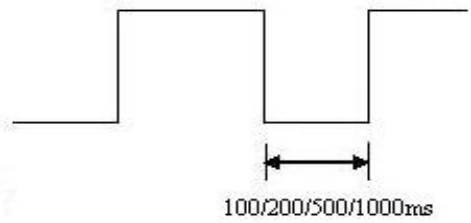
Test Engineer	Jeffery	2014/10/23		Pass
Test Configuration				
Model name	RITY8R1			
PCB version	A02			
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz			
OS	Android 4.3			
Kernel Version	3.0.35			
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)			
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)			
Adapter	FSP090-DMAB1 19V 4.74A 90W			

Power interruption test

Test Condition：Environment：25℃± 2℃ ambient Humidity：50 ± 10% RH

Test time：10 times
Interval time 100ms/200ms/500ms/1000ms

Procedure：
1 Input the AC voltage
2 system boot up
3 Apply switching main power switch with the specified conditions.
(In case of the products equipped with the voltage-switch unit, installed them)



Judgment Criteria：
1 There must be no danger of fire.
2 It must not catch fire or produce smoke.
3 There should be no abnormal phenomenon (ex. auto-boot up)
4. There should be no abnormalities affecting the product's functions and performance

Power interruption Test

Item	Adapter	interval time	Mode	Test Stage	Result	Note/Issue ID
Power interruption Test	FSP090-DMAB1	100ms	AT	DVT	Pass	
		200ms	AT	DVT	Pass	
		500ms	AT	DVT	Pass	
		1000ms	AT	DVT	Pass	

Room Temp Power On/Off Test

DMR Task Number T25403-00
版本 A1

Test Engineer	Jeffery		2014/10/17~2014/10/20	Pass
Test Configuration				
Model name	RITY8R1			
PCB version	A02			
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz			
OS	Ubuntu 12.04			
Kernel Version	3.0.35			
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)			
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)			
Adapter	FSP090-DMAB1 19V 4.74A 90W			

Test Condition：

Condition

1 Test temperature : Room temperature

2 Number of test : 4000 times

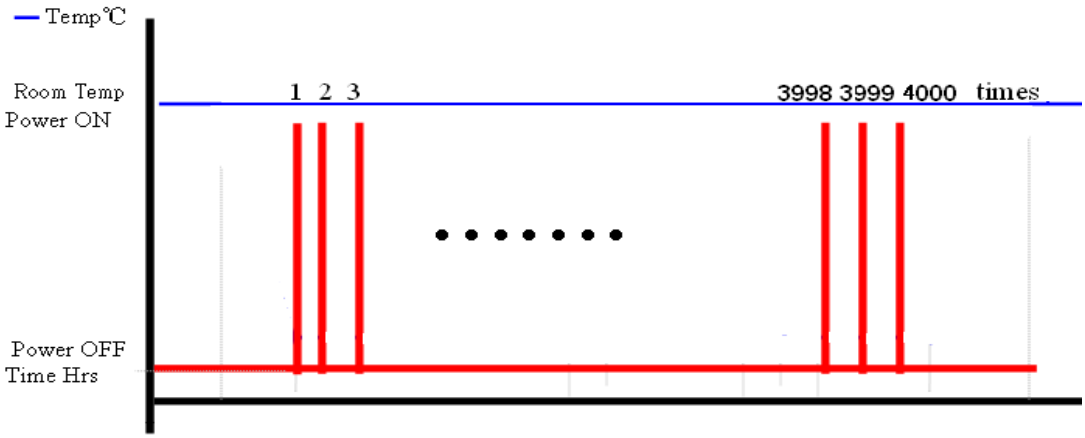
3 Test software : Ubuntu

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

B) After 1 minutes, system power on again.

C) Recycle step A and B for 4000 times.

5 Test environment curve :



Test result：

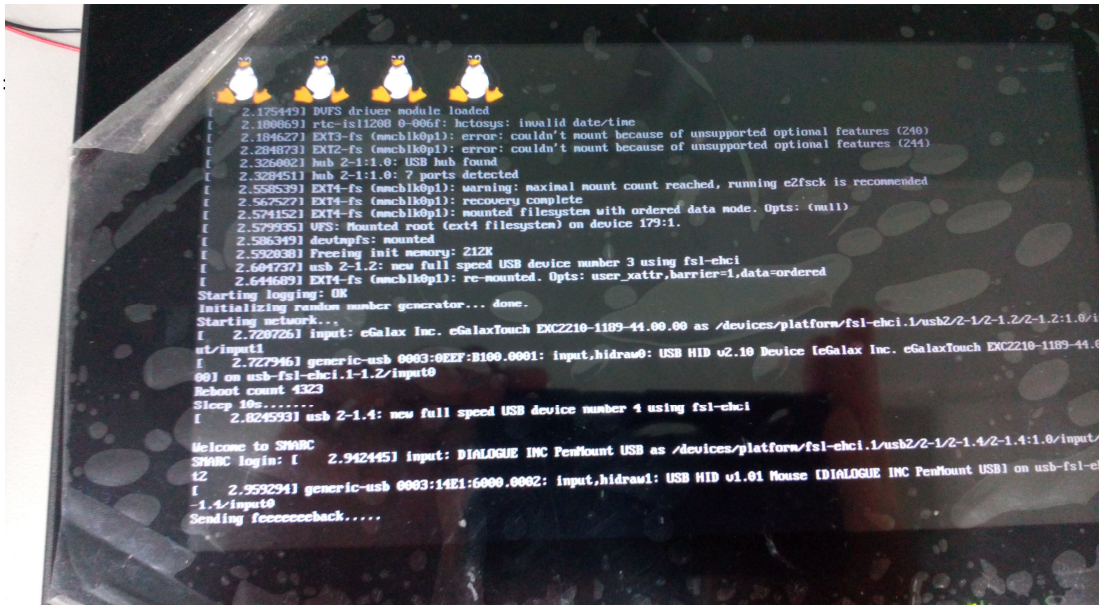
1 All system functions must be checked with appropriate testing programs and should pass the inspection.

2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

There is no damage in electronic and mechanical functions.
Degradation has no been found.
Performance is maintained with no incurable physical damage or degradation.

Temperature	Power mode	
Room temperature	AT	ATX
Result	Pass	N/A

Test picture :



High Temperature Operation Test

DMR Task Number T25403-00
版本 A1

Test Engineer	Jeffery		2014/10/9~2014/10/10		Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

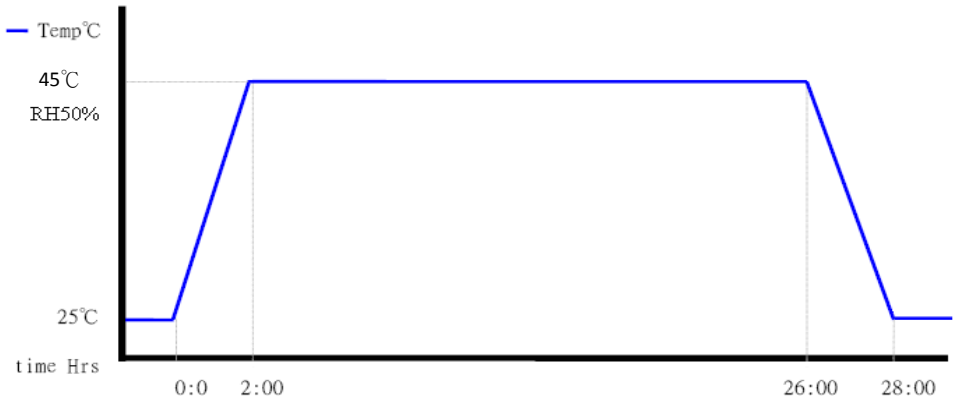
Test Standard：
Reference IEC60068-2-2 Testing procedures
Test Bb : Dry Heat Test

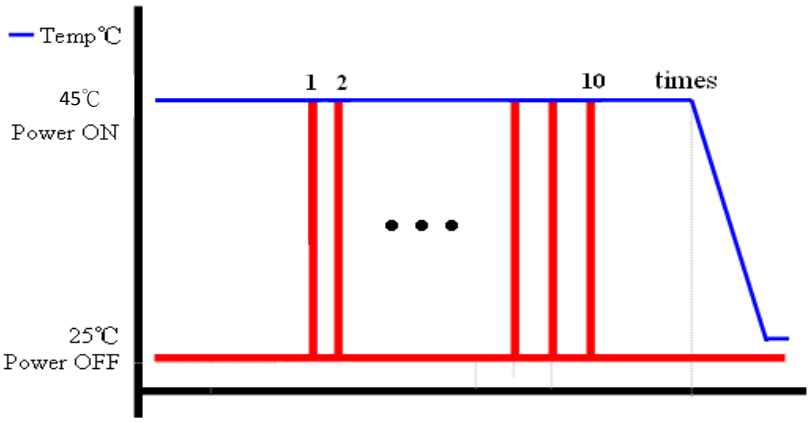
Test Condition：
1 Test Temperature :45℃ for board level

2 Test Time : 24 hours

3 Test software : H.264 video

4 Executing on/off test 10 times after running burn in test 24 hours





Test equipment：

Programmable temperature & humidity chamber

use chamber		V		
Model:	Ten Billion FX1004	THS-D4T-150	THS-D4T-150+LN2	KSON THS-A4T-100
Date of calibration :	2013/12/20	2014/6/26	2014/6/26	2013/12/20

Performance criteria：

1 All system functions must be checked with appropriate testing programs and should pass the inspection.

2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

Test result：

There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture：

Low Temperature Operation Test

DMR Task Number T25403-00
版本 A1

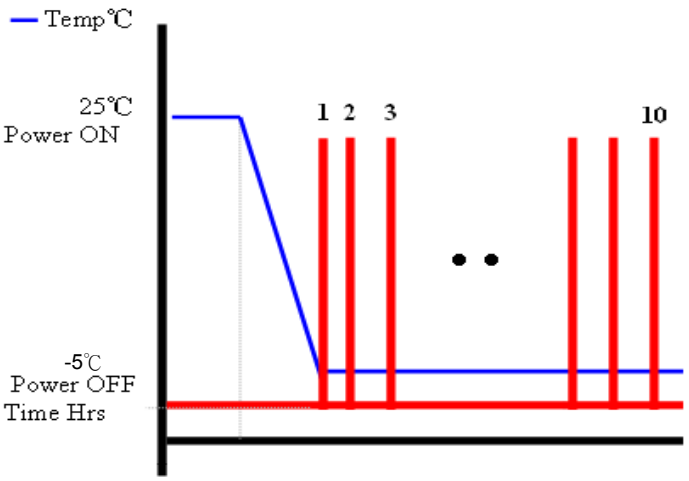
Test Engineer	Jeffery	2014/10/10~2014/10/11		Pass
Test Configuration				
Model name	RITY8R1			
PCB version	A02			
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz			
OS	Android 4.3			
Kernel Version	3.0.35			
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)			
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)			
Adapter	FSP090-DMAB1 19V 4.74A 90W			

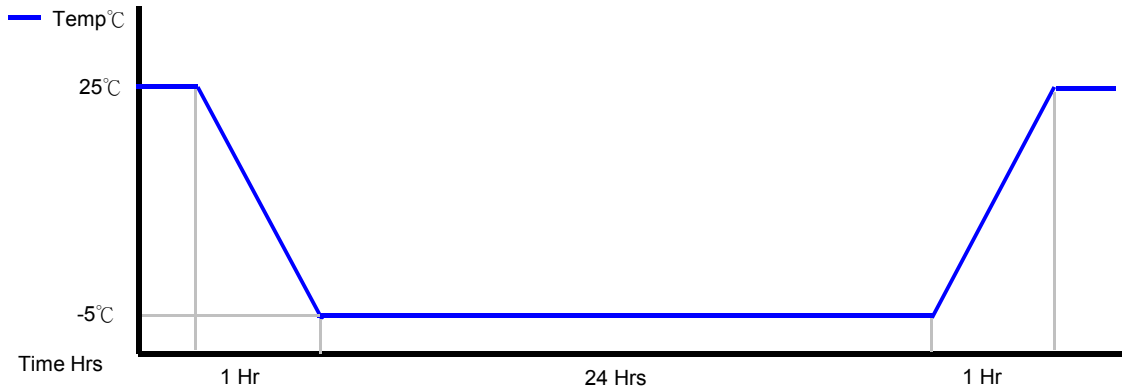
Test Standard：
Reference IEC60068-2-1 Testing procedures
Test Ab : Cold Test

Test Condition：
1 Test Temperature : -5℃

2 Test Time : 24 hours
3 Test software : H.264 video

Test procedure：
1 Power on at -5℃ into OS by manually and check device manager list, there are should be no " ! " or " ? " mark display
2 Peripheral check : 10 times
3 After peripheral chek is finish, keep lower chamber temperature at -5℃ and running test program.





Test equipment：

Programmable temperature & humidity chamber

use chamber		V		
Model:	Ten Billion FX1004	THS-D4T-150	THS-D4T-150+LN2	KSON THS-A4T-100
Date of calibration :	2013/12/20	2014/6/26	2014/6/26	2013/12/20

Performance criteria：

1 All system functions must be checked with appropriate testing programs and should pass the inspection.

2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

Test result：

There are should be no " ! " or " ? " mark display at device manager

There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture：

Temperature cycle test

DMR Task Number T25403-00

版本 A1

Test Engineer	Jeffery	Date	2014/10/11~2014/10/13		Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Temperature cycle test

Test Standard： Reference IEC60068-2-14 Testing procedures

Test N : Change of temperature test

Test Condition： 1 Test Temperature : High temperature 45℃ RH95% / Low temperature -5℃

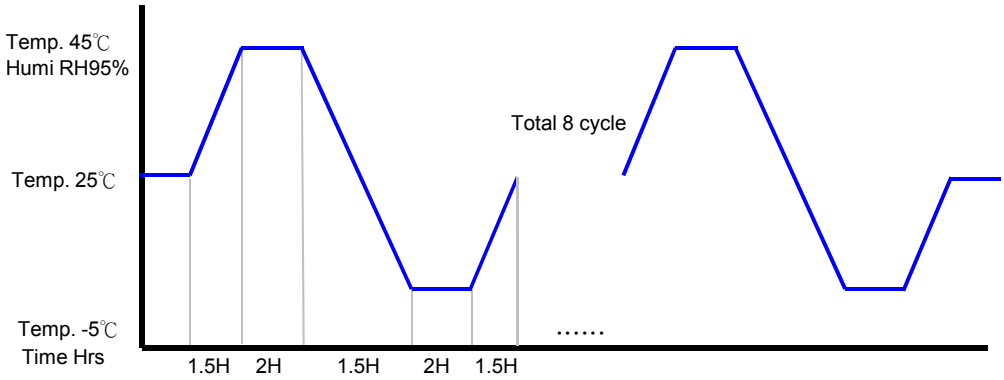
2 Test dwell Time : 2 hours

3 Temperature slope : heating 1 hour, cooling 1 hour

4 Test cycle : 8 cycles

5 Test software : H.264 video

6 Test environment curve



Test equipment： Programmable temperature & humidity chamber

use chamber		V		
Model:	Ten Billion FX1004	THS-D4T-150	THS-D4T-150+LN2	KSON THS-A4T-100
Date of calibration :	2013/12/20	2014/6/26	2014/6/26	2013/12/20

Performance criteria： 1 All system functions must be checked with appropriate testing programs and should pass the inspection.

2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

Test result： There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture：

Power on cycle test

DMR Task Number T25403-00
版本 A1

Test Engineer	Jeffery	**Date**	2014/10/20~2014/10/21	**-5℃ Result**	Pass
Test Configuration				**45℃ Result**	Pass
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Ubuntu 12.04				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Power On/Off Test

Test Standard：

Reference IEC60068-2-2 Testing procedures Test Bb : Dry Heat test

Reference IEC60068-2-1 Testing procedures Test Ab : Cold test

Test Condition：

Condition

1 Test temperature : -5℃

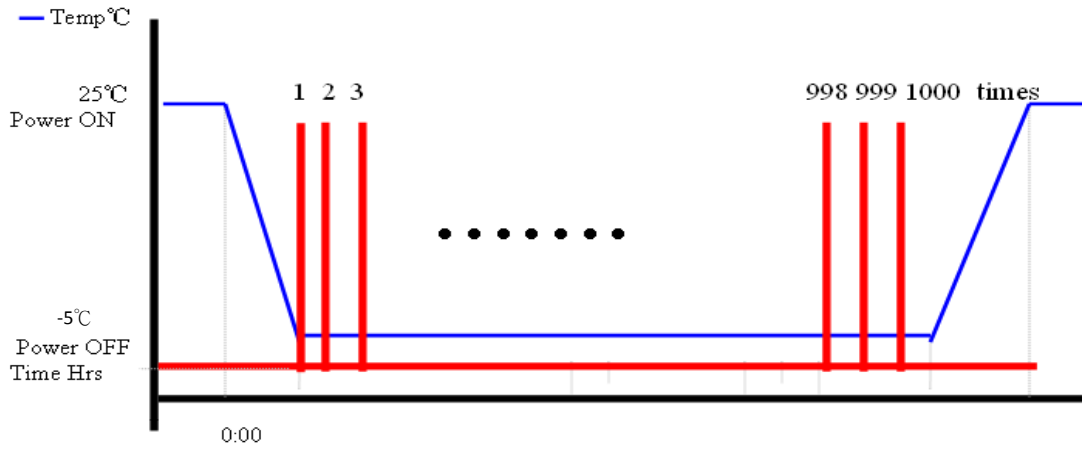
2 Number of test : 1000 times

3 Test software : Ubuntu

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

B) After 1 minutes, system power on again.

C) Recycle step A and B for 1000 times.



1 Test temperature : 45℃

2 Number of test : 1000 times

3 Test software : Ubuntu

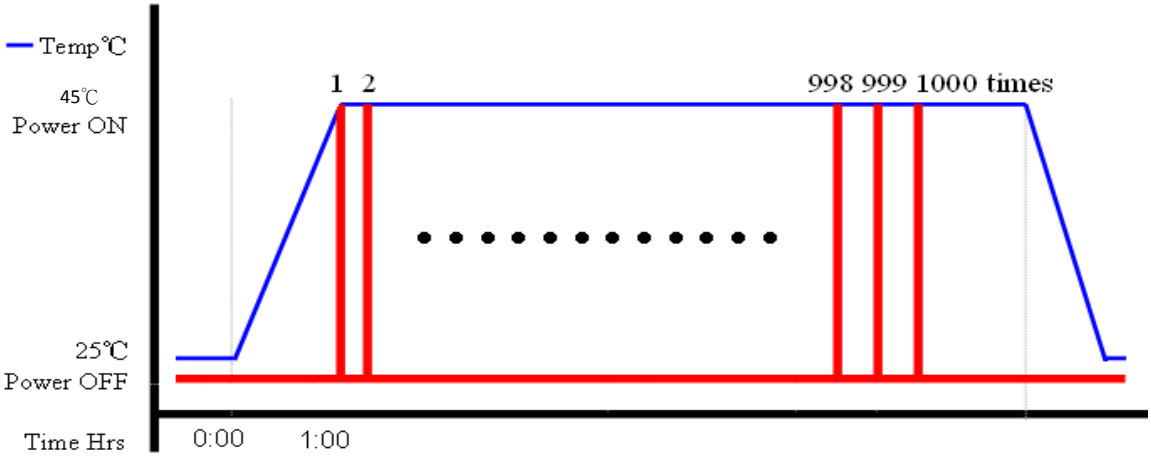
4 Step : A) System power on, record the count number then system power off

B) After 1 minute, system power on again.

C) Recycle step A and B for 1000 times.

5 Test environment curve :

Test equipment：



use chamber		V		
Model:	Ten Billion FX1004	THS-D4T-150	THS-D4T-150+LN2	KSON THS-A4T-100
Date of calibration :	2013/12/20	2014/6/26	2014/6/26	2013/12/20

Performance criteria： 1 All system functions must be checked with appropriate testing programs and should pass the inspection.

2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

Test result： There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture：


運轉中
-5.07℃
---.-%
THS-200S


運轉中
45.06℃
49.6%
THS-200S

Storage test

DMR Task Number T25403-00

版本 A1

Test Engineer		Jeffery	Date	2014/10/24~2014/10/27	Result	Pass
Test Configuration						
Model name	RITY8R1					
PCB version	A02					
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz					
OS	Android 4.3					
Kernel Version	3.0.35					
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)					
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)					
Adapter	FSP090-DMAB1 19V 4.74A 90W					

Storage Test

Test Standard：

Reference IEC60068-2-3 High temperature & Humidity storage test Test : Ca

Reference IEC60068-2-1 Cold test Test : Ab

Test Condition：

Condition

Low temperature setup

1 Test temperature : -5℃ (if system has LCD panel,storage temperature depend on panel spec.)

2 Test time : 24 hours

3 Temperature gradient 1℃/minute

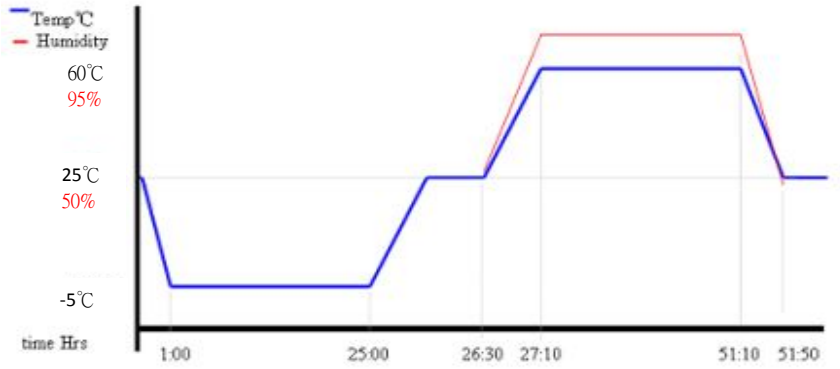
High temperature setup

1 Test temperature : 60℃

2 Test humidity : RH 95%

3 Test time : 24 hours

4 Temperature gradient 1℃/minute



Test equipment：

Programmable temperature & humidity chamber

use chamber		V		
Model:	Ten Billion FX1004	THS-D4T-150	THS-D4T-150+LN2	KSON THS-A4T-100
Date of calibration :	2013/12/20	2014/6/26	2014/6/26	2013/12/20

Performance criteria：

1 All system functions must be checked with appropriate testing programs and should pass the inspection.

2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

Test result：

There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture：

Random Vibration Operation

DMR Task Number T25403-00

版本 A1

Test Engineer		James	Date	2014/10/15	Result	Pass
Test Configuration						
Model name	RITY8R1					
PCB version	A02					
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz					
OS	Android 4.3					
Kernel Version	3.0.35					
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)					
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)					
Adapter	FSP090-DMAB1 19V 4.74A 90W					

Random Vibration Operation

Test Standard：Reference IEC60068-2-64 Testing procedures

Test Fh : Vibration boardband random Test

Test Condition：1 Test PSD : 0.00454G²/Hz , 1.5 Grms

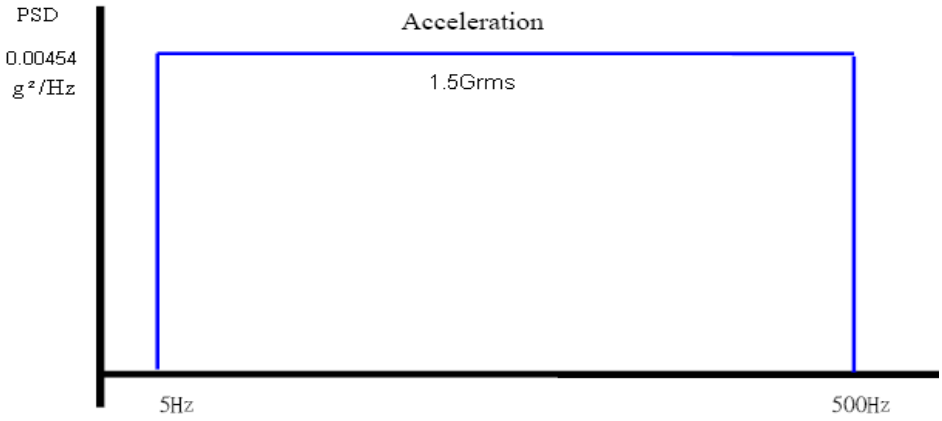
2 Test frequency : 5~500 Hz

3 Test axis : X,Y and Z axis

4 Test time : 30 minutes each axis

5 System condition : operation mode

6 Test curve



Test equipment：Vibration simulator system

Model : VS-300VH

Date of calibration : 2014/8/18

Performance criteria：1 All system functions must be checked with appropriate testing programs and should pass the inspection

2 There should be no abnormalities, which couldn't affect the product specified functions and performances

3 The cover and connectors should work properly without any interference

4 All screws should be tightened up appropriately

5 All gaps on the surface are appropriately

6 The assembling / disassembling of the system enclosure must be smooth and no deformed parts should be found

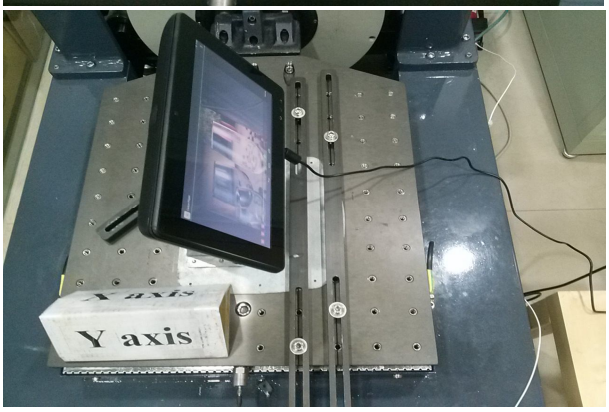
Test result：

There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture：



Sine Vibration test (Non-operation)

DMR Task Number 0

版本 0

Test Engineer	James	Date	2014/10/15	Result	Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Random Vibration Operation

Test Standard： Reference IEC60068-2-6 Testing procedures

Test Fc : Vibration sinusoidal

Test Condition： 1 Test Acceleration : 2G

2 Test frequency : 5~500 Hz

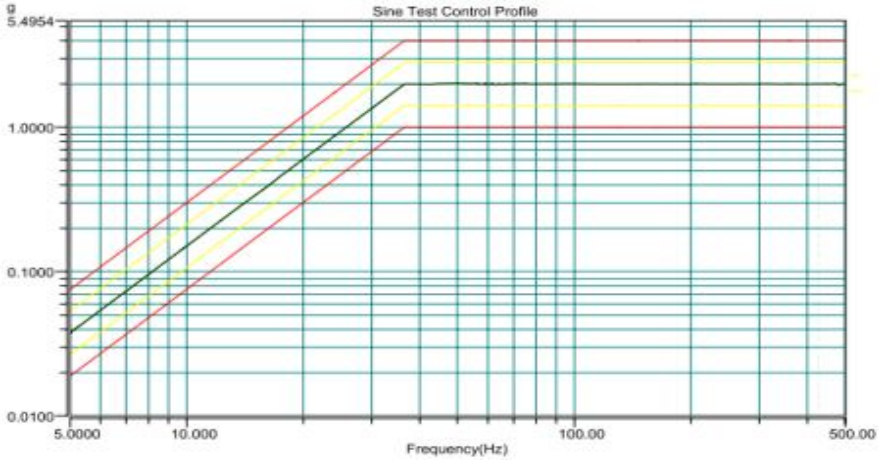
3 Sweep：1 Oct/ per one minute. (logarithmic)

4 Test axis : X,Y and Z axis

5 Test time :10 min. each axis

6 System condition : Non-Operating mode

7 Test curve



Test equipment： Vibration simulator system

Model : VS-300VH

Date of calibration :2014/8/18

Performance criteria： 1 All system functions must be checked with appropriate testing programs and should pass the inspection

2 There should be no abnormalities, which couldn't affect the product specified functions and performances

3 The cover and connectors should work properly without any interference

4 All screws should be tightened up appropriately

5 All gaps on the surface are appropriately

6 The assembling / disassembling of the system enclosure must be smooth and no deformed parts should be found

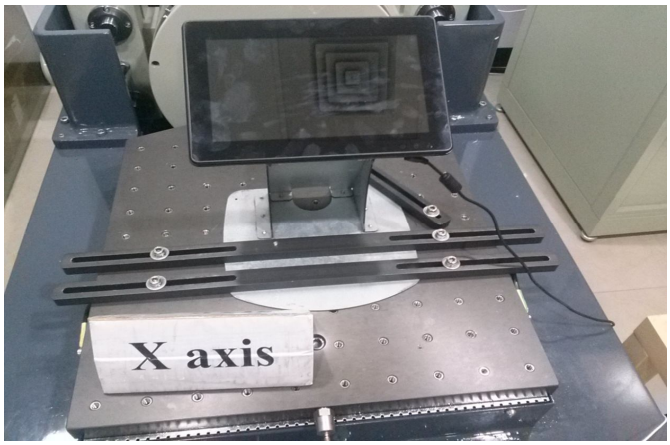
Test result：

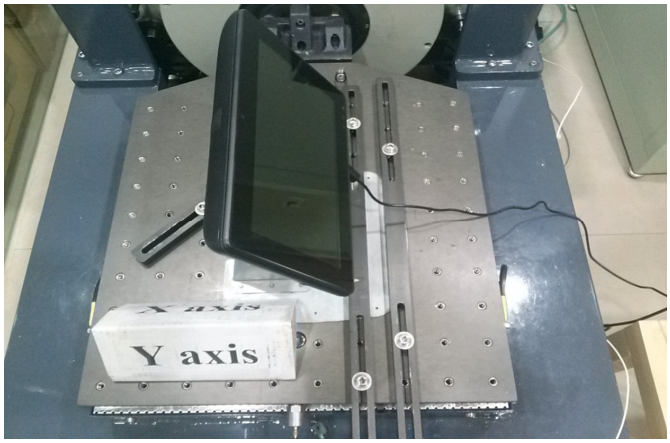
There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture：





Bump Test

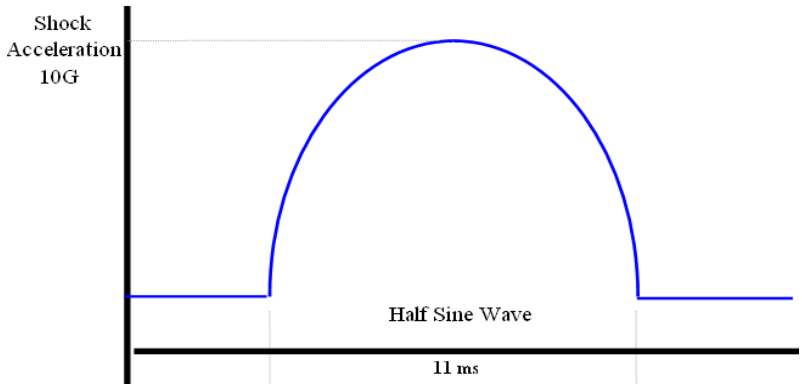
DMR Task Number T25403-00
版本 A1

Test Engineer	James	Date	2014/10/17	Result	Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Test Standard： Reference IEC 60068-2-29 Testing procedures
Test Eb : Bump Test

Test Condition： Wave form：Half Sine wave
Acceleration Rate：10g
Duration Time：11ms
No. of Shock：Z axis 1000 times
Test Axis: Z axis
System condition : operation (running burn in test program)

Test curve：



Test equipment： Shock tester
Model : VS-300VH
Date of calibration : 2014/8/18

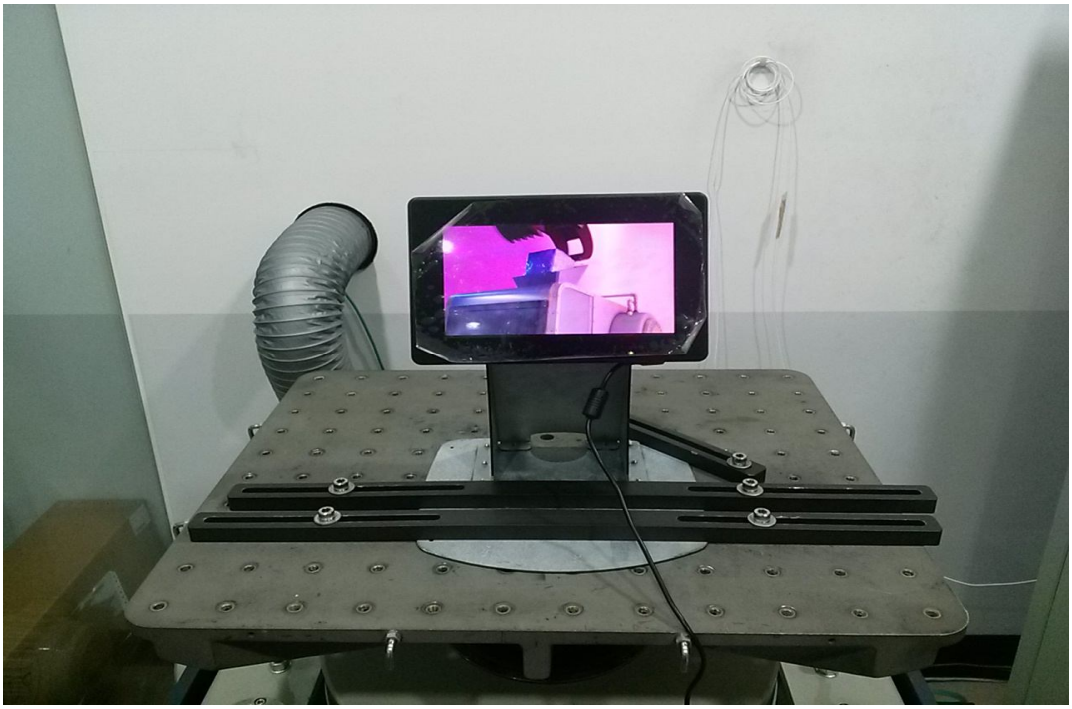
Performance criteria：

1 All system functions must be checked with appropriate testing programs and should pass the inspection
2 There should be no abnormalities, which couldn't affect the product specified functions and performances
3 The cover and connectors should work properly without any interference
4 All screws should be tightened up appropriately
5 All gaps on the surface are appropriately
6 The assembling / disassembling of the system enclosure must be smooth and no deformed parts should be found

Test result：

There is no damage in electronic and mechanical functions.
Degradation has no been found.
Performance is maintained with no incurable physical damage or degradation.

Test picture：



Package vibration test

DMR Task Number T25403-00

版本 A1

Test Engineer	Jeffery	Date	2014/10/17	Result	Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Package Vibration Test

Test Standard：Reference IEC60068-2-64 Testing procedures

Test Fh : Vibration boardband random Test

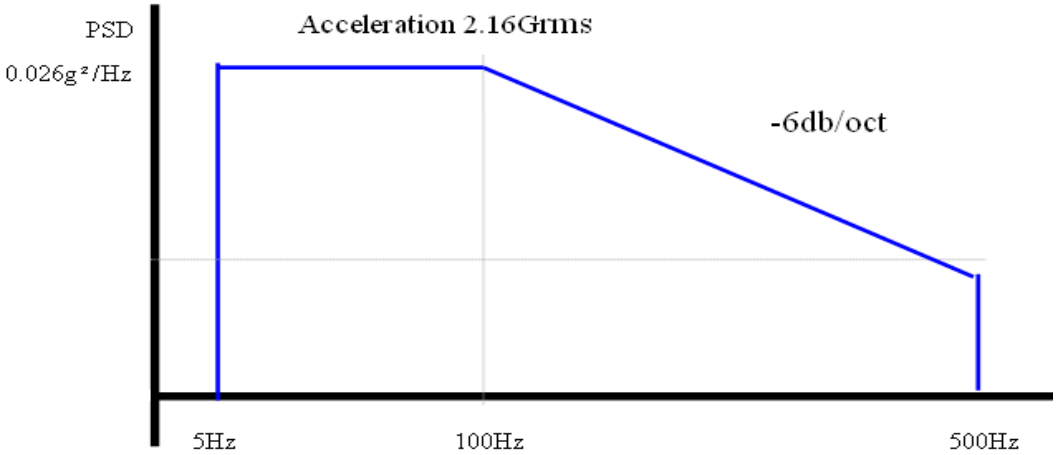
Test Condition：1 Test PSD : 0.026G²/Hz , 2.16 Grms

2 Test frequency : 5~500 Hz

3 Test axis : X,Y and Z axis

4 Test time : 30 minutes each axis

5 Test curve



Test equipment：Vibration simulator system

Model : VS-300VH

Date of calibration : 2014/8/18

Performance criteria：1 All system functions must be checked with appropriate testing programs and should pass the inspection

2 There should be no abnormalities, which couldn't affect the product specified functions and performances

3 The cover and connectors should work properly without any interference

4 All screws should be tightened up appropriately

5 All gaps on the surface are appropriately

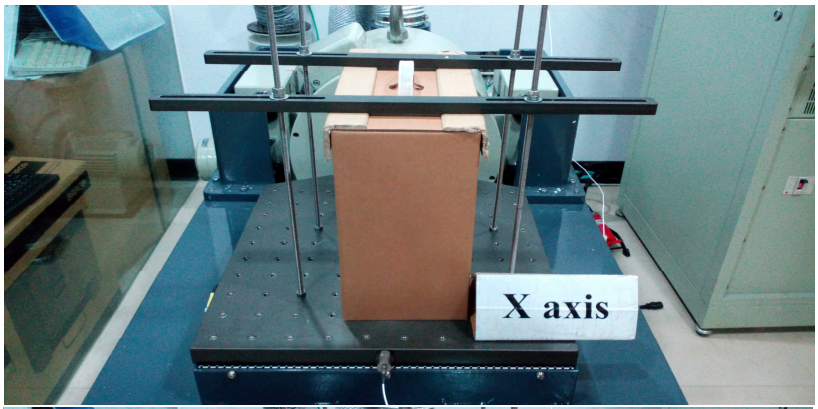
6 The assembling / disassembling of the system enclosure must be smooth and no deformed parts should be found

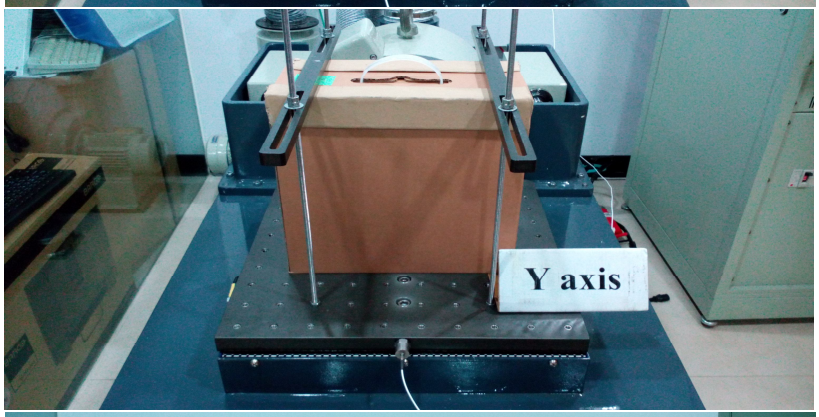
Test result：There is no damage in electronic and mechanical functions.

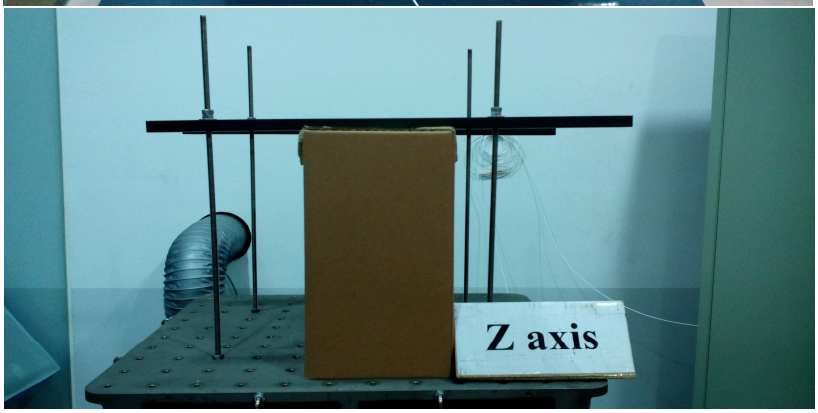
Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture：







Package Drop Test

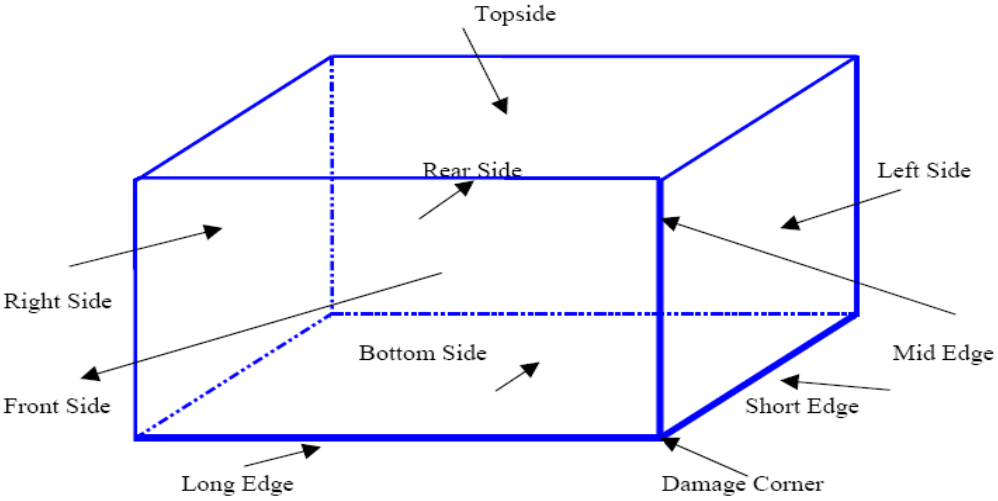
DMR Task Number T25403-00
版本 A1

Test Engineer	Jeffery	Date	2014/10/17	Result	Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Package Drop Test

Test Standard：
Reference ISTA 2A, Method : IEC-60068-2-32 Test:Ed
Test Ea : Drop Test

Test Condition：
1 Test phase : One corner, three edges, six faces
2 Test high : 96.5cm
3 Package weight : 2.6 Kg
4 Test drawing

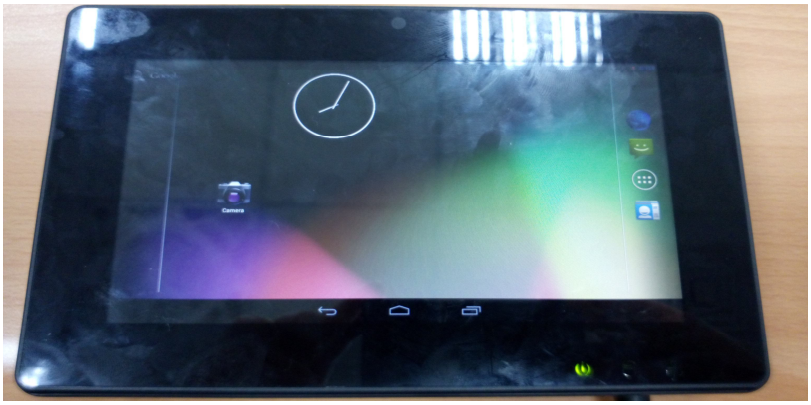


Test equipment：
Drop test machine
J.T.M Tech.
Model : JTM-1775

Performance criteria：
1 All system functions must be checked with appropriate testing programs and should pass the inspection
2 There should be no abnormalities, which couldn't affect the product specified functions and performances
3 The cover and connectors should work properly without any interference
4 All screws should be tightened up appropriately
5 All gaps on the surface are appropriately
6 The assembling / disassembling of the system enclosure must be smooth and no deformed parts should be found

Test result：
There is no damage in electronic and mechanical functions.
Degradation has no been found.
Performance is maintained with no incurable physical damage or degradation.

Test picture：



Misuse Test

DMR Task Number T25403-00
版本 A1

Test Engineer	Jeffery		2014/10/17		Pass
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

Purpose: To evaluate whether the functions are maintained in a stable condition after the product is implement misuse test.

Conditions: Perform all types of misuses including the following which could take place in operation.

1) Simultaneous operation
2) Opposite operation
3) Halfway operation
4) Incomplete operation
5) Procedure omission
6) Wrong procedure

1-1 Turn on the system and press any two keys simultaneous until system into OS.
1-2 Turn on the system and press mouse right and left keys simultaneous until system into OS.
1-3 Turn on the system and press touch panel simultaneous until system into OS.

2 Opposite operation
2-1 PS/2 keyboard connector connect with PS/2 mouse then power on and boot into the OS.
2-2 PS/2 mouse connector connect with PS/2 keyboard then power on and boot into the OS.
2-3 Audio line out connector connect with MIC then turn on system and play music file.
2-4 Cash drawer cable RJ11 connect to RJ45 connector then power on and boot into the OS.

3 Halfway
3-1 Directly turn off power at system starting boot up into OS.
3-2 Insert devices at system starting boot up.
3-3 Removed devices at system executing closing.

4 Incomplete operation

4-1 Insert power cord to power supply socket incompletely then perform the on/off test.
4-2 Insert devices to specified connector incompletely then power on and boot into OS.

5 Procedure omission
5-1 Directly power off without OS shutdown rule.
5-2 Adapter with DC output then directly plug to system DC jack and boot up system ten times.

6 Wrong procedure

6-1 System mode is S5 then press and hold push button until system stop operation.

6-2 System mode is S0 then press and hold push button until system stop operation.

Judgment Criteria:

The product shall operate normally and no any damage after the test.

Item	sub-Item	Device	Manufacture /PN	Test stage	Result	Note/Issue ID
Simultaneous operation	1-1	Keyboard		DVT	Pass	
	1-2	Mouse		DVT	Pass	
	1-3	Touch		DVT	Pass	
Opposite operation	2-1	Mouse		DVT	NA	
	2-2	Keyboard		DVT	NA	
	2-3	Audio		DVT	Pass	
	2-4	RJ45	RJ11 cable	DVT	Pass	
Halfway	3-1			DVT	Pass	
	3-2	USB Key/Mous		DVT	Pass	
	3-3	USB Key/Mous		DVT	Pass	
Incomplete operation	4-1			DVT	Pass	
	4-2	USB Key/Mous		DVT	Pass	
Procedure omission	5-1			DVT	Pass	
		19V		DVT	Pass	
		24V		DVT	NA	
Wrong procedure	6-1			DVT	Pass	
	6-2			DVT	Pass	

Short Test

DMR Task Number T25403-00

版本 A1

Test Engineer	Jeffery	2014/10/17		Pass
Model name	RITY8R1			
PCB version	A02			
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz			
OS	Android 4.3			
Kernel Version	3.0.35			
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)			
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)			
Adapter	FSP090-DMAB1 19V 4.74A 90W			

Purpose: To check that there is no risk of fire or electric shock in abnormal situations caused by the failure of an internal component of the product.

Conditions: Environment：25℃± 2℃ ambient Humidity：60 ± 10% RH

Test Procedure:

1 Adjust the serial port DC output to +5V by jumper cap.
2 Turn on the test item and startup into the OS
3 Perform the short test +5V to GND
4 Adjust the serial port DC output to +12V by jumper cap, then repeat step 2 and 3.
5 Turn on the test item and startup into the OS
9 Turn on the test item and startup into the OS
10 Turn on the test item and startup into the OS
11 Perform the DC IN short test. (DC IN power supply only)

Judgment Criteria:

1 There must be no danger of fire.
2 It must not catch fire.
3 It must not produce smoke. (If the product is equipped with a protective device, smoke is allowed in an amount not exceeding that produced by the burning end of a cigarette for 10 seconds.)
4 Solder must not have been melted by heating of components.
5 The case must not deform from the generated heat.
6 The product must not present a danger of electric shock.

Test item	Nunber	Result ststement	Test stage	Result	Note/Issue ID
USB port	USB1	No danger of fire	DVT	Pass	
	USB2	No danger of fire	DVT	Pass	
DC IN	19V	System shutdown	DVT	Pass	

Thermal and Capacitor Life time Calculation

DMR Task Number 0

版本 0

Test Engineer	James		2014/11/5	Result	Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

$$Lx = Lo \times 2^{(To - Tx)/10} \times 2^{(\Delta To - \Delta Tx)/5}$$
$$= Lo \times 2^{(105 - Tx)/10} \times 2^{(5 - \Delta Tx)/5}$$

Where: Lx = Lifetime (hours) of the capacitor to be estimated
Lo = Base lifetime (hours) of the capacitor described in the specification sheet
To = Maximum rated operating temperature
Tx = Actual ambient temperature (ºC) of the capacitor within device
(This is not the environment temperature of the device, but the environment temperature of the capacitor that has been placed within the device.)
ΔTo = Rise (ºC) in core temperature of the capacitor due to rated (permissible) maximum ripple current.

Life Time Estimation Formula on PX/PXA/PS/PSA series Capacitors

$$Lx = Lo \times 10^{(To - Tx)/20}$$
$$= 2000 \times 10^{(105 - Tx)/20}$$

Where: Lx = Lifetime (hours) of the capacitor to be estimated
Lo = Base lifetime (hours) of the capacitor described in the specification sheet ; **2000hours for PX/PXA/PS/PSA series**
To = Maximum rated operating temperature ; 105ºC for PX/PXA/PS/PSA series
Tx = Actual ambient temperature (ºC) of the capacitor within device
(This is not the environment temperature of the device, but the environment temperature of the capacitor that has been placed within the device.)

$$\Delta Tx = (Ts - Tx) \times Kc$$

Where: Ts = Surface temperature (ºC) of the case
Tx = Actual ambient temperature (ºC) of the capacitor
Kc = Coefficient standing for the ratio of the ΔTx to the (Ts - Tx)
For the Kc's, refer to the table below:

Kc :

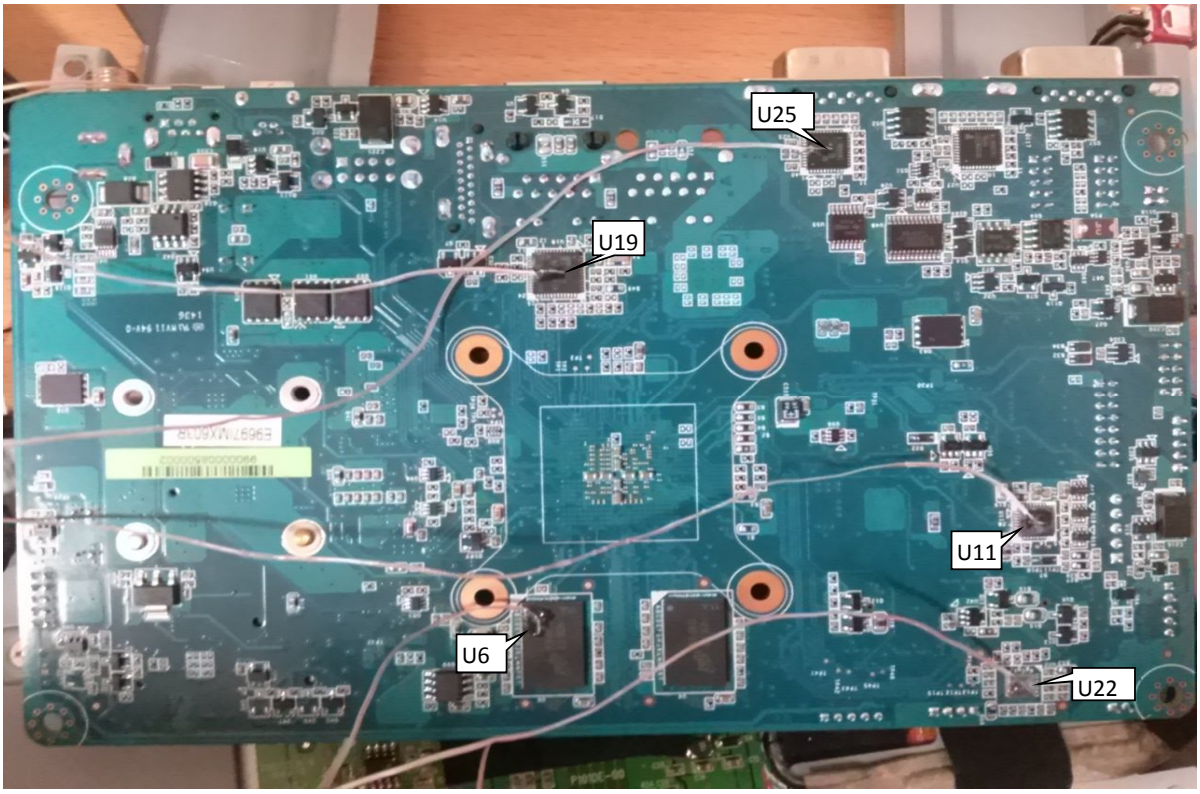
Capacitor diameter (mm)	φ5- φ8	φ10	φ12.5	φ16	φ18
Kc	1.10	1.15	1.20	1.25	1.30

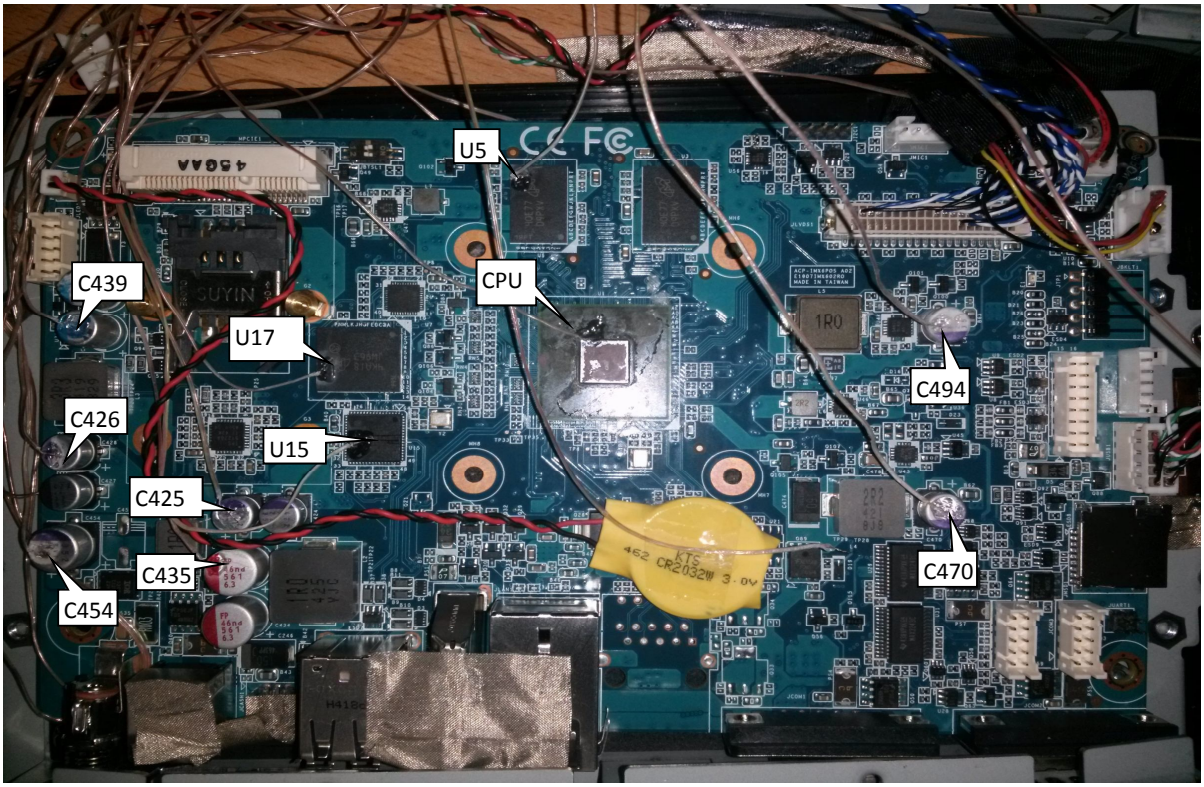
Test procedure： 1. Room Temperature Thermal and Capacitor Life time Calculation & battery , Panel , Inverter or Converter

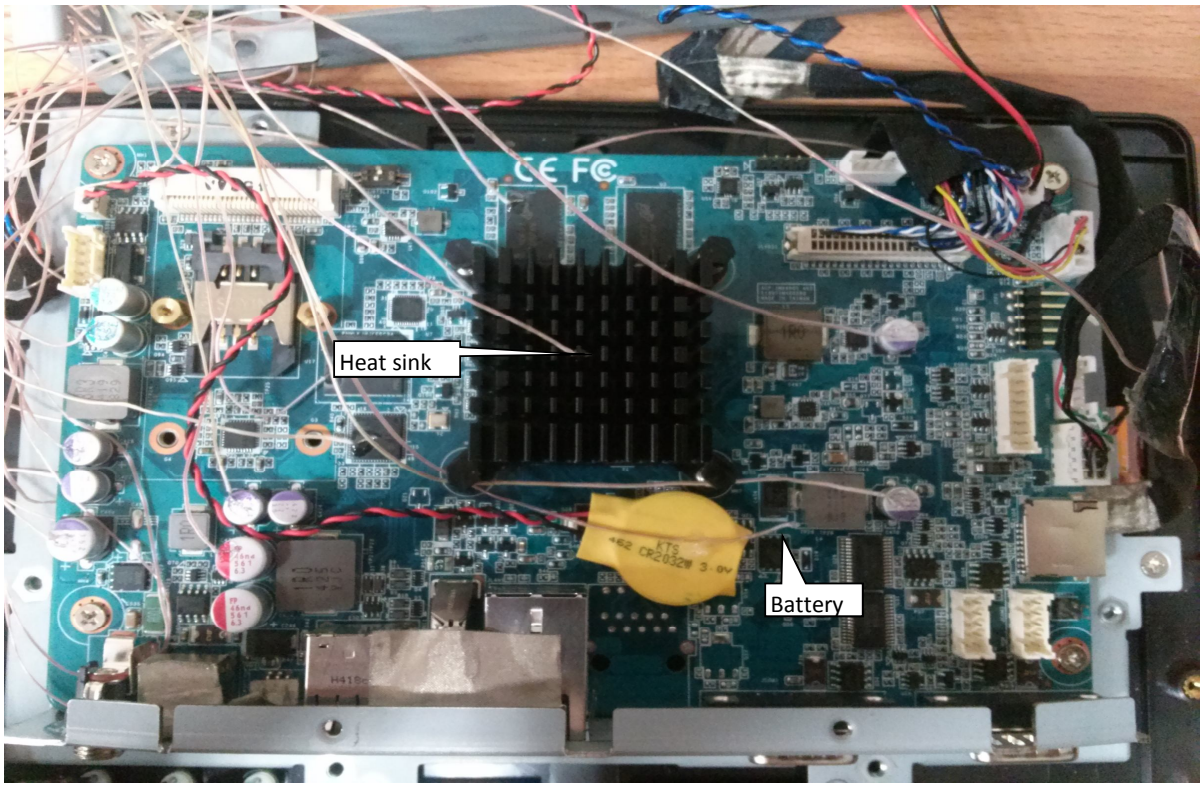
Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
25℃	C425	C426	C435	C439	C454	C470	C494
Ts(℃)	55.40	52.10	54.70	51.60	51.00	52.60	52.90
Tx(℃)							
Lo(hours)	5000	5000	2000	5000	5000	5000	5000
Kc							
ΔTx(℃)							
Lx(hours)	1509976	2207852	654681	2338676	2505936	2084347	2013585
Life(years)	172.37	252.04	74.74	266.97	286.07	237.94	229.86
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

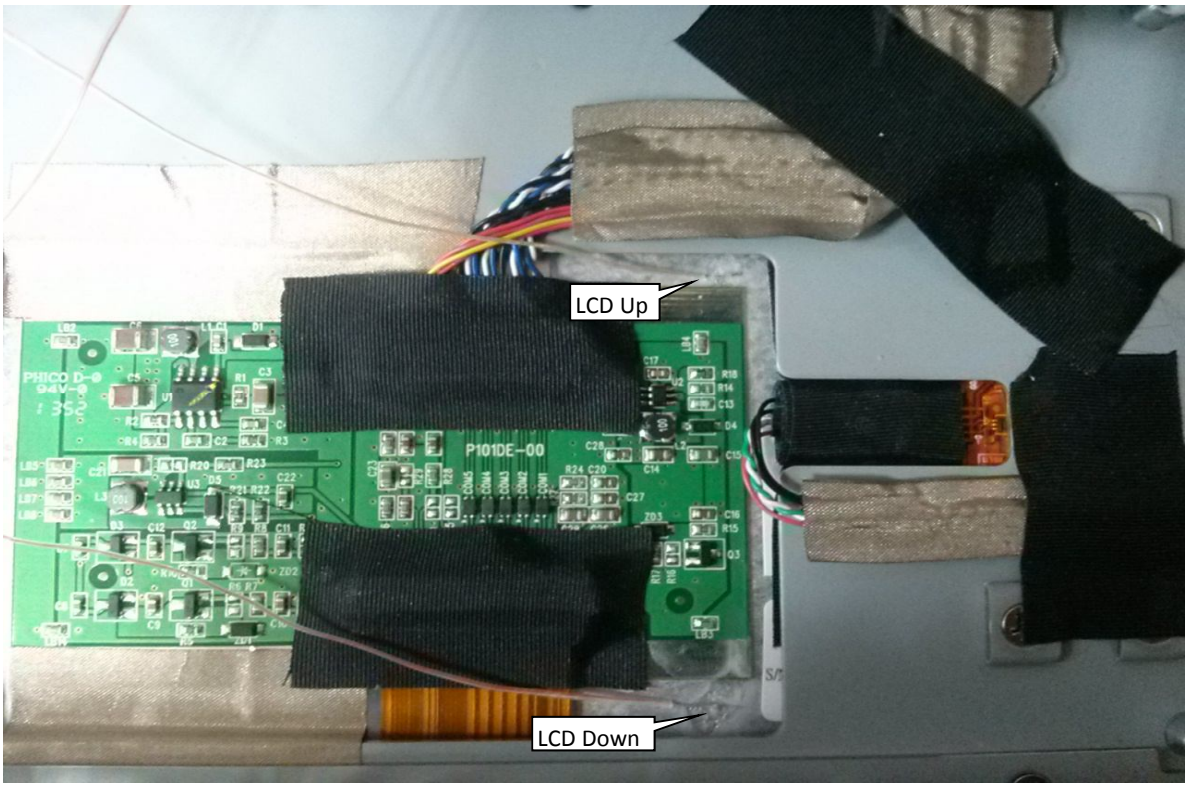
Chamber	Freescale iMX6 Quad 1G Hz	Micron DDR3	Micron DDR3
25℃	U56	U5	U6
SPEC(Tc)	105 (Tj)	95.00	95.00
Ts	63.50	58.20	57.40
SPEC - Ts	41.50	36.80	37.60
Result	Pass	Pass	Pass

Chamber	SMSC USB2517-JZX	Micron emmc 4G	Micrel KSZ9031RNXCA	PenMount 6000-6001017 Ver.6.0.0	Wolfson WM8962BECSN/R	LCD UP	LCD Down	Battery	Heat sink
25℃	U15	U17	U19	U11	U22				
SPEC(Ta)	70.00	85.00	70.00	85.00	85.00	80.00	80.00	60.00	
Ts	65.60	57.80	59.50	51.80	50.80	44.40	45.80	52.40	61.40




U5
C439
CPU
U17
C494
C426
U15
C425
C435
C470
C454


Heat sink
Battery


LCD Up
LCD Down
P101DE-00

Thermal and Capacitor Life time Calculation

DMR Task Number 0

版本 0

Test Engineer	James		2014/11/5	Result	Pass
Test Configuration					
Model name	RITY8R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Quad CPU 1GHz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 2GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP090-DMAB1 19V 4.74A 90W				

$$Lx = Lo \times 2^{(To - Tx)/10} \times 2^{(\Delta To - \Delta Tx)/5}$$
$$= Lo \times 2^{(105 - Tx)/10} \times 2^{(5 - \Delta Tx)/5}$$

Where: Lx = Lifetime (hours) of the capacitor to be estimated
Lo = Base lifetime (hours) of the capacitor described in the specification sheet
To = Maximum rated operating temperature
Tx = Actual ambient temperature (ºC) of the capacitor within device
(This is not the environment temperature of the device, but the environment temperature of the capacitor that has been placed within the device.)
ΔTo = Rise (ºC) in core temperature of the capacitor due to rated (permissible) maximum ripple current.

Life Time Estimation Formula on PX/PXA/PS/PSA series Capacitors

$$Lx = Lo \times 10^{(To - Tx)/20}$$
$$= 2000 \times 10^{(105 - Tx)/20}$$

Where: Lx = Lifetime (hours) of the capacitor to be estimated
Lo = Base lifetime (hours) of the capacitor described in the specification sheet ; **2000hours for PX/PXA/PS/PSA series**
To = Maximum rated operating temperature ; 105ºC for PX/PXA/PS/PSA series
Tx = Actual ambient temperature (ºC) of the capacitor within device
(This is not the environment temperature of the device, but the environment temperature of the capacitor that has been placed within the device.)

$$\Delta Tx = (Ts - Tx) \times Kc$$

Where: Ts = Surface temperature (ºC) of the case
Tx = Actual ambient temperature (ºC) of the capacitor
Kc = Coefficient standing for the ratio of the ΔTx to the (Ts - Tx)
For the Kc's, refer to the table below:

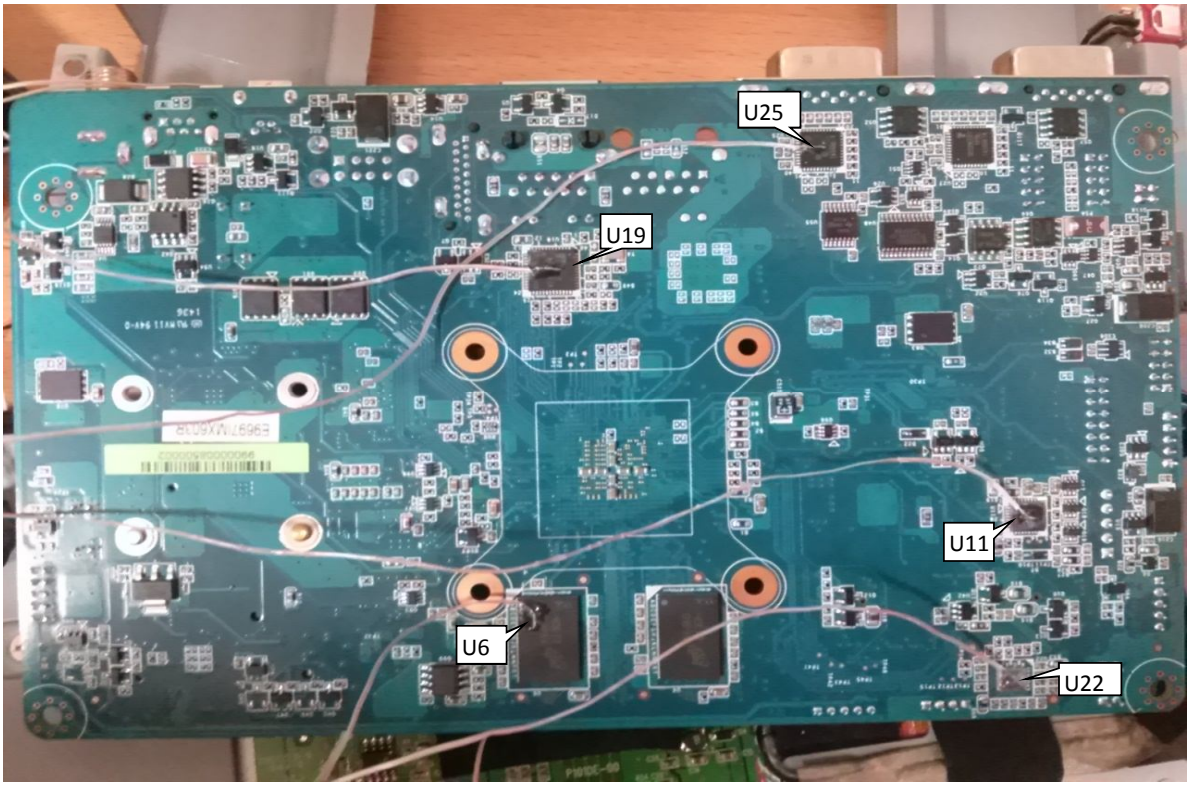
Kc :

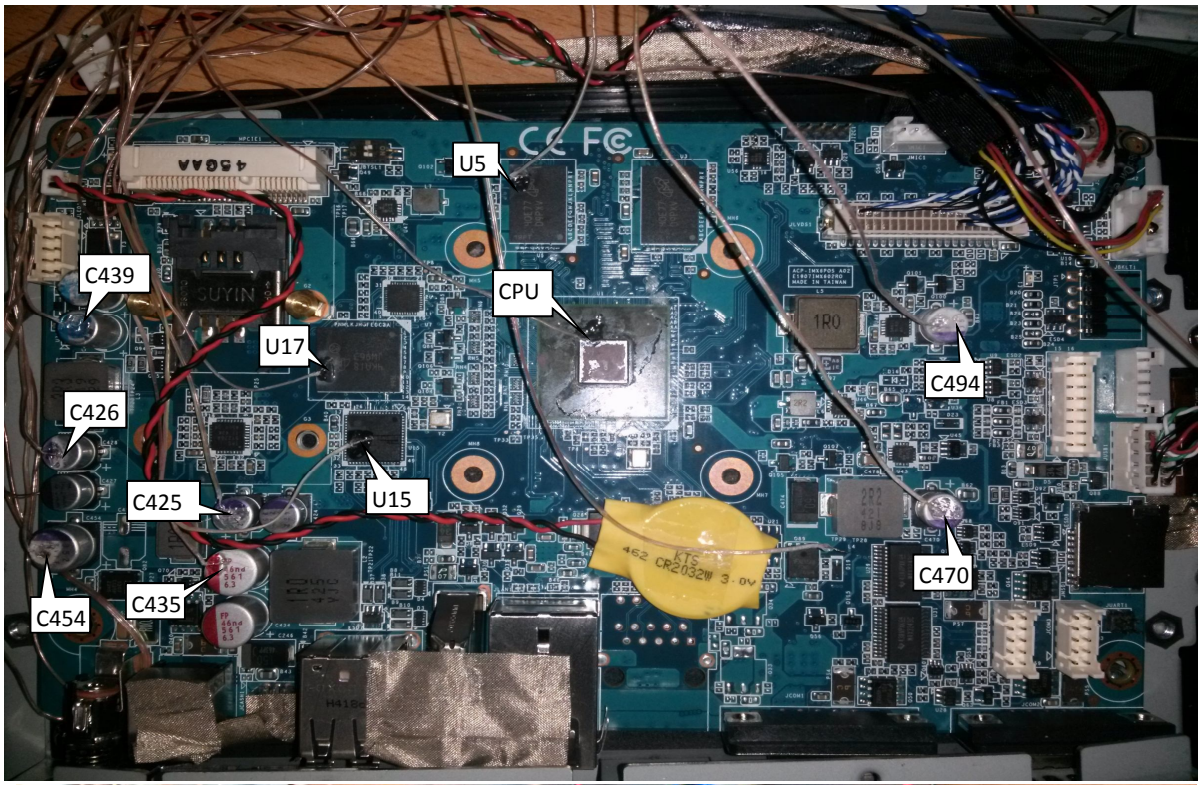
Capacitor diameter (mm)	ϕ5- ϕ8	ϕ10	ϕ12.5	ϕ16	ϕ18
Kc	1.10	1.15	1.20	1.25	1.30

Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
40℃	C425	C426	C435	C439	C454	C470	C494
Ts(℃)	65.20	63.00	64.40	65.10	62.80	61.70	76.80
Tx(℃)							
Lo(hours)	5000	5000	2000	5000	5000	5000	5000
Kc							
ΔTx(℃)							
Lx(hours)	488619	629463	214304	494277	644125	731089	128520
Life(years)	55.78	71.86	24.46	56.42	73.53	83.46	14.67
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Chamber	Freescale iMX6 Quad 1G Hz	Micron DDR3	Micron DDR3
40℃	U56	U5	U6
SPEC(Tc)	105 (Tj)	95.00	95.00
Ts	75.60	70.10	69.30
SPEC - Ts	29.40	24.90	25.70
Result	Pass	Pass	Pass

Chamber	SMSC USB2517-JZX	Micron emmc 4G	Micrel KSZ9031RNXCA	PenMount 6000-6001017 Ver.6.0.0	Wolfson WM8962BECSN/R	LCD UP	LCD Down	Battery	Heat sink
40℃	U15	U17	U19	U11	U22				
SPEC(Ta)	70.00	85.00	70.00	85.00	85.00	80.00	80.00	60.00	
Ts	66.20	57.80	69.00	64.10	63.40	56.60	57.30	60.00	70.10




U5
C439
CPU
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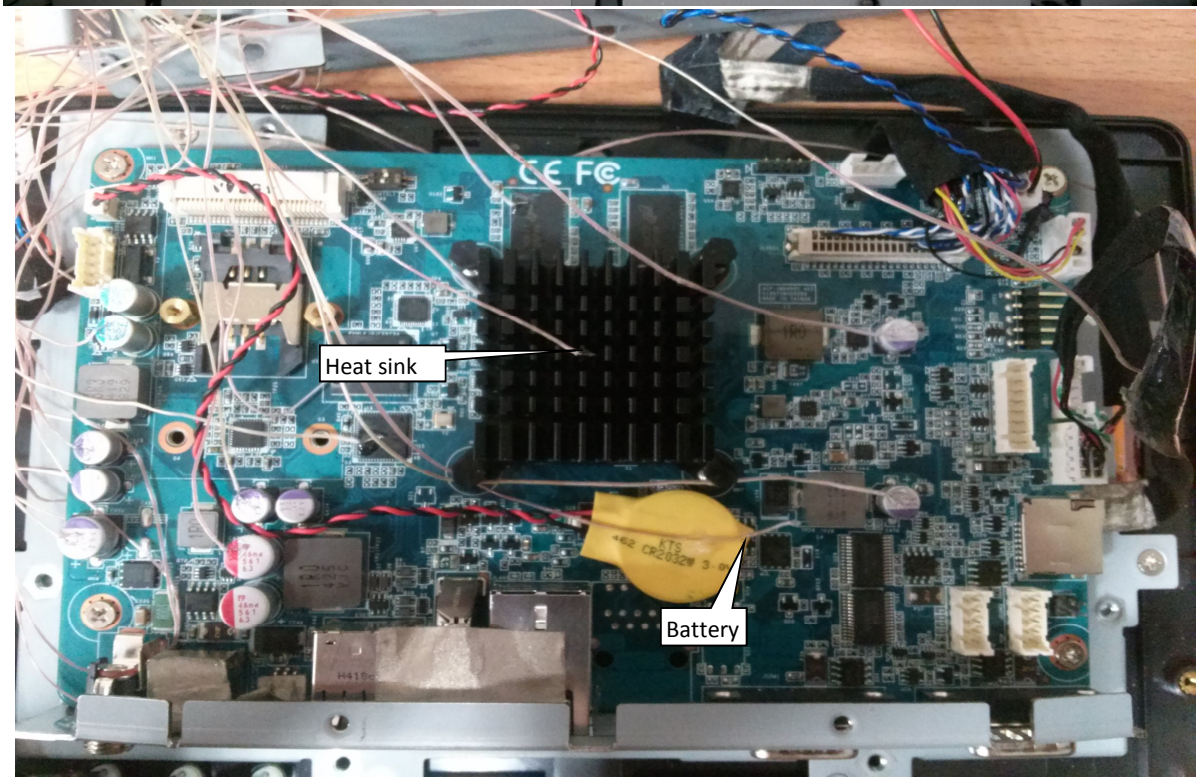
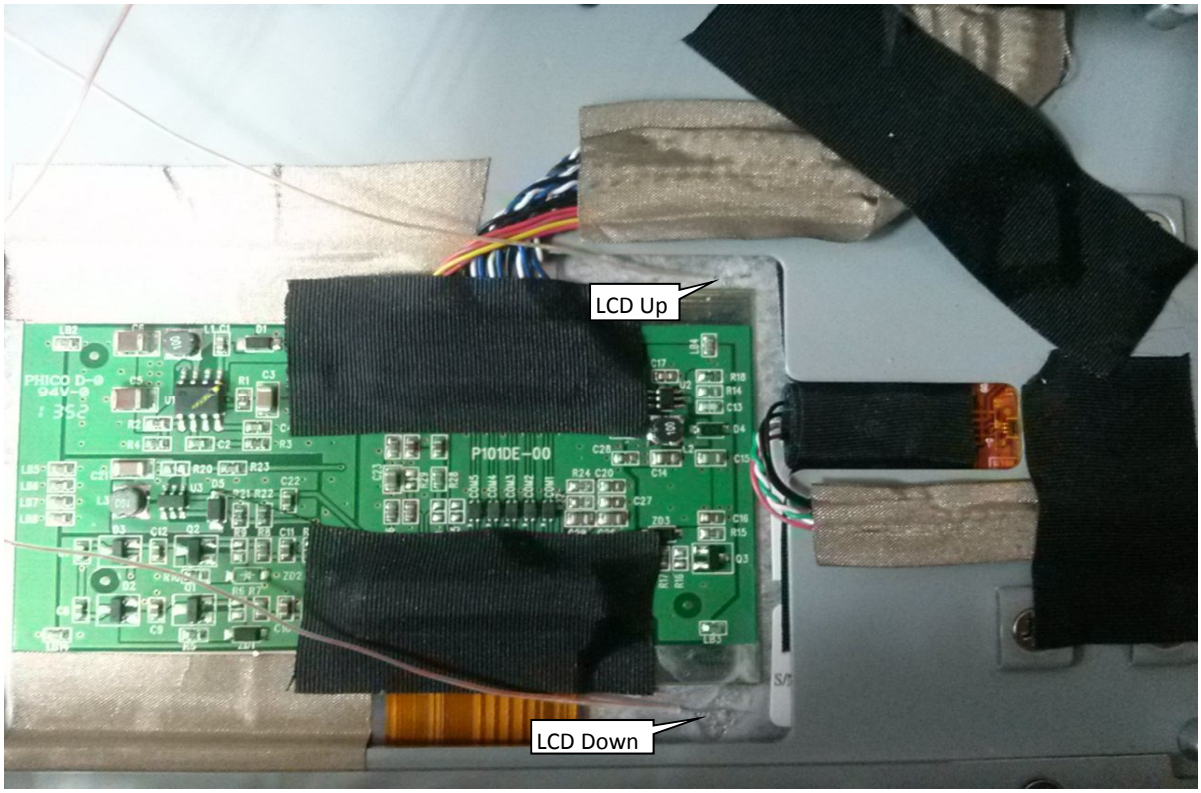

Heat sink
Battery


LCD Up
P101DE-00
LCD Down