RITY15R

Design Verification Report

Initiated by	Jeffery Chen	**Job Title**	Senior Engineer	**Originate Date**	2015/5/7
Reviewed by	Max Chen	**Job Title**	Supervisor	**Revision**	QQ4-037 Rev.A7
Approved by	Simon Lin	**Job Title**	Manager	**DMR Task Number**	T28699-00
				Version	A1

Product Information

DMR Task Number T28699-00

Version A1

	Test Unit Information		
Model	RITY15R		
Description	N/A		
PCB version	A1		
OS	Android 4.4.2		
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	Penmount 6000		
LCD Panel Model	15" CMI G150XGE-L04 C4		
Storage Size	Micron eMMC 4GB		
Internal Memory Size	Onboard Up to 1GB(Dual Lite) or 2GB(Quad) DDR3 1066/1333 SDRAM		

Product image

Summary

DMR Task Number T28699-00
Version 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	**Pass**
	Power Margin test	DC power source Upper / Middle / Low limit test	**Pass**
	AC Power Margin test	AC power source Upper / Middle / Low limit test	**Pass**
	Power interruption test	100/200/500/1000ms	**Pass**
	Display Compatibility Test	Check Display Clone & Extend mode	**Limit.**
	LAN Compatibility Test	Check LAN Function	**Pass**
	USB Compatibility Test	Check USB Function	**Pass**
	Stress test	LAN Stress test	**Pass**
	Room temperature Power on/off test	Room temperature / 4000times	**Pass**
	High Temperature Test	45℃ IEC 60068-2-2 Test:Bb / 24 hrs	**Pass**
	Low Temperature Test	-5℃ IEC 60068-2-1 Test:Ab / 24 hrs	**Pass**
	Temperature cycle test	High temperature 45℃ RH95% / Low temperature -5℃ IEC 60068-2-14 Test:N / 6 cycles	**Pass**

Power on cycle test	-5℃ / 1000times IEC 60068-2-1 Test:Ab	**Pass**
	45℃ / 1000times IEC 60068-2-2 Test:Bb	**Pass**
Storage test	-5℃24hrs 60℃ / RH95% 24hrs IEC 60068-2-3 Test:C	**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 : CF or SSD	**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		
System Features	Freescale i.MX6 Cortex-A9 Dual lite/Quad 1GHz CPU	
	4~8GB eMMC	
	Up to 1GB or 2GB DDR3 SDRAM	
	Dual Display (LVDS + VGA(Quad core only) or LVDS+HDMI)	
	Optional Dual GLAN	
	Support Cash Drawer (12V/24V)	
	12~24V DC input	
	Support 2x RS232/422/485, 2x USB	
	I2C RTC Intersil ISL1208IB8Z	
	USB Touch Controller Penmount6000	
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	Dual lite
CPU Cooler (Type)	NA	N/A
Memory	Onboard 4~8GB eMMC, Up to 1GB(Dual Lite) or 2GB(Quad) DDR3 1066/1333 SDRAM	1GB(Dual Lite)
Power Supply	NA	N/A
Adapter	DC 12V power input by Power 3.5mm DC Jack	V
System Fan	Fanless	V
Microphone	Option	N/A
Speaker	On back x2 (per channel 2W)	V
Camera	Supported optional	N/A
Wireless LAN	Supported optional	N/A
Bluetooth	Supported optional	N/A
Operating System	Linux : Linux Kernel 2.6.x & 3.0.x Android 4X	Android 4.4.2
Expansion Card	NA	N/A
Other Component	NA	N/A
Storage		
Floppy Disk Drive	NA	N/A
Hard Disk Drive	NA	N/A
Optical Disk Drive	NA	N/A
Solid State Drive	NA	N/A
Other Stoage Device	Mini SD	N/A
Panel		
LCD Panel	15" CMI G150XGE-L04 C4 1024 x 768	V
LCD Control Board	Panel built in	V
B/L Inverter/Converter	Panel built in	V
Touch Screen	5-wires Resistive / PCT	5-wires Resistive
Touch Controller	PenMount6000	V
Others	NA	N/A
External I/O		
PS/2 KB & Mouse	NA	N/A
Serial Port	x2	V
Parallel Port	NA	N/A
USB Port	USB Type A Double Deck x1	V
1394 Port	NA	N/A
PCMCIA Port	NA	N/A

DIO Port	NA	N/A
Video Port	HDMI x1	V
Audio Port	NA	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	NA	N/A
Mechanical		
Power Type	DC 12-24V power input	V
Power Connector Type	3.5mm DC Jack	V
Dimension	362.1mm x 290.08mm x 51mm	V
Weight	6.02 kgs	V
Color	Black /White	V
Fanless	Yes	V
Others		N/A
Reliability		
EMI Test	CE/FCC/VCCI : Class B	N/A
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℃	V
Operating Humidity	0% ~ 90% Relative Humidity, Non-condensing	V
Storage Temperature	-5~60℃	V
Other Test	NA	V

LED indicator check

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	OS	Note
☐		
☑	**Android 4.4.2**	
☐		

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	Result	Note
Power LED indicator (LED indicator must be in the darkroom confirmation)	Power on LED color check	Pass	
	Power LED Dark for system off	Pass	Can't have Micro-Light lamp
	Power LED Light for system turn on	Pass	
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	
Ethernet LED indicator	Data Rate , Off => 10Mbits/sec	Pass	
	Data Rate , Green => 100Mbits/sec	Pass	
	Data Rate , Orange => 1000Mbits/sec	Pass	
	Link / ACT , Off => not established	Pass	
	Link / ACT , Yellow Off => established	Pass	
	Link / ACT , Yellow Blinking => activity	Pass	LED flash is too fast when transmitting data

Basic Function

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Version A1

Test Engineer	Jeffery	**Date :**	**2014/5/5**	**Result**	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

Subject	Test Item	Result	Note
Video Function	*.WMA	N/A	
	*.H.264	Pass	
	*.MP4	Pass	
Audio Function	*.MP3	Pass	
	Microphone	N/A	
	Speaker adjust volume	Limit	*
	Alarm Colock volume	Limit	*
LAN Function	Turn On/Off	N/A	
	Network notification	N/A	
	Download file from internet	Pass	
WiFi	Connect to internet	N/A	
RFID	Can read RFID card	N/A	
Smart Card reader	Can read smart card	N/A	
Camera	Take picture 10 times	N/A	
	Take video 2 minutes	N/A	
Light Sensor	Brightness Level	Pass	
	Suspend mode	N/A	
G-Sensor	X、Y Reverse Test (90° 、180° 、360°)	N/A	
Speaker	Remove memory then power on, there is warning beep from Buzzer (Speaker)	N/A	
	Mini Volume	Pass	
	Max Volume	Pass	
Miss Operation	Power off suddenly while OS is booting up.	Pass	
	Reset system while OS is booting up.	N/A	
USB Port 1	Auto detect (for all channels)	Pass	
	Hot plug function is normal (for all channels)	Pass	
	System information is correct	Pass	
	Read/Write test (Copy 1GB file(s))	Pass	Test data by eMMC size
	USB 2.0 Removable Devices	Pass	
	Remove & Increase USB Device	Pass	
	USB Keyboard / USB Mouse / USB HDD	Pass	

USB Port 2	Auto detect (for all channels)	Pass	
	Hot plug function is normal (for all channels)	Pass	
	System information is correct	Pass	
	Read/Write test (Copy 1GB file(s))	Pass	Test data by eMMC size
	USB 2.0 Removable Devices	Pass	
	Remove & Increase USB Device	Pass	
	USB Keyboard / USB Mouse / USB HDD	Pass	
USB Port 3	Auto detect (for all channels)	Pass	
	Hot plug function is normal (for all channels)	Pass	
	System information is correct	Pass	
	Read/Write test (Copy 1GB file(s))	Pass	Test data by eMMC size
	USB 2.0 Removable Devices	Pass	
	Remove & Increase USB Device	Pass	
	USB Keyboard / USB Mouse / USB HDD	Limit	**
USB Port 4	Auto detect (for all channels)	Pass	
	Hot plug function is normal (for all channels)	Pass	
	System information is correct	Pass	
	Read/Write test (Copy 1GB file(s))	Pass	Test data by eMMC size
	USB 2.0 Removable Devices	Pass	
	Remove & Increase USB Device	Pass	
	USB Keyboard / USB Mouse / USB HDD	Limit	**
OTG Port	Function Check	Pass	
HDMI Port	Display function	Pass	
	Audio output	Pass	
VGA Port	Display function	N/A	
Cash drawer Port	Open	Pass	
	Close	Pass	
	Status	Pass	
COM 1	Function Check for RS-232	Pass	
	Function Check for RS-422	Pass	
	Function Check for RS-485	Pass	
COM 2	Function Check for RS-232	Pass	
	Function Check for RS-422	Pass	
	Function Check for RS-485	Pass	

* The volume can't be adjust when inserting HDMI Cable

** Sometimes can't detecting USB 3.0 devices

Performance

DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date :	2015/5/6		Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

Application	Test Item	Mbps	Note
NetIQ Chariot 8.0 Throughput	Maximum	333.337	
	Minimum	8.214	
	Average	222.464	
Application	**Test Item**	**Score**	**Note**
AnTuTu Benchmark 5.1	System	11751	
	Multitask	2325	
	Runtime	943	
	CPU (multi-thread) integer	624	
	CPU (multi-thread) float-point	763	
	CPU (single thread) integer	805	
	CPU (single thread) float-point	893	
	RAM Operation	694	
	RAM Speed	845	
	Storage I/O	619	
	Database I/O	495	
	2D Graphics Test	573	
	3D Graphics Test	2172	1024x768
Performance test lite 1.4	CPU Test	7.4	
3D Mark Ice Storm 1.2	Ice Storm Extreme	743	
	Graphics	609	
	Phyaics	3224	
	Graphics test1 (FPS)	3.4	
	Graphics test2 (FPS)	2.2	
	Phyaics test (FPS)	10.2	

Power Consumption

DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date :	2015/1/14		Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

Testing Software (MAX. load)

1 *Runing H.264 1080P video*

2 *Stability test CPU+GPU 10 minutes*

****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		
+12V	1.15	0.94	1.07	1	
Total (Watt)	13.8	11.28	12.84		
+12V	1.15	0.94	1.21	2	
Total (Watt)	13.8	11.28	14.52		
+19V	0.78	0.63	0.76	1	
Total	14.82	11.97	14.44		
+19V	0.78	0.63	0.83	2	
Total	14.82	11.97	15.77		
+24V	0.67	0.57	0.64	1	
Total (Watt)	16.08	13.68	15.36		
+24V	0.67	0.57	0.7	2	
Total (Watt)	16.08	13.68	16.8		

Condition	USB Power measurement (mA)						Note / Issue ID
	Voltage (4.75v~5.00v)	Current	Power On			Result	
USB1	4.96	510mA	5.13			Pass	
USB2	4.96	510mA	5.13			Pass	
USB3	4.95	510mA	5.13			Pass	
USB4	4.95	510mA	5.13			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 T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/5/5	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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	11.64	12V	-3%	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

AC Power margin Test

DMR Task Number T28699-00

Ver. A1

Test Engineer	Jeffery	Date	2015/1/15	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

AC Power margin Test

Item	Voltage	Spec	Limit	Test Stage	Result	Note/Issue ID
AC power low limit	90V / 60Hz	100V	-10%	DVT	**Pass**	
	90V / 50Hz	100V	-10%	DVT	**Pass**	
AC power middle value	180V / 60Hz	(upper limit + low limit) /2		DVT	**Pass**	
	180V / 50Hz	(upper limit + low limit) /2		DVT	**Pass**	
AC power upper limit	264V / 60Hz	240V	+10%	DVT	**Pass**	
	264V / 50Hz	240V	+10%	DVT	**Pass**	

1. Adjust AC 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 T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/14	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

Power interruption test

Test Condition：

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

Test time：10 times

Interval time 100ms/200ms/500ms/1000ms

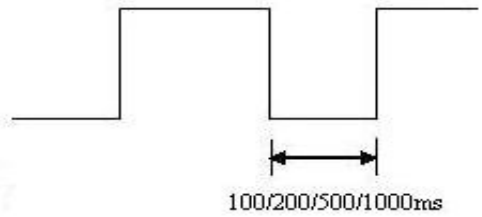
Procedure：

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	FSP060-DBAE1	100ms	AT	DVT	Pass	
		200ms	AT	DVT	Pass	
		500ms	AT	DVT	Pass	
		1000ms	AT	DVT	Pass	
	EDAC EA10723 19V	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 T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/23~2015/1/26	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

Test Condition：

Condition

1 Test temperature : Room temperature

2 Number of test : 4000 times

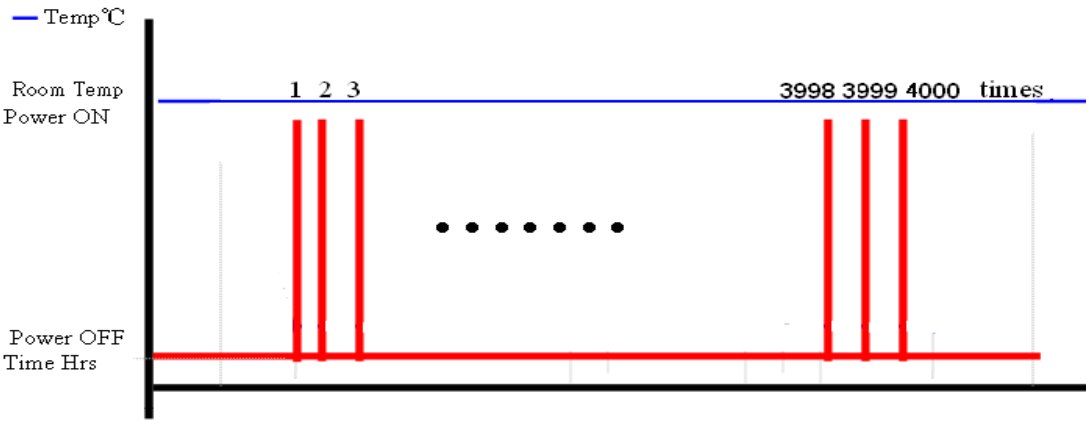
3 Test software : Ubuntu

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：

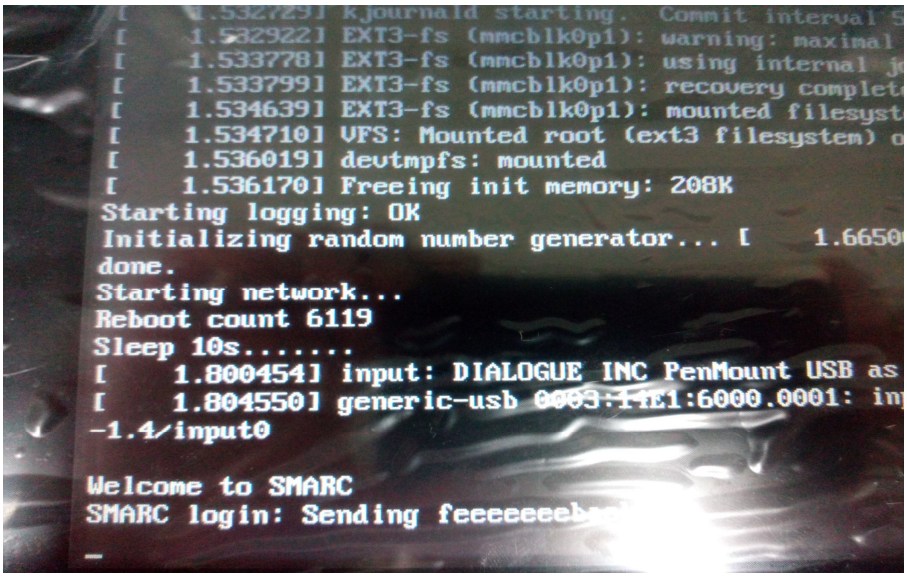
1 All system functions must be checked with appropriate testing programs and should pass the inspection.

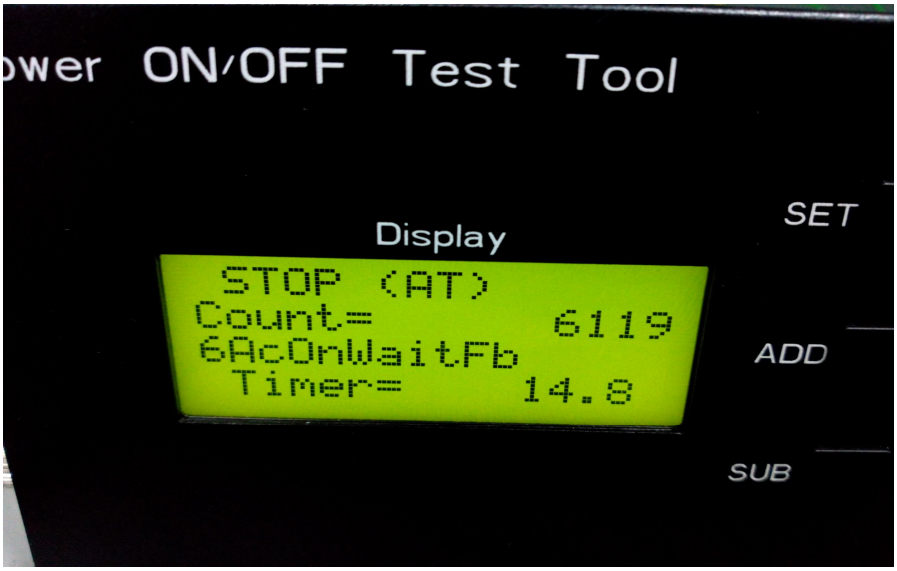
2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

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 T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/19~2015/1/20	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

Test Standard : Reference IEC60068-2-2 Testing procedures

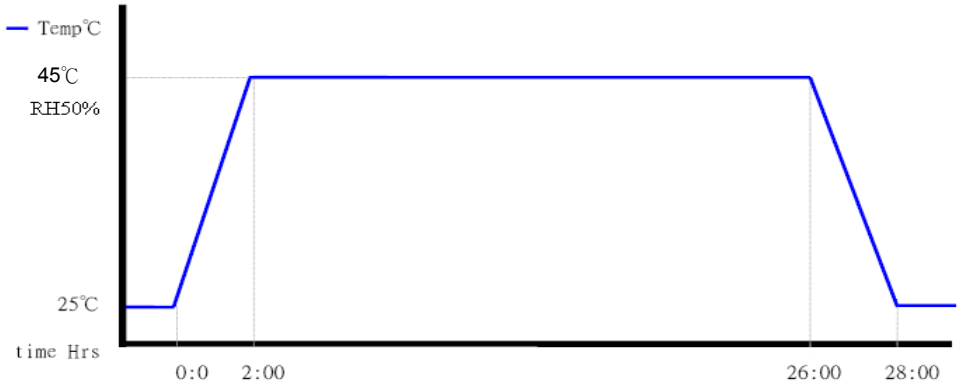
Test Bb : Dry Heat Test

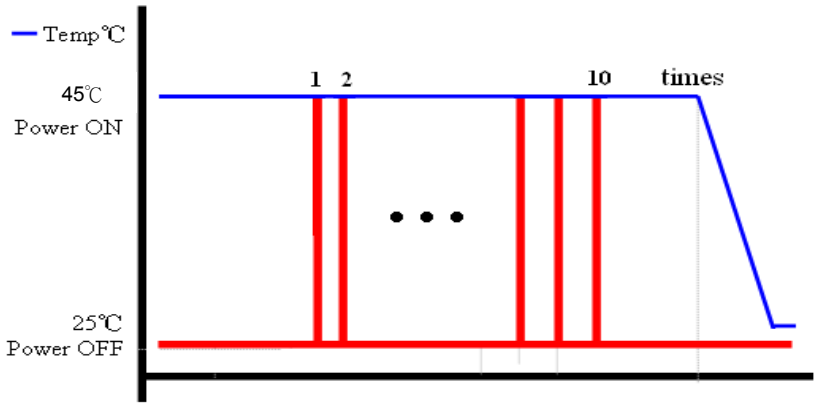
Test Condition : 1 Test Temperature : 45℃

2 Test Time : 24 hours

3 Test software : Stability test CPU+GPU

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 :	2014/12/18	2014/6/26	2014/6/26	2014/12/18

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.

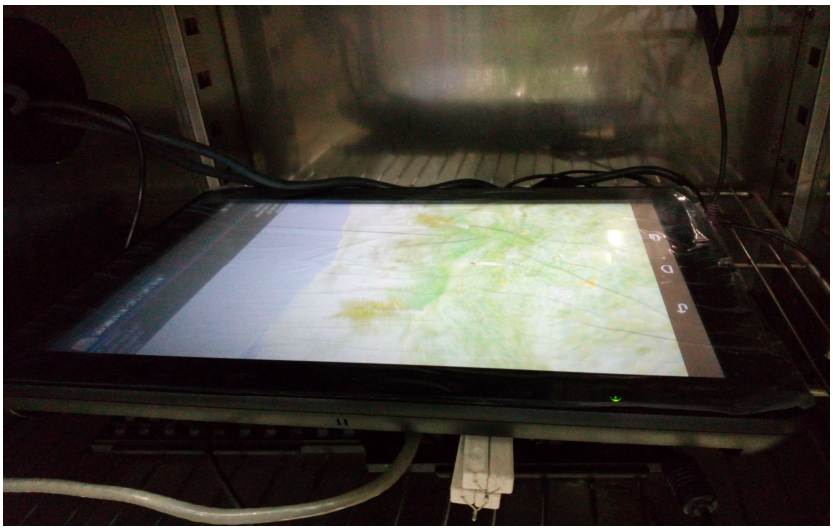
Test result：

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

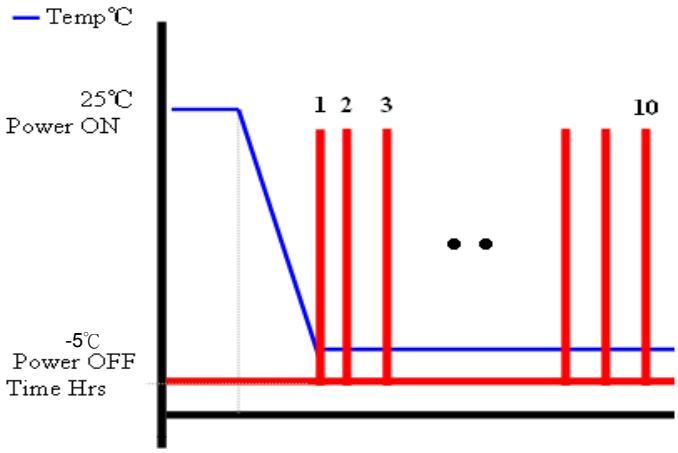
DMR Task Number T28699-00
Version A1

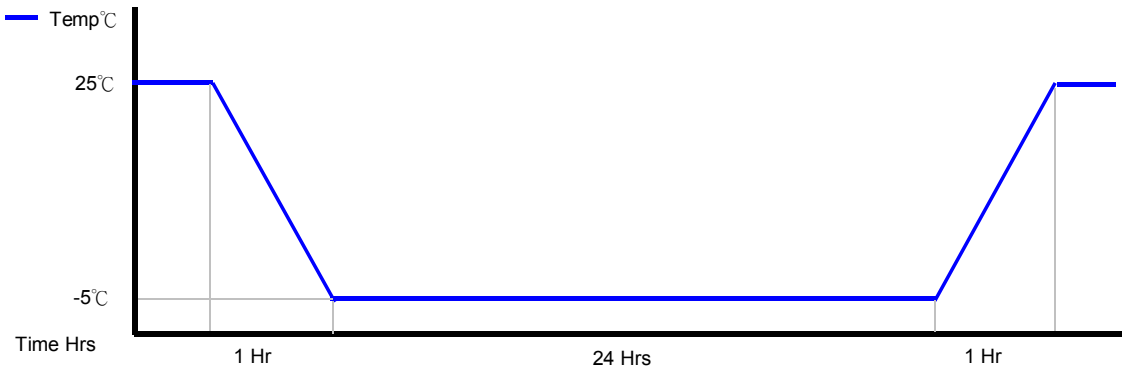
Test Engineer	Jeffery	Date	2015/1/11~2015/1/12	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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 : Stability test CPU+GPU

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 :	2014/12/18	2014/6/26	2014/6/26	2014/12/18

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.

Test result：

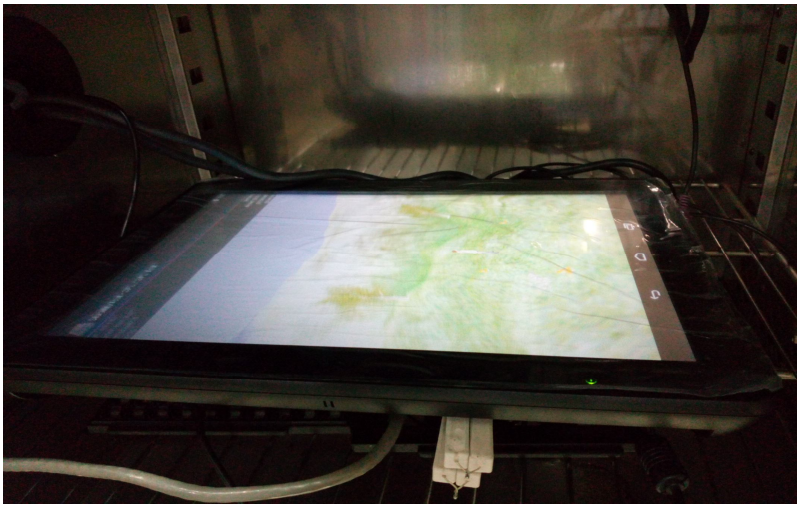
There are should be no " ! " or " ? " mark display at device manager

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 T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/9~2015/1/11	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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℃

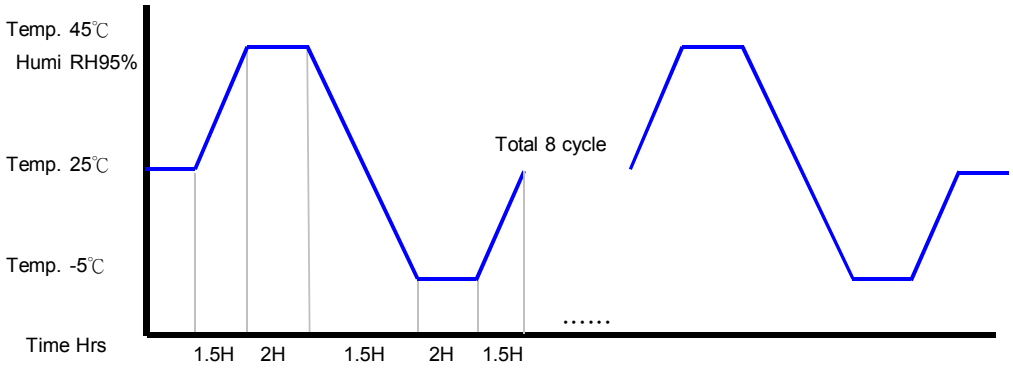
2 Test dwell Time : 2 hours

3 Temperature slope : heating 1 hour, cooling 1 hour

4 Test cycle : 6 cycles

5 Test software : Stability test CPU+GPU

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 :	2014/12/18	2014/6/26	2014/6/26	2014/12/18

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

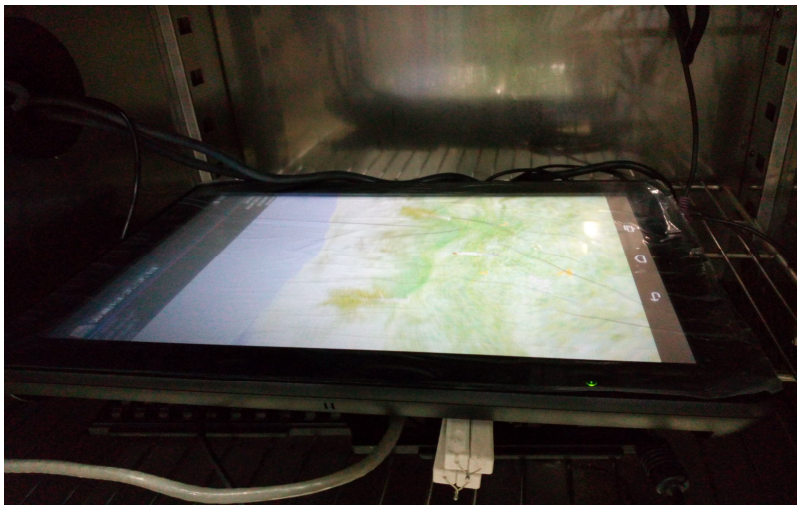
2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

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 T28699-00
Version A1

Test Engineer	Jeffery	**Date**	2015/1/26~2015/1/27	**-5℃ Result**	Pass
Test Configuration				**45℃ Result**	Pass
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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

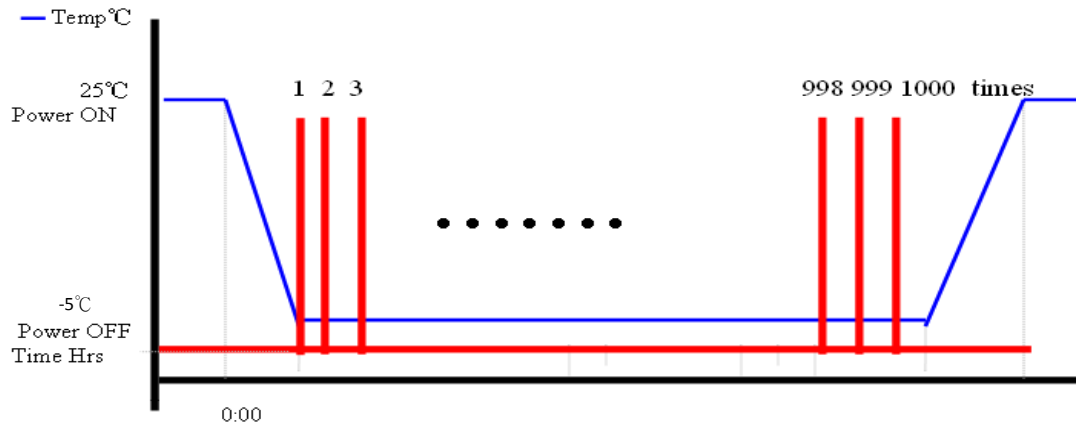
Test Condition：
Condition

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.



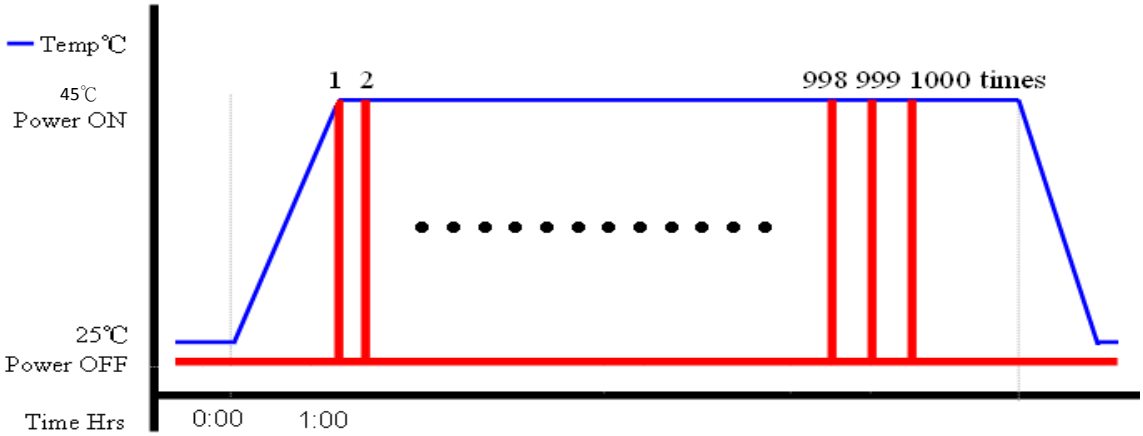
1 Test temperature : 45℃

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 :	2014/12/18	2014/6/26	2014/6/26	2014/12/18

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

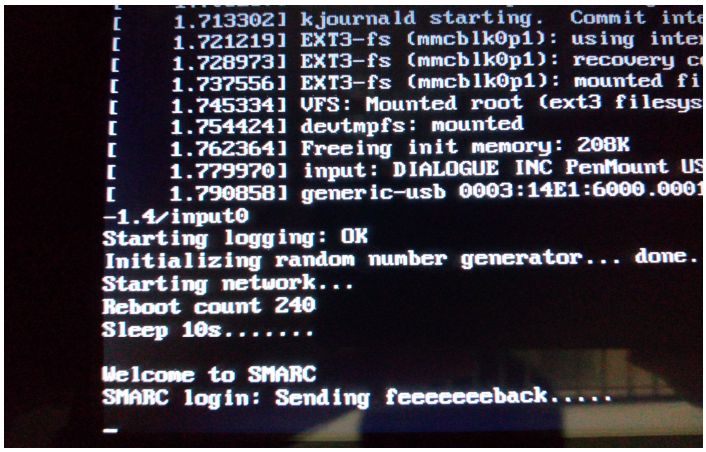
2 There should be no abnormalities, which couldn't affect the product specified functions and performances.

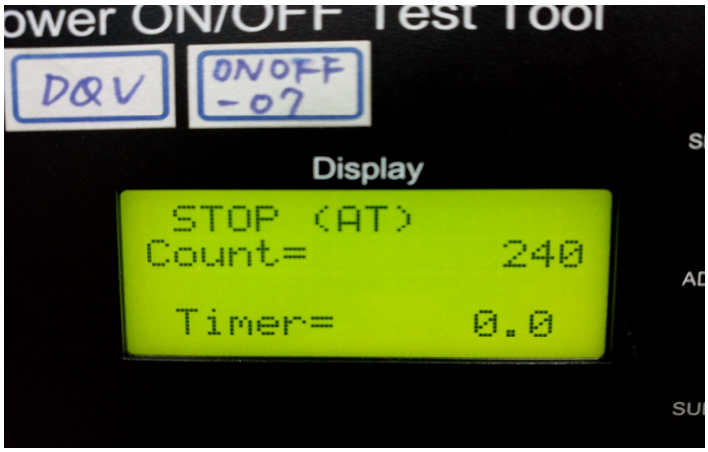
Test result： There is no damage in electronic and mechanical functions.

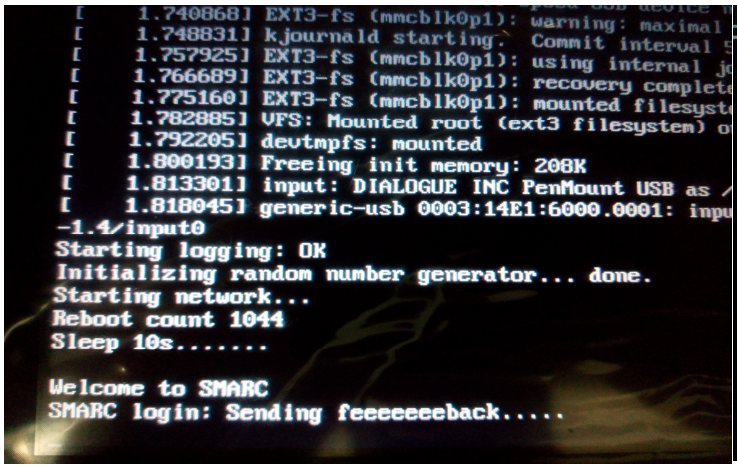
Degradation has no been found.

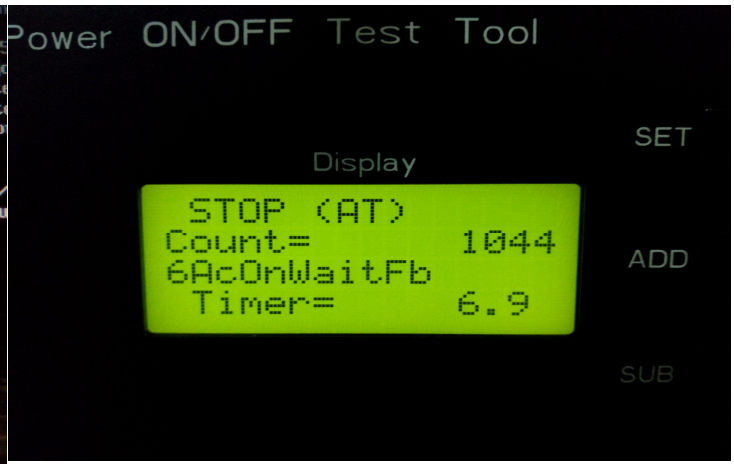
Performance is maintained with no incurable physical damage or degradation.

Test picture：






[1.740868] EXT3-fs (mmcblk0p1): warning: maximal
[1.748831] kjournald starting. Commit interval
[1.757925] EXT3-fs (mmcblk0p1): using internal
[1.766689] EXT3-fs (mmcblk0p1): recovery
[1.775160] EXT3-fs (mmcblk0p1): mounted
[1.782885] VFS: Mounted root (ext3 filesystem)
[1.792205] devtmpfs: mounted
[1.800193] Freeing init memory: 208K
[1.813301] input: DIALOGUE INC PenMount USB as
[1.818045] generic-usb 0003:14E1:6000.0001: inpu
-1.4/input0
Starting logging: OK
Initializing random number generator... done.
Starting network...
Reboot count 1044
Sleep 10s.....
Welcome to SMARC
SMARC login: Sending feeeeeeeback.....


Power ON/OFF Test Tool
SET
Display
STOP (AT)
Count= 1044
6AcOnWaitFb
Timer= 6.9
ADD
SUB

Stress Test

DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/5/5~2015/5/6	Result	Pass
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

LAN Port Stress Test

LAN Port	Testing condition	Test Time(Hours)	Test Stage	Result	Note/Issue ID
LAN 1	High_Performance_Through (Send/Reciive)	12	DVT	Pass	

Display Compatibility Check

DMR Task Number T28699-00

Ver. A1

Test Engineer	Jeffery	Date	2015/1/14	Pass	Fail	Limit.
Test Configuration				12	0	1
Model name	RITY15R					
PCB version	A1					
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz					
OS	Android 4.4.2					
Kernel Version	3.0.35					
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)					
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)					
Adapter	FSP060-DMAE1 12V 5A 60W					

LCD Display Full Screen Check (Clone & Extend Mode Check)

Brand and Model	Signal type	Test Item		Result	Note/Issue ID
LG 23EA53	Digital (HDMI)	System power on initial test		Pass	
		Resolution	1024x768	Pass	
Acer S235HL	Digital (HDMI)	System power on initial test		Pass	
		Resolution	1024x768	Pass	
ASUS VS229HA	Digital (HDMI)	System power on initial test		Pass	
			1024x768	Pass	
ViewSonic VX2433	Digital (HDMI)	System power on initial test		Pass	
			1024x768	Pass	
DELL U2410	Digital (HDMI)	System power on initial test		Pass	
			1024x768	Pass	
DELL 3008WFP	Digital (HDMI)	System power on initial test		Pass	
			1024x768	Pass	

Driver Feature					
Item	Resolution	Comment	Test Stage	Result	Note/Issue ID
2 Display Full Screen Test	LVDS + HDMI		DVT	Limit.	1024x768,Can't full screen
3 Display Full Screen Test	CRT + HDMI		DVT	NA	

LAN Switch Test

DMR Task Number T28699-00

Ver. A1

Test Engineer	Jeffery	Date	2015/1/30	Pass	Fail	Limit.
Test Configuration				7	0	0
Model name	RITY15R					
PCB version	A1					
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz					
OS	Android 4.4.2					
Kernel Version	3.0.35					
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)					
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)					
Adapter	FSP060-DMAE1 12V 5A 60W					

LAN Switch

Testing Points	Pass Critera
1. Connect EUT and PXE server through LAN switch HUB with 100M CAT5e LAN cable *2. Ping 100 times to PXE server with default 65500bytes package size*	*1. Switch/HUB and EUT LAN LED status should be correct* *2. Ping to PXE server properly without any packet lost*

Brand Name	Model	Spec	Result	Note/Issue ID	
HP	J9077A	10 /100/1000Base-T/8-port	Pass		
D-Link	DES-1008D	10 /100 Fast Ethernet /8-port	Pass		
BUFFALO	LSW 10/100-8R	10 /100 Fast Ethernet /8-port	Pass		
CAMEO	EZ-GSW-T24	10/100/1000 24-port	Pass		
3-COM	Super StackII 3C16592A	10 and 100BASE-T 12-port	Pass		
3-COM	Baseline Switch 2024 3C16471	10 and 100BASE-T 24-port	Pass		
3-COM	Super StackII 3C16406	10 BASE-T 24-port	Pass		

USB Devices Compatibility Test

DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/20~2015/1/24	Pass	Fail	Limit.
Test Configuration				14	0	0
Model name	RITY15R					
PCB version	A1					
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz					
OS	Android 4.4.2					
Kernel Version	3.0.35					
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)					
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)					
Adapter	FSP060-DMAE1 12V 5A 60W					

Type	Brand Name	Model	Type	Result	Note/Issue ID
USB keyboard	Microsoft	1366	USB1.1	Pass	
USB Mouse	Microsoft	1113	USB1.1	Pass	
USB Flash	Transcend	Jefflash 700 16GB	USB3.0	Pass	
USB Flash	Transcend	Jefflash V90 2GB	USB2.0	Pass	
USB Flash	Adata	V150 16GB	USB3.0	Pass	
USB HDD	Toshiba	V63700-A 500GB	USB3.0	Pass	
USB HDD	Buffalo	HD-PCF500U3B-AP 500GB	USB3.0	Pass	
USB HDD	WD	WDBACY500ABK-01 500GB	USB3.0	Pass	
USB HDD	HP	HD BD08 1TB	USB3.0	Pass	
USB mouse	Buffalo	BSMBW02	USB1.1	Pass	
USB mouse	Acer	MOBVUO	USB1.1	Pass	
USB Flash	Buffalo	Disk 4000 4GB	USB2.0	Pass	
USB Flash	Toshiba	TDKMediaTrans-It Drive PMAP 16GB	USB2.0	Pass	
USB keyboard	MSI	OTNS-KB730	USB1.1	Pass	

Storage test

DMR Task Number T28699-00
Version A1

Test Engineer		Jeffery	Date	2015/1/16~2015/1/19	Result	Pass
Test Configuration						
Model name	RITY15R					
PCB version	A1					
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz					
OS	Android 4.4.2					
Kernel Version	3.0.35					
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)					
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)					
Adapter	FSP060-DMAE1 12V 5A 60W					

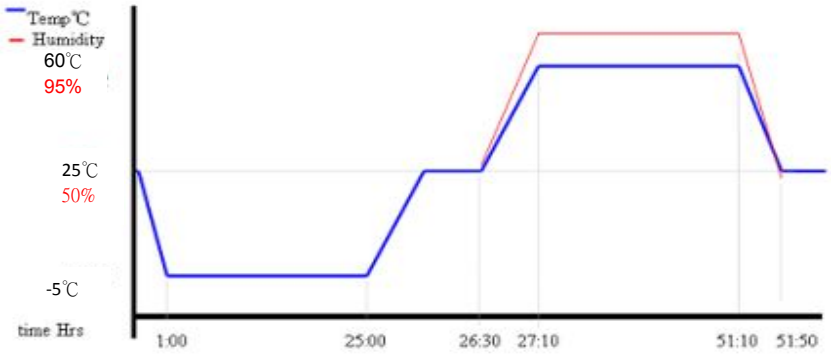
Storage Test

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 :	2014/12/18	2014/6/26	2014/6/26	2014/12/18

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.

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 T28699-00
Version A1

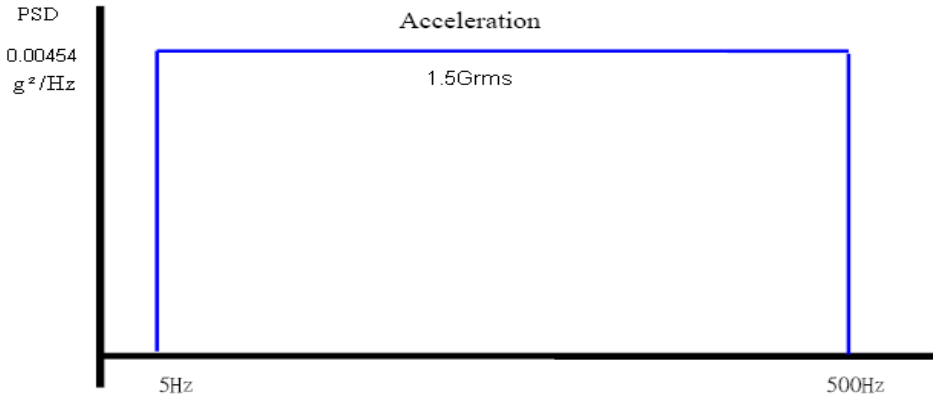
Test Engineer	Jeffery	Date	2015/1/23	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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

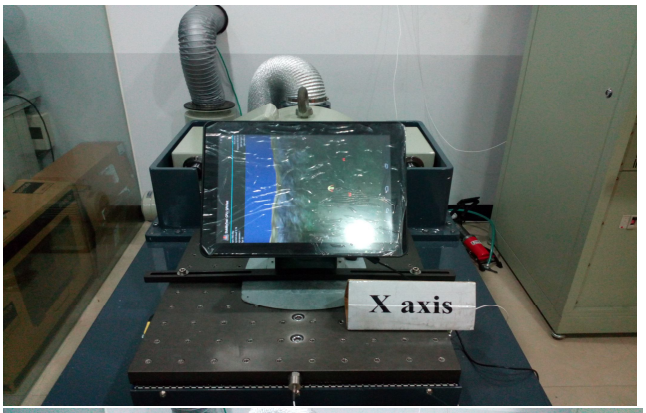
Test result：

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)

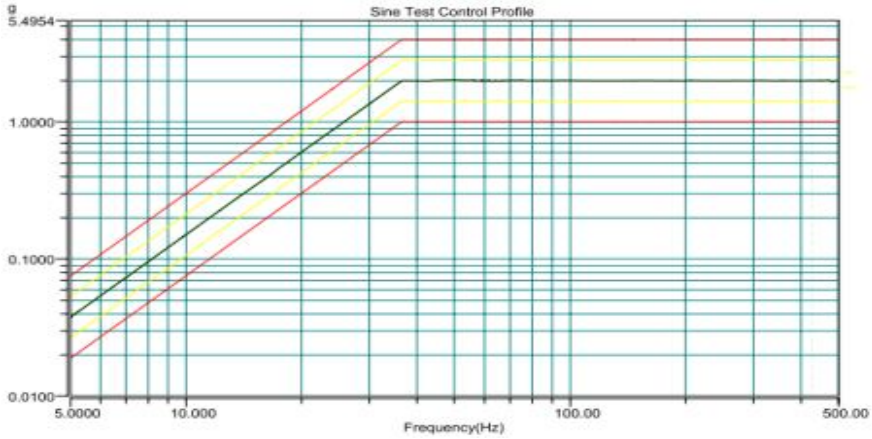
DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/23	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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

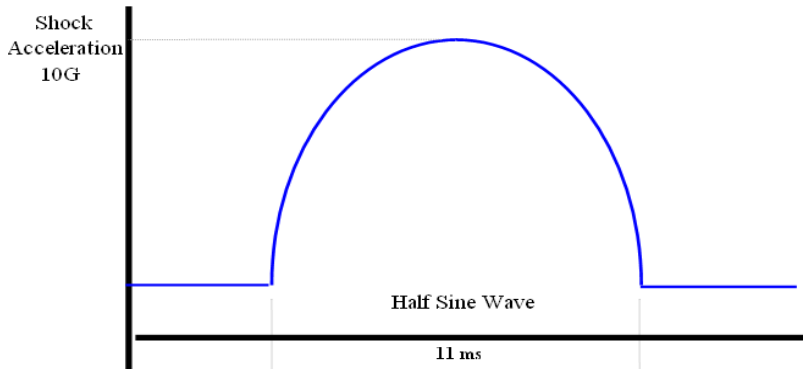
DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/22	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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 T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/12	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

Package Vibration Test

Test Standard：Reference IEC60068-2-64 Testing procedures

Test Fh : Vibration boardband random Test

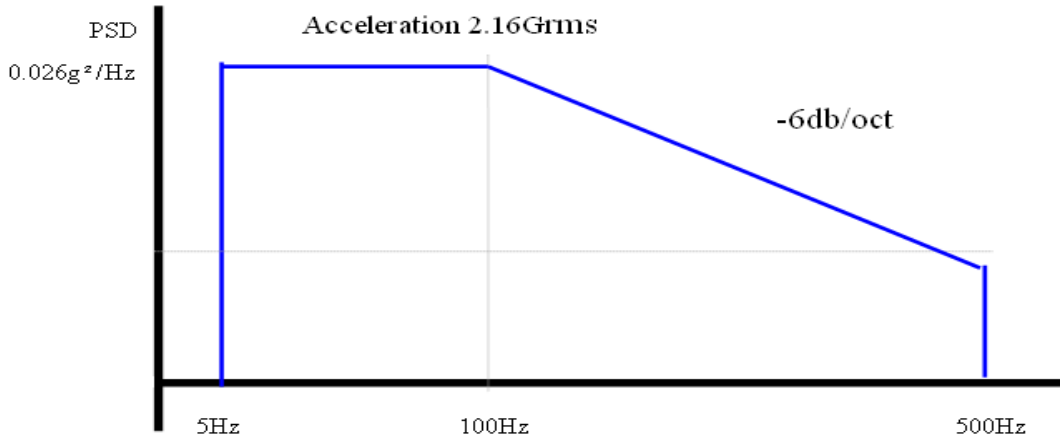
Test Condition：1 Test PSD : 0.026G²/Hz , 2.16 Grms

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

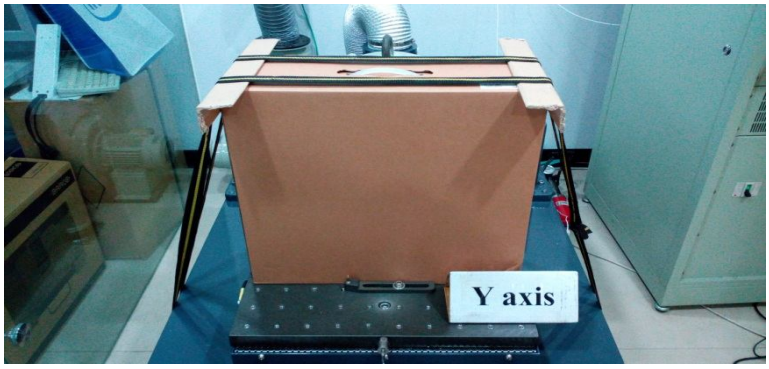
6 The assembling / disassembling of the system enclosure must be smooth and no deformed parts should be found

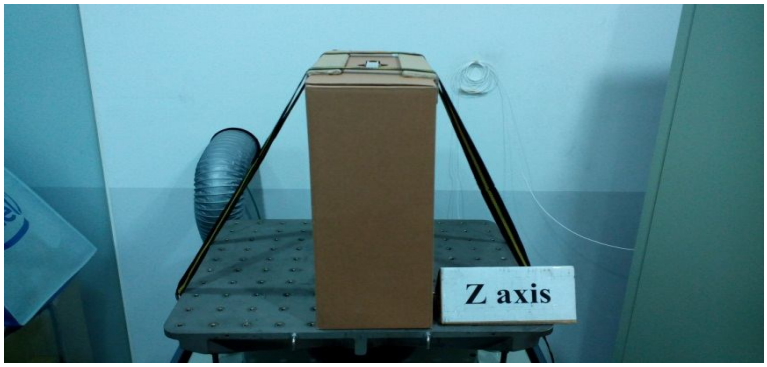
Test result：There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture :





Package Drop Test

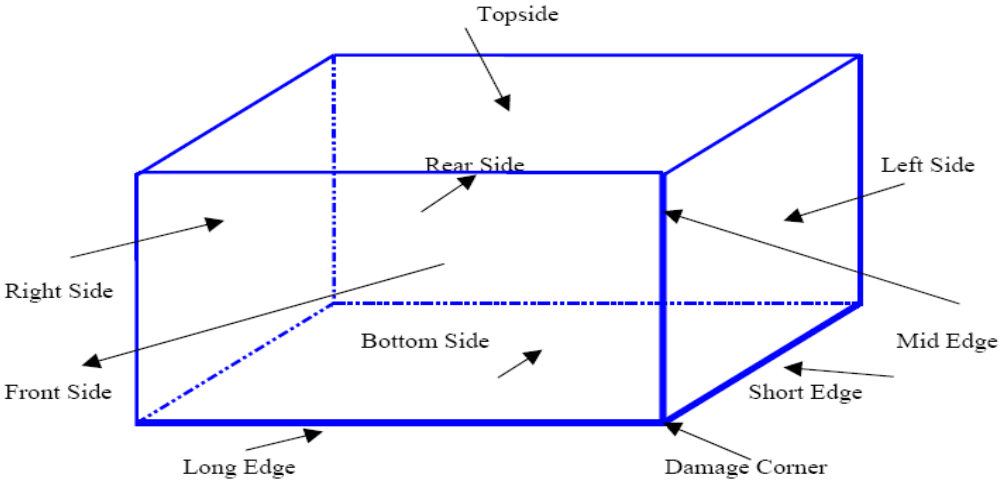
DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/23	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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 : 5.58 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：

Short Test

DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/29	Result	Pass
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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	
	USB3	No danger of fire	DVT	Pass	
	USB4	No danger of fire	DVT	Pass	
DC IN	12V	System shutdown	DVT	Pass	

Misuse Test

DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	**Date**	2015/1/30	**Result**	Pass
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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	NA	
	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	
		12V		DVT	Pass	
		19V		DVT	Pass	
Wrong procedure	6-1			DVT	Pass	
	6-2			DVT	Pass	

Thermal and Capacitor Life time Calculation

DMR Task Number T28699-00
Version A1

Test Engineer	Jeffery	Date	2015/1/22	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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

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.

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

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

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.)

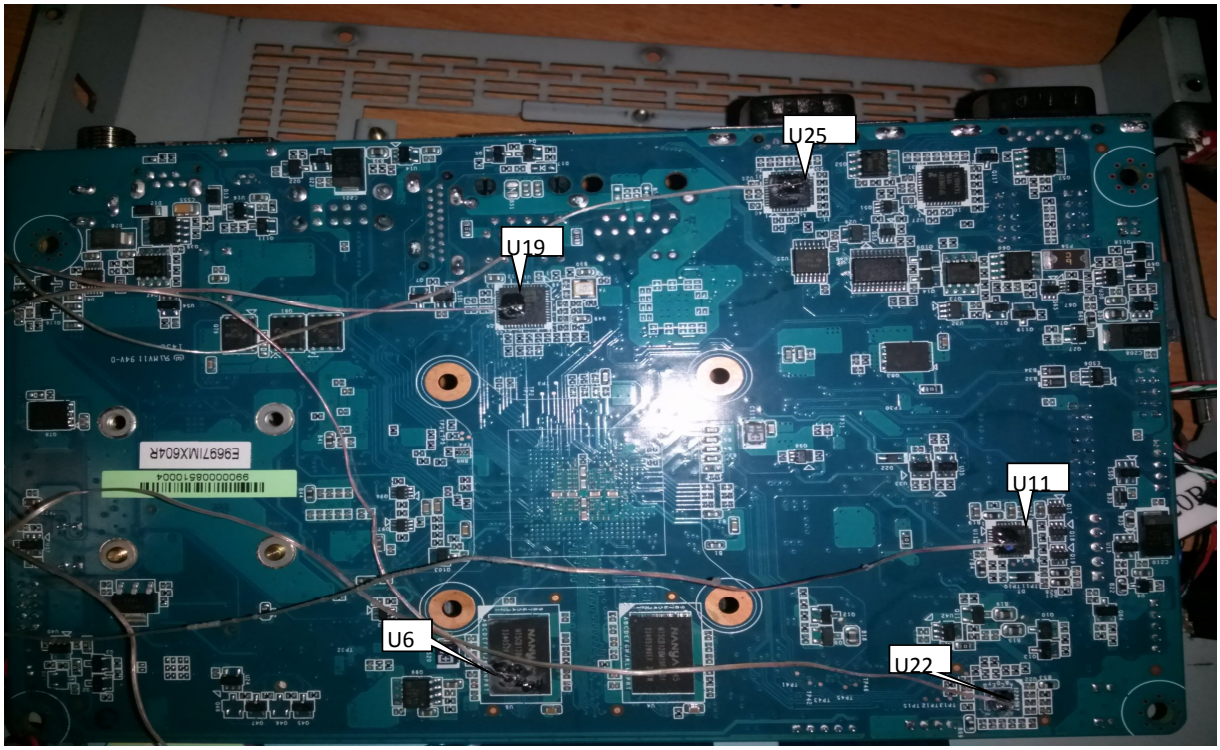
Test procedure : 1. Room Temperature Thermal and Capacitor Life time Calculation & battery , Panel , Inverter or Converter

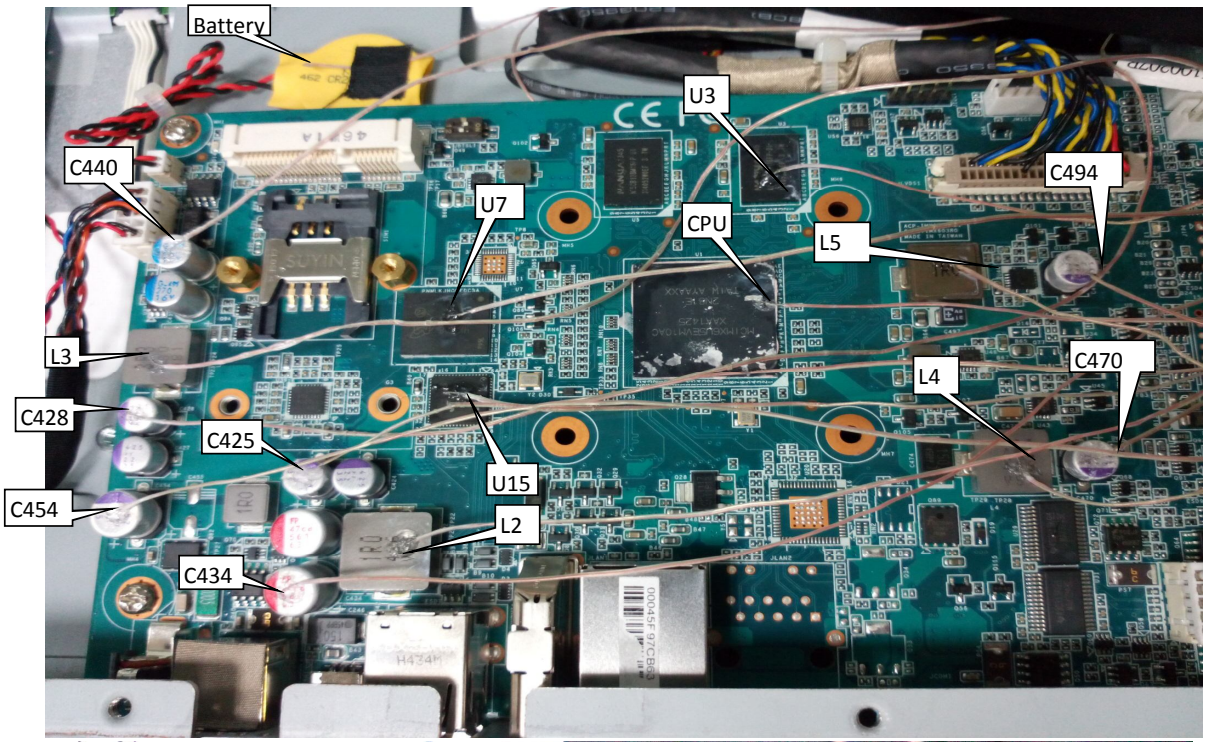
Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
25℃	C425	C428	C434	C440	C454	C470	C494
Ts(℃)	52.10	49.40	26.10	48.00	47.50	50.00	50.50
Tx(℃)							
Lo(hours)	5000	5000	2000	5000	5000	5000	5000
Kc							
ΔTx(℃)							
Lx(hours)	2207852	3012798	17620977	3539729	3749471	2811707	2654422
Life(years)	252.04	343.93	2011.53	404.08	428.02	320.97	303.02
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

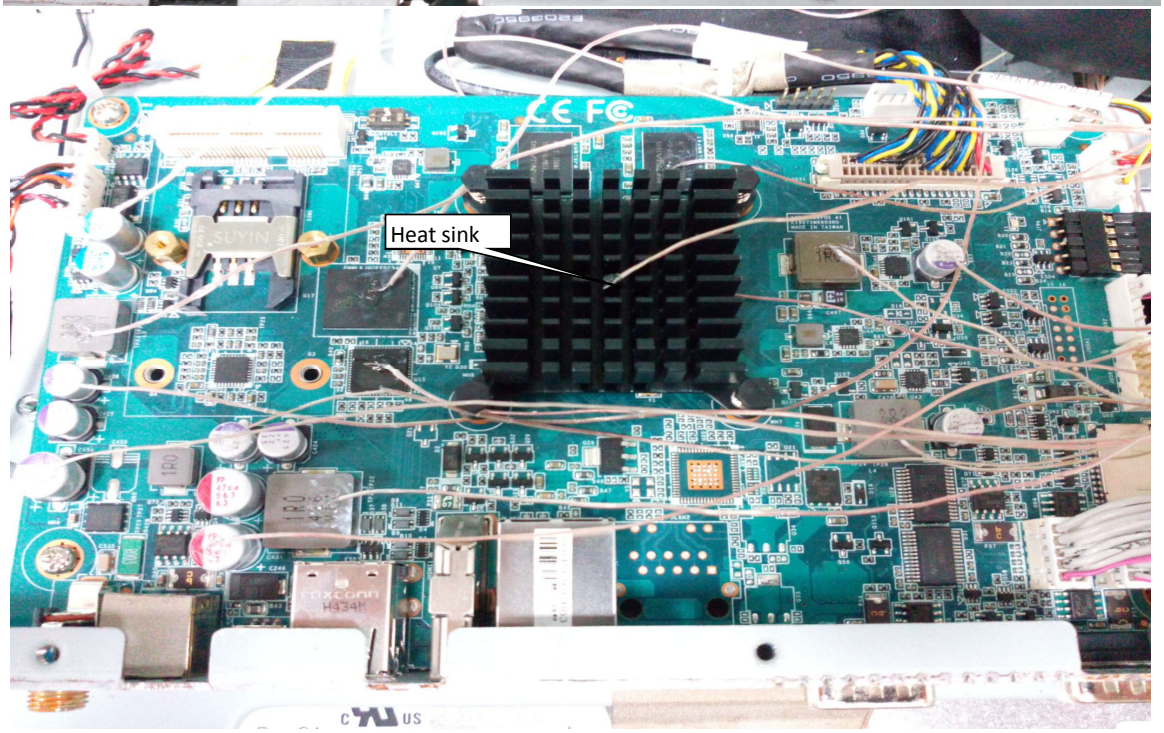
Chamber	Freescale iMX6 Duallite 1G Hz	Micron DDR3	Micron DDR3	1uH/29A	3.3uH/14.5A	2.2uH/12A	3.3uH/14.5A
25℃	U1	U3	U6	L2	L3	L4	L5
SPEC(Tc)	105(Tj)	95.00	95.00	125.00	125.00	125.00	125.00
Ts	63.50	59.70	58.50	57.80	49.40	53.20	54.40
SPEC - Ts	41.50	35.30	36.50	67.20	75.60	71.80	70.60
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

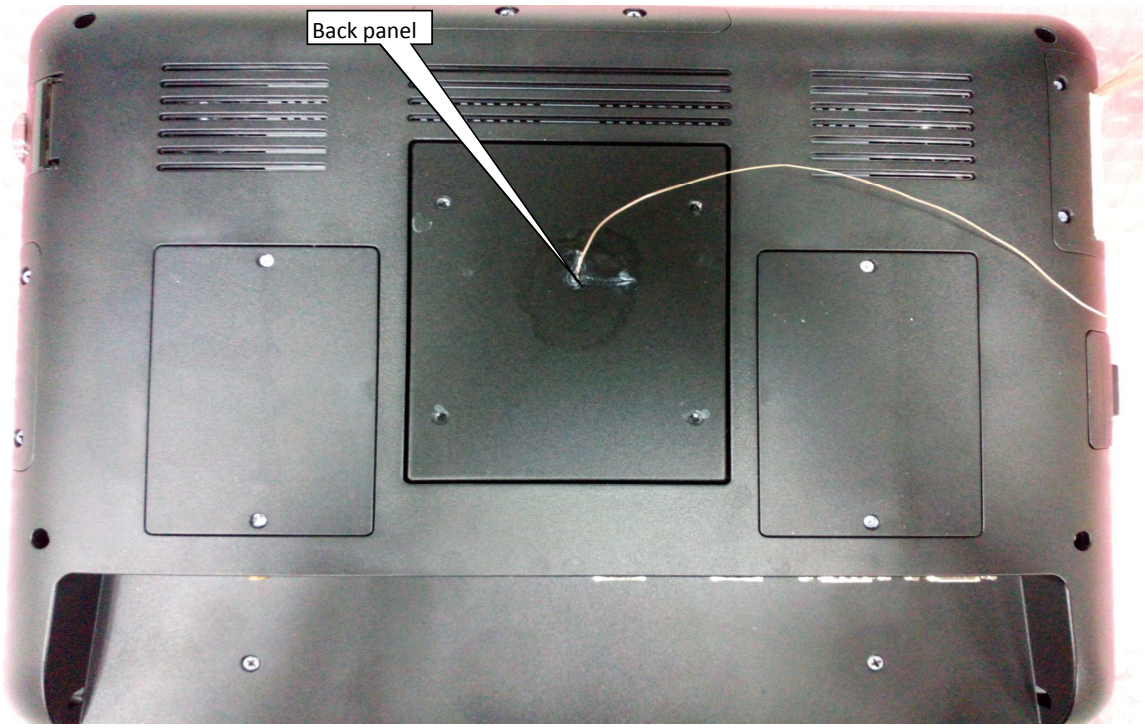
Chamber	SMSC USB2517-JZX	Micron emmc 4G	Micrel KSZ9031RNXCA	PenMount 6000-6001017 Ver.6.0.0	Wolfson WM8962BECSN/R	LCD UP	LCD Down	Battery	Heat sink
25℃	U15	U17	U19	U11	U22				
SPEC(Ta)	70.00	85.00	70.00	85.00	85.00	80.00	80.00	60.00	
Ts	65.50	56.00	57.80	49.60	48.00	40.20	40.80	40.60	40.60

Chamber	Back Panel
25℃	
SPEC(Ta)	
Ts	31.90




Battery
U3
C440
C494
U7
CPU
L5
L3
C470
L4
C428
C425
U15
C454
L2
C434


Heat sink


Back panel

Thermal and Capacitor Life time Calculation

DMR Task Number T28699-00

Version A1

Test Engineer	Jeffery	Date	2015/1/22	Result	Pass
Test Configuration					
Model name	RITY15R				
PCB version	A1				
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz				
OS	Android 4.4.2				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT41K256M16HA-125:E)				
Storage	Micron 4GB eMMC (MTFC4GMVEA-4M)				
Adapter	FSP060-DMAE1 12V 5A 60W				

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

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.

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

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

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.)

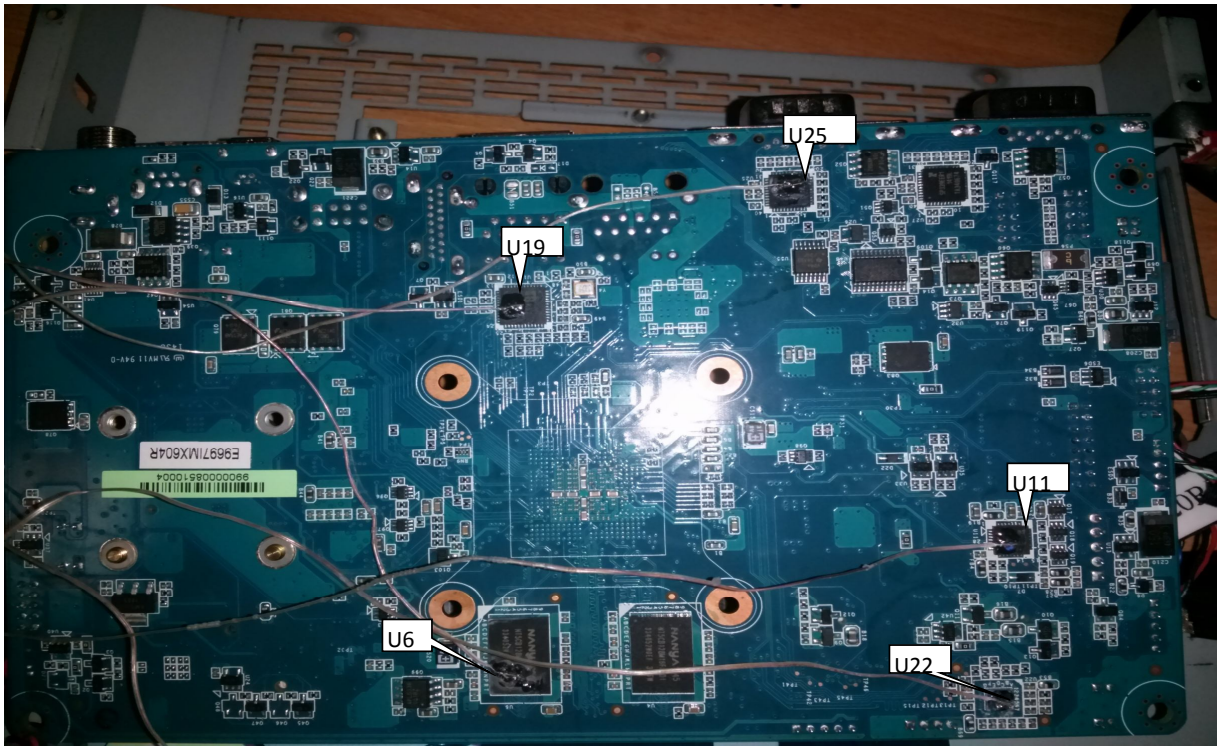
Test procedure : 1. Room Temperature Thermal and Capacitor Life time Calculation & battery , Panel , Inverter or Converter

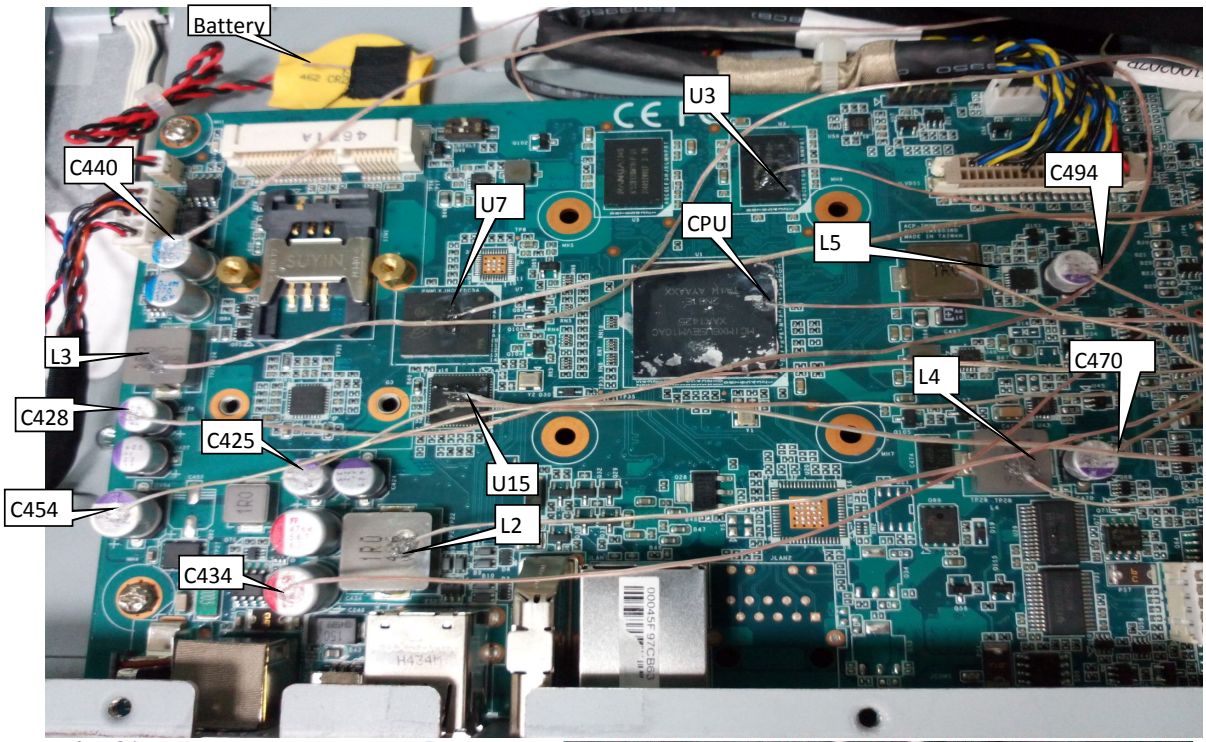
Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
40℃	C425	C428	C434	C440	C454	C470	C494
Ts(℃)	68.10	65.10	66.90	65.20	63.20	66.40	69.70
Tx(℃)							
Lo(hours)	5000	5000	2000	5000	5000	5000	5000
Kc							
ΔTx(℃)							
Lx(hours)	349921	494277	160705	488619	615134	425569	291052
Life(years)	39.95	56.42	18.35	55.78	70.22	48.58	33.23
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

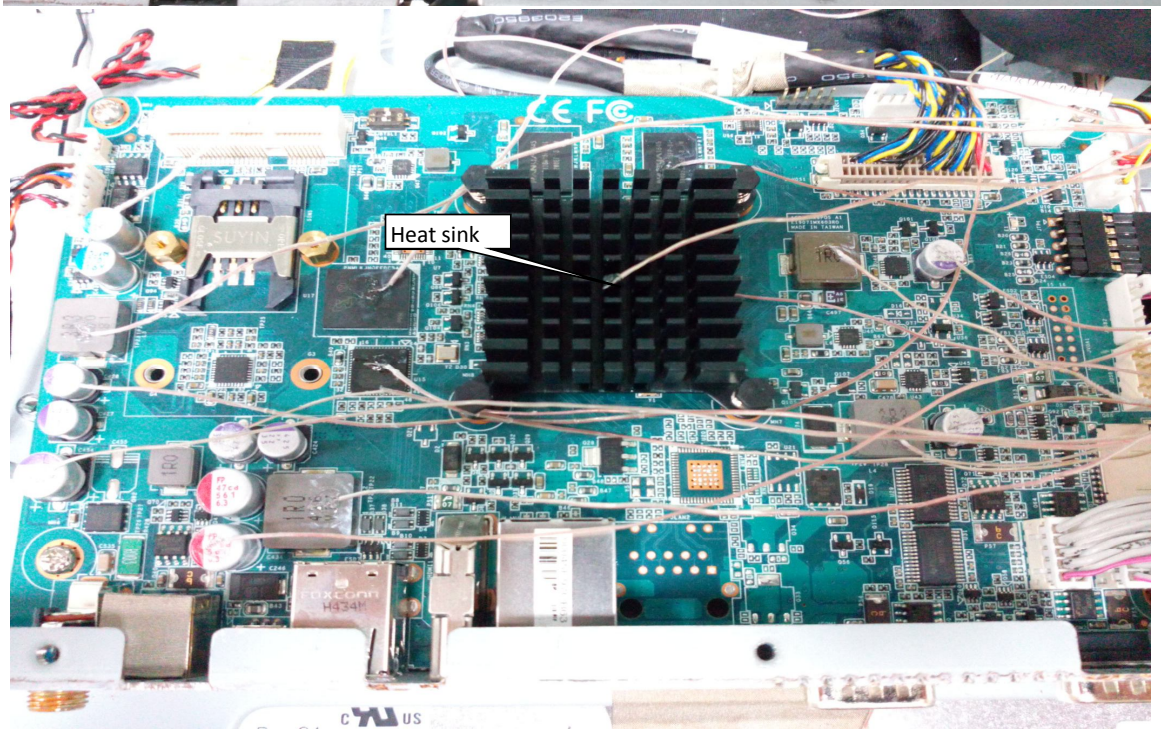
Chamber	Freescale iMX6 Duallite 1G Hz	Micron DDR3	Micron DDR3	1uH/29A	3.3uH/14.5A	2.2uH/12A	3.3uH/14.5A
40℃	U1	U3	U6	L2	L3	L4	L5
SPEC(Tc)	105(Tj)	95.00	95.00	125.00	125.00	125.00	125.00
Ts	80.10	74.20	76.70	73.30	63.90	66.90	70.80
SPEC - Ts	24.90	20.80	18.30	51.70	61.10	58.10	54.20
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

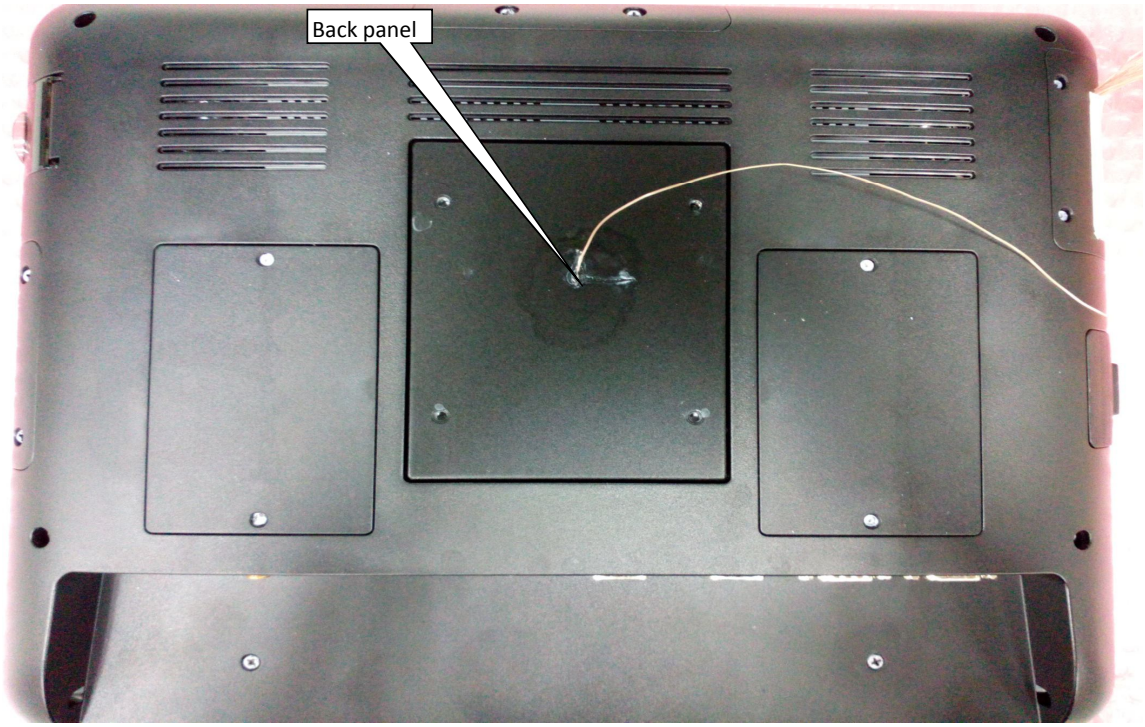
Chamber	SMSC USB2517-JZX	Micron emmc 4G	Micrel KSZ9031RNXCA	PenMount 6000-6001017 Ver.6.0.0	Wolfson WM8962BECSN/R	LCD UP	LCD Down	Battery	Heat sink
40℃	U15	U17	U19	U11	U22				
SPEC(Ta)	70.00	85.00	70.00	85.00	85.00	80.00	80.00	60.00	
Ts	81.30	72.00	73.50	65.50	63.80	55.90	55.40	60.00	77.20

Chamber	Back Panel
40℃	
SPEC(Ta)	
Ts	50.90




Battery
U3
C440
C494
U7
CPU
L5
L3
C470
L4
C428
C425
U15
C454
L2
C434


Heat sink


Back panel