ACP-iMX6POS

Design Verification Report

Initiated by	Eagle Chen	**Job Title**	Engineer	**Originate Date**	2014/9/30
Reviewed by	Sam Yeh Kevin Huang	**Job Title**	Engineer	**Revision**	QQ4-037 Rev.A7
Approved by	Jeffery Chen	**Job Title**	Senior Engineer	**DMR Task Number**	T23327-00
				版本	A1

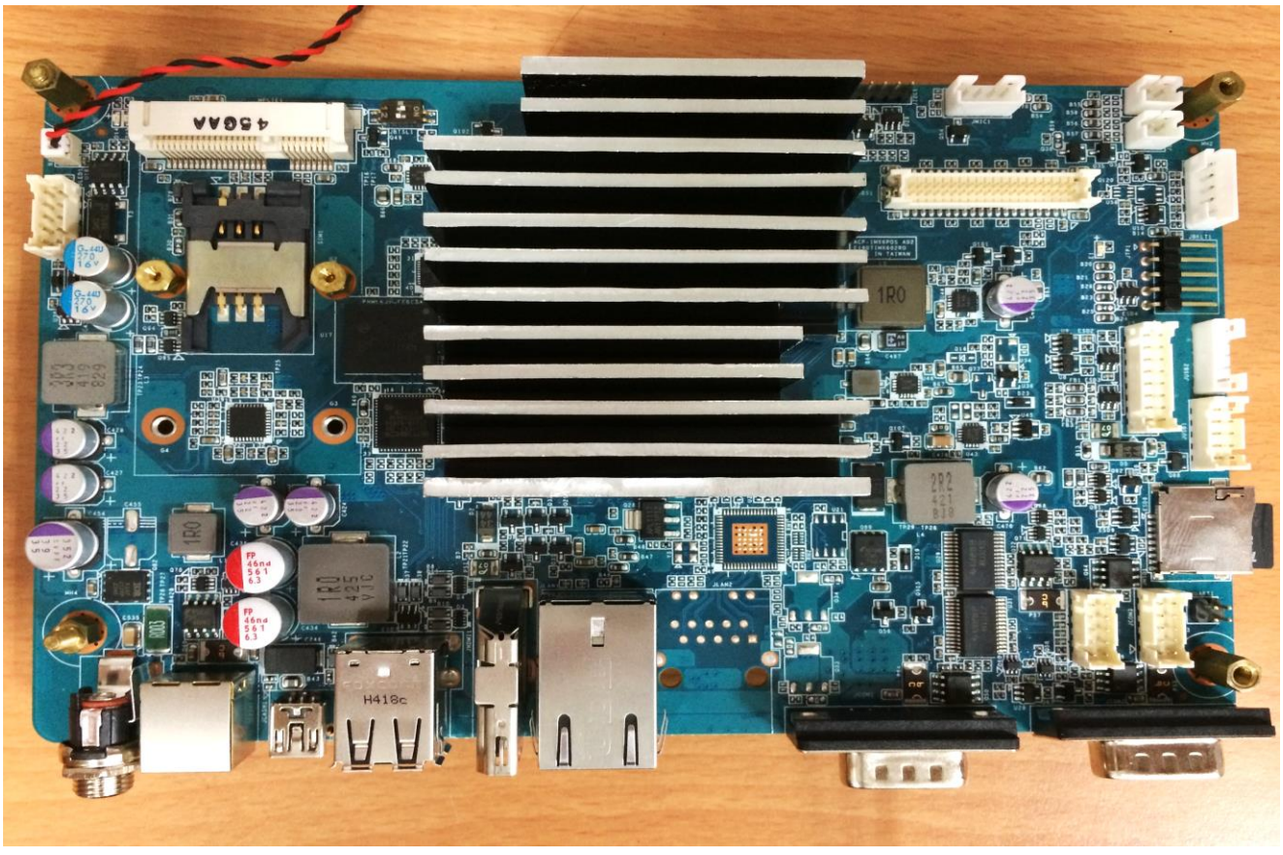
Product Information

DMR Task Number T23327-00

版本 A1

	Test Unit Information		
Model	ACP-IMX6POS		
Description	N/A		
PCB version	A02		
OS	Android 4.3		
Kernel version	3.0.35		
Product phase	N/A		
Produced by	Eagle Chen		
CPU	Freescale iMX6S 800MHz		
PM IC	N/A		
LAN chipset	Micrel KSZ9031RNX	Connector location	CN1
Touch	Penmount 6000		
LCD Panel Model	Dual channel 24bit LVDS		
Storage Size	Micron eMMC 4GB		
Internal Memory Size	Micron DDR3 1066 2GB		

Product image



Summary

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版本 A1

Item		Descriptions	Result
	Product Spec Verification	Specification Check	**Pass**
	LED check	LED indicator check (Power / HDD / LED / Others)	**Pass**
	Basic Function	WiFi / USB / COM / Audio Function Test & Check	**Pass**
	Performance	LAN	**Pass**
	Power Consumption	Full load / Idel / Erp mode 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	65℃/24hrs IEC 60068-2-2 Test:Bb	**Pass**
	Low Temperature Test	-5℃/24hrs IEC 60068-2-1 Test:Ab	**Pass**
	Temperature cycle test	-5℃~65℃ RH95% 8 cycles IEC 60068-2-14 Test:N	**Pass**
	Power on cycle test	-5℃ / 1000times IEC 60068-2-1 Test:Ab	**Pass**
		65℃ / 1000times for system level IEC 60068-2-2 Test:Bb	**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 PSD: 0.01818G²/Hz , 3.0 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**
Thermal	1 Max. Loading at Room Temperature & 60℃ 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	ACP-IMX6POS	Verification check
Features	Freescale i.MX6 Cortex-A9 Dual lite/Quad 1GHz CPU	✓
	4~64GB eMMC	4GB
	Up to 2GB DDR3 SDRAM	✓
	Dual Display (VGA+HDMI or LVDS+HDMI)	✓
	Dual GLAN	Micrel KSZ9031RNX
	Support Cash Drawer	✓
	12~24V DC input	✓
	Support UART x4	✓
	I2C RTC Intersil ISL1208IB8Z	✓
	USB Touch Controller Penmount6000	✓
Specifications		
System		
CPU	Freescale i.MX6 Cortex-A9 Dual Lite/ Quad 1GHz	✓
BIOS	N/A	N/A
System Chipset	N/A	N/A
I/O Chip	N/A	N/A
System Memory	Onboard Up to 1GB(Dual Lite) or 2GB(Qual) DDR3 1066/1333 SDRAM	✓
SSD	4~64GB eMMC	4GB
SD Card	Micro SD Socket x1	✓
Watchdog Timer	Freescale i.MX6 Build-in	N/A
EEPROM	N/A	N/A
H/W Status Monitor	N/A	N/A
Expansion	1x Mini PCI Express slot (USB signal only) Supported WIFI & 3.5G module SIM card holder onboard Micro SD Socket x1 (in system access window area)	✓
Touch Controller	Penmount 6000	✓
RTC	I2C RTC EPSON RX8010SJ	✓
I/O		
Serial Port	4 x COM port supported (2 X Pin header , 2 X Edge I/O) All Pin 9 supported 5V/12V 1A max output, selected by GPIO. COM1 & 2: RS232/422/485 selected in GPIO, RS232 by standard. COM3 & 4 Ping header	✓
USB Port	1x dual stack USB 2.0 port 1x USB for USB touch controller 1x USB for mini-PCIe socket 3x USB pin header for optional function USB hub is SMSC USB2517	✓
Switch	Pin header for Power Button (The first time auto power on)	✓
Indicator Light	Front panel right side with PWR/ WIFI/ LAN	✓
Others	1x RJ11 connector for cash drawer (GPO select RJ11 power supply 12V or 24V)	✓
Display Specification		
Chipset	Freescale i.MX6	✓
Resolution	Up to 1920x1080	✓
Multiple Display	VGA + HDMI or LVDS + HDMI VGA signal is converted by Chrontel Ch7055A (Pin header)	
HDMI	From Freescale i.MX6	✓
S-Video	N/A	
LCD Interface	Dual channel 24bit LVDS	N/A
Audio Specification		
I2S Codec	Wolfson WM8962	✓

Audio Port	2Pin Wafer Box P=2.0m x2 (Speaker out R & L) (Driver per channel max 2W)	✓
Mic	4Pin Wafer Box P=2.0m x1(Microphone)	✓
Ethernet Specification		
LAN Chip	1st LAN => from i.MX6 MAC, PHY is Micrel KSZ9031RNX 2nd LAN => Intel 82574L by PCIe interface (or I210 Assessment).	LAN1
Ethernet Interface	2x RJ45 connectors for Dual G LAN	LAN1
Internal I/O Connectors		
Fan	N/A	N/A
System 1 I2C	N/A	N/A
Buzzer	N/A	N/A
RTC Battery	CR2032 Battery with cable	✓
Power ON	Pin header for Power Button (The first time auto power on)	✓
Reset	Pin header for Reset Button	
Audio	2P Pin header x2 (Speaker out R & L) (Driver per channel max 2W)	✓
Rear I/O Connectors		
USB	USB Type A Double Deck x1	✓
LAN	RJ45 connector with indicate LED x2	✓
HDMI	HDMI connector x1 (Vertical type)	✓
Mini-USB	Mini-USB connector x1	✓
RJ11	RJ11 connector x1 for catch drawer	✓
COM Port	DB9 male connector x2	✓
DC Jack	DC-JACK E1652503106R , Power input為12~24V	✓
Mechanical & Environmental		
Power Requirement	TBD	N/A
ACPI	N/A	N/A
Power Type	DC 12-24V power input	✓
Operating Temp.	0~60 degree C	✓
Storage Temp.	-40~85 degree C	✓
Operating Humidity	0% ~ 90% Relative Humidity, Non-condensing	✓
Size (L x W)	175x110mm	✓
Weight	TBD	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	✓		For Monitor
	Power LED Flash for standby with ATX power	✓		
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 Flash is too fast.
WIFI LED indicator (LED indicator must be in the darkroom confirmation)	Power on LED color check	N/A		
	LED Dark for system off	N/A		Can't have Micro-Light lamp
	LED Light for system turn on	N/A		

Basic Function

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Test Engineer	Eagle Chen	Date :	2014/7/30	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3, Ubuntu				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 12V 5A 60W				

Subject	Test Item	Pass	Fail	Note
Video Function	*.WMA	✓		
	*.H.264	✓		
	*.MP4	✓		
Audio Function	*.MP3	✓		
	Microphone	✓		
	Speaker adjust volume	✓		Ubuntu
	Alarm Colock volume	✓		Ubuntu
LAN Function	Turn On/Off	✓		Ubuntu
	Network notification	✓		
	Download file from internet	✓		
	Disconnect policy	✓		
Transmission	Read / Write Test(Upload/Download/Copy 10GB files)	✓		
Connection	Download file from internet	✓		
G-Sensor	X、Y Reverse Test（90°、180°、360°）	✓		Fly app
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 10GB file(s))	✓		
	USB 2.0 Removable Devices	✓		
	Remove & Increase USB Device	✓		
	USB Keyboard / USB Mouse / USB HDD	✓		
USB Port 2	Auto detect (for all channels)	✓		
	Hot plug function is normal (for all channels)	✓		
	System information is correct	✓		
	Read/Write test (Copy 10GB file(s))	✓		
	USB 2.0 Removable Devices	✓		
	Remove & Increase USB Device	✓		
	USB Keyboard / USB Mouse / USB HDD	✓		
USB Port 3	Auto detect (for all channels)	✓		
	Hot plug function is normal (for all channels)	✓		
	System information is correct	✓		
	Read/Write test (Copy 10GB file(s))	✓		
	USB 2.0 Removable Devices	✓		
	Remove & Increase USB Device	✓		
	USB Keyboard / USB Mouse / USB HDD	✓		
USB Port 4	Auto detect (for all channels)	✓		
	Hot plug function is normal (for all channels)	✓		
	System information is correct	✓		
	Read/Write test (Copy 10GB file(s))	✓		
	USB 2.0 Removable Devices	✓		

	Remove & Increase USB Device	✓		
	USB Keyboard / USB Mouse / USB HDD	✓		
USB Port 5	Auto detect (for all channels)	✓		
	Hot plug function is normal (for all channels)	✓		
	System information is correct	✓		
	Read/Write test (Copy 10GB file(s))	✓		
	USB 2.0 Removable Devices	✓		
	Remove & Increase USB Device	✓		
	USB Keyboard / USB Mouse / USB HDD	✓		
Micro SD Port	Auto detect	✓		
	Hot plug function is normal	✓		
	System information is correct	✓		
	Read/Write test	✓		
COM Port 1	1. Physical Pin define testing (RS232/422/485) (Test APK) 2. Baud rate testing (RS232/422/485) 3. Cable Length testing (RS232: 15M RS422/485: 1.2KM)	✓		
COM Port 2		✓		
COM Port 3		✓		
COM Port 4		✓		

Performance

DMR Task Number T23327-00

版本 A1

Test Engineer	Eagle Chen	Date :	2014/9/22	Result	Pass

Test Configuration	
Model name	ACP-IMX6POS
PCB version	A02
CPU Type	Freescale iMX6 Quad 1G Hz
OS	Android 4.3
Kernel Version	3.0.35
Memory	Micron DDR3L 1600 512M*4 2GB
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.
Adapter	EDAC POWER EA10953 24V 3.75A, EDAC POWER EA10521F-190 19V 3.15A

Application	Test Item	Bandwidth(Mbits/Sec)	Note
Iperf Test 1. Type command -w 100m -i 1 -t 30 and record the result if LAN speed is Giga 2. Type command -w 10m -i 1 -t 30 and record the result if LAN speed is Mega	Giga LAN	164	

Application	Test Item	Score	Note
AnTuTu Benchmark 4.3.3	System	12355	
	Multitask	2317	
	Runtime	878	
	CPU integer	1570	
	CPU float-point	1094	
	RAM Operation	1224	
	RAM Speed	447	
	Storage I/O	792	
	Database I/O	590	
	2D Graphics Test	787	(720*1232)
	3D Graphics Test	2656	

Power Consumption

DMR Task Number T23327-00

版本 A1

Test Engineer	Eagle Chen	Date :	2014/9/23	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE2 24V 2.5A 60W, FSP FSP060-DBAE1 12V 5A 60W				

Testing Software (MAX. load)

1 *Runing H.264 1080P video (MX Player Pro 1.7.28)*

****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)				
	Power on - Boot procedure	Idle mode	Max Load	Test Softw are	Note / Issue ID
+12V	0.8075	0.512	0.7701	1	
Total (Watt)	9.69	6.144	9.2412		
+24V	0.5086	0.3524	0.4988	1	
Total (Watt)	12.2064	8.4576	11.9712		

Condition	USB Power measurement (mA)				Note / Issue ID
	Voltage (4.75v~5.00v)	Current	Power On	Result	
USB1	4.86	510mA	5.03	Pass	
USB2	4.87	511mA	5.03	Pass	
USB3	4.87	510mA	5.03	Pass	
USB4	4.86	510mA	5.03	Pass	
USB5	4.85	511mA	5.03	Pass	

Power margin Test

DMR Task Number T23327-00
版本 A1

Test Engineer	Eagle Chen	Date	2014/9/23	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	DC Power source				

Power margin Test

Item	Voltage	Spec	Limit	Test Stage	Result	Note/Issue ID
DC power upper limit	25.2	24V	+5%	DVT	Pass	
DC power middle value	18 V	(upper limit + low limit) /2		DVT	Pass	
DC power low limit	11.4	12 V	-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 Mpeg video

Power interruption Test

DMR Task Number T23327-00
版本 A1

Test Engineer	Eagle Chen	Date	2014/9/23	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	EDAC POWER EA10953 24V 3.75A				

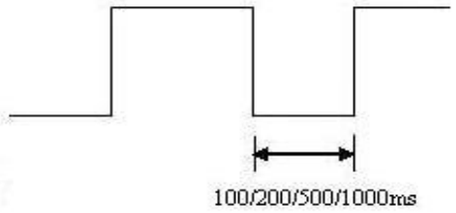
Power interruption test

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	FSP FSP060-DBAE1 12V 5A 60W	100ms	AT	DVT	Pass	
		200ms	AT	DVT	Pass	
		500ms	AT	DVT	Pass	
		1000ms	AT	DVT	Pass	
	FSP FSP060-DBAE2 24V 2.5A 60W	100ms	AT	DVT	Pass	
		200ms	AT	DVT	Pass	
		500ms	AT	DVT	Pass	
		1000ms	AT	DVT	Pass	

Room Temp Power On/Off Test

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版本 A1

Test Engineer	Eagle	Date	2014/09/24-2014/09/25	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 12V 5A 60W				

Test Condition：

Condition

1 Test temperature : Room temperature

2 Number of test : 4000 times

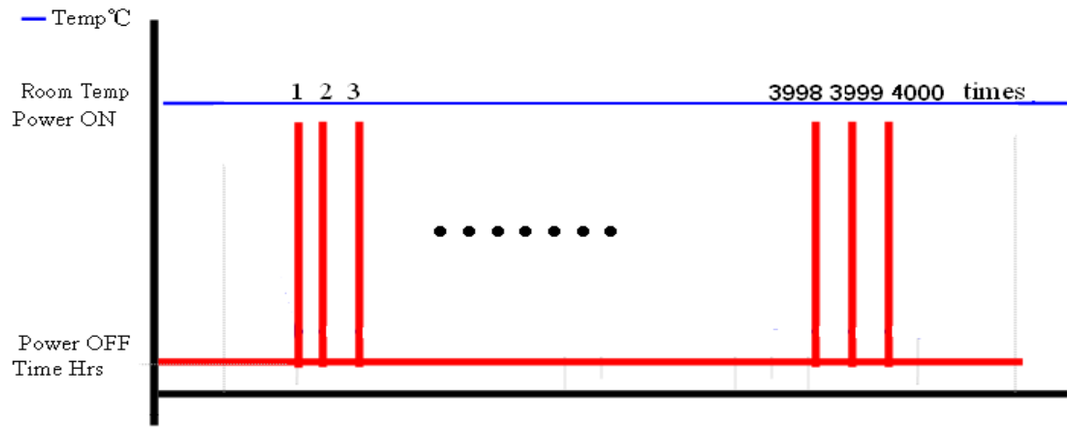
3 Test software : Ubuntu

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.

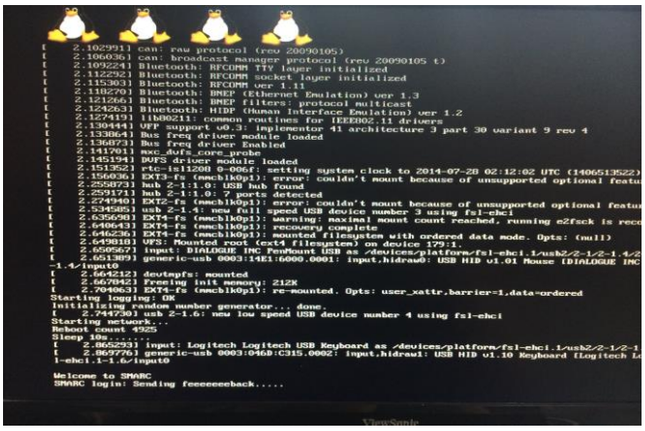
There is no damage in electronic and mechanical functions.

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 T23327-00

版本 A1

Test Engineer	Eagle Chen	Date	2014/9/27	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 12V 5A 60W				

Test Standard：

Reference IEC60068-2-2 Testing procedures

Test Bb : Dry Heat Test

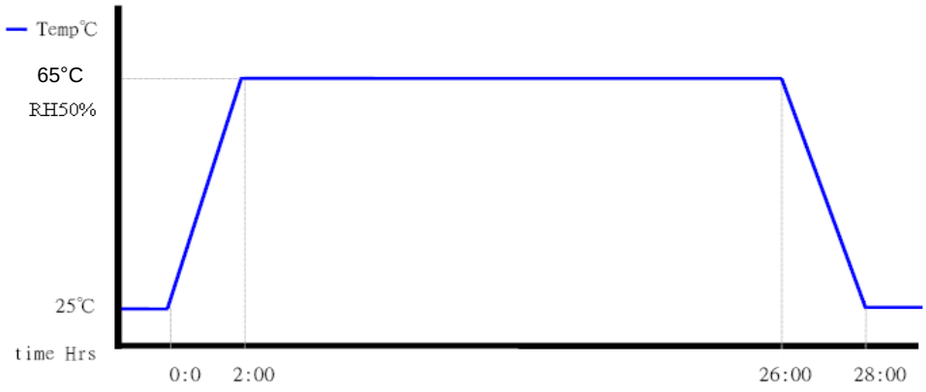
Test Condition：

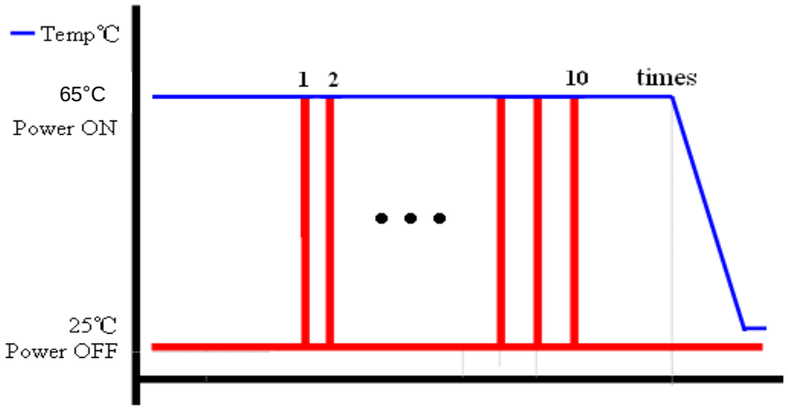
1 Test Temperature : 65°C for board level

2 Test Time : 24 hours

3 Test software : H.264 video + Ping IP

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.

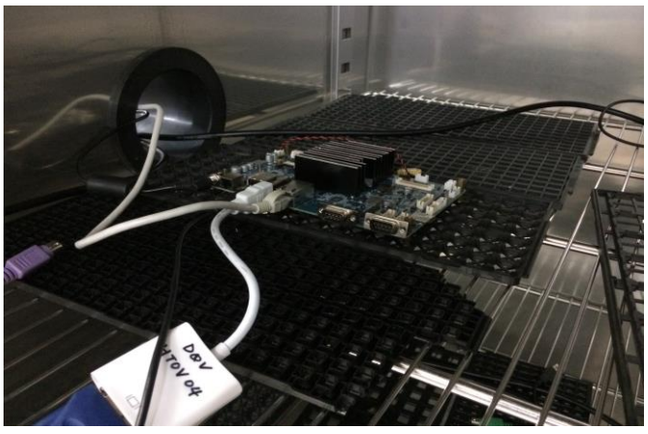
Test result：

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 T23327-00

版本 A1

Test Engineer	Eagle Chen	Date	2014/9/28	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 12V 5A 60W				

Test Standard：

Reference IEC60068-2-1 Testing procedures

Test Ab : Cold Test

Test Condition：

1 Test Temperature : -5°C

2 Test Time : 24 hours

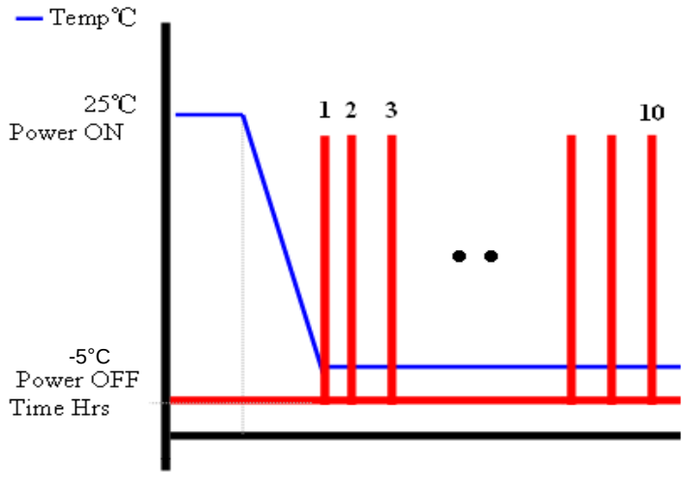
3 Test software : H.264 video + Ping IP

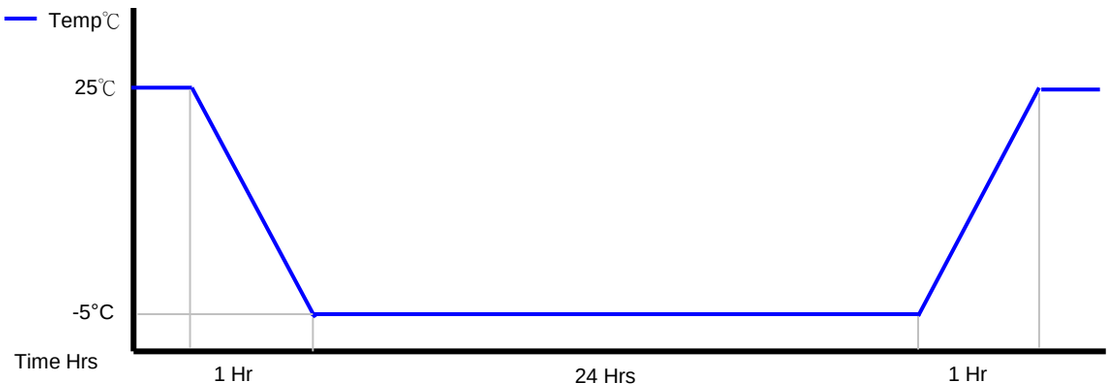
Test procedure：

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：

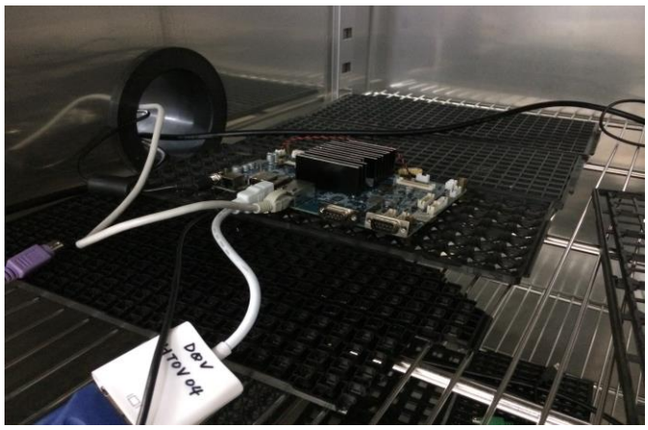
There are should be no " ! " or " ? " mark display at device manager

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 T23327-00

版本 A1

Test Engineer	Eagle Chen	Date	2014/9/29~2014/09/30	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 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 65℃ RH95% / Low temperature -5℃

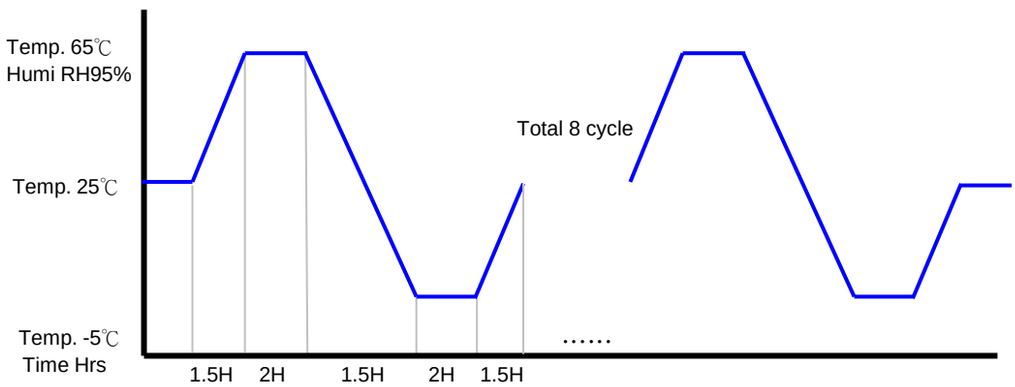
2 Test dwell Time : 2 hours

3 Temperature slope : heating 1.5 hour, cooling 1.5 hour

4 Test cycle : 8 cycles

5 Test software : H.264 video + Ping IP

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.

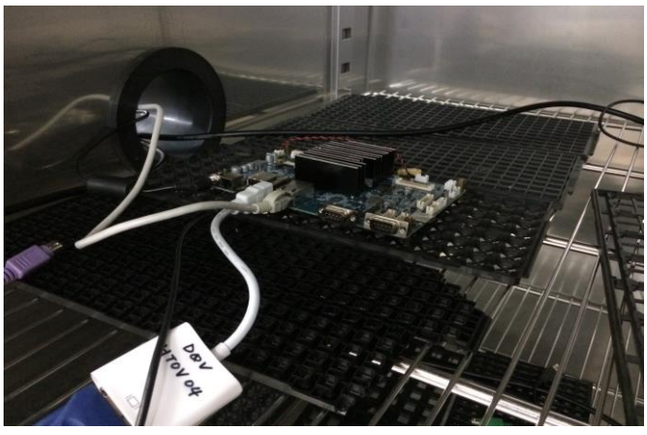
Test result：

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 T23327-00

版本 A1

Test Engineer	Eagle Chen	Date	2014/9/22-2014/9/23	-5℃ Result	Pass
Test Configuration				65℃ Result	Pass
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Ubuntu				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 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℃

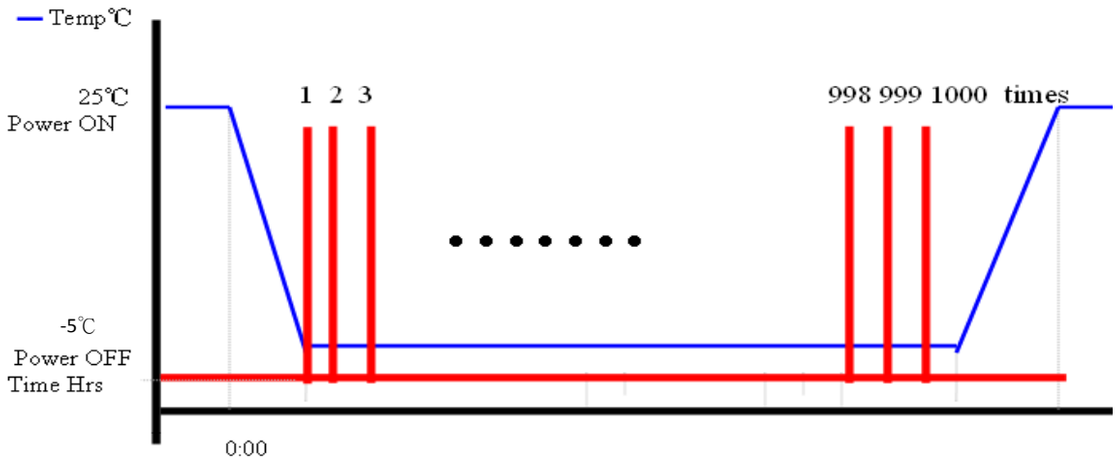
2 Number of test : 1000 times

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.



Condition II

1 Test temperature : 65℃

2 Number of test : 1000 times

3 Test software : Ubuntu

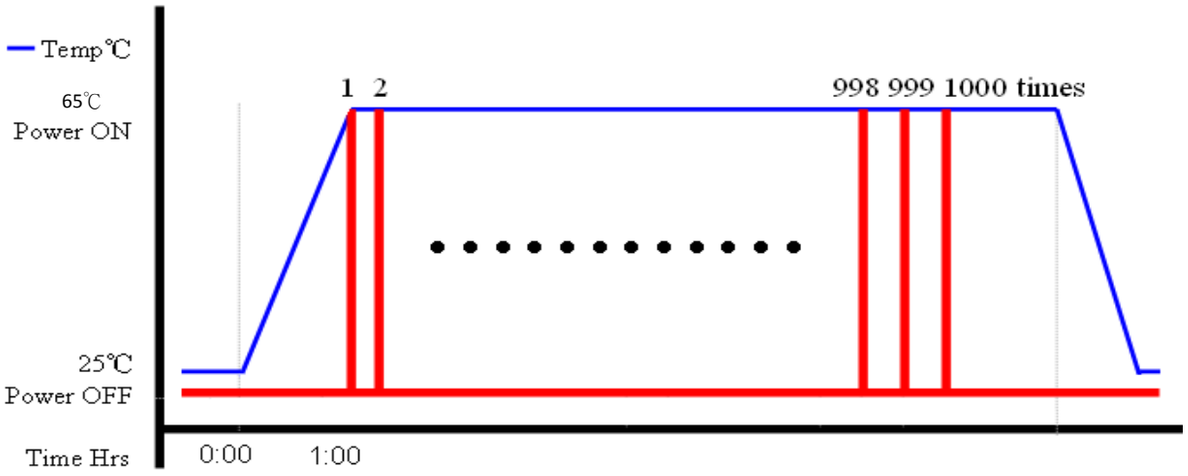
4 Step : A) System power on, record the count number then system power off

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：

Stability Test

Test Engineer	Eagle Chen	Date	2014/9/29	Result	Pass
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 12V 5A 60W				

Power On/Off and Boot Test

Item	Comment	details		Test Stage	Result	Note/Issue ID
Timer	Time		≦ 2 sec/day	DVT	Pass	
	RTC timer		≦ 2 sec/day	DVT	Pass	
Clock measured (Room temperature)	32.768KHz	Range 32767.34464 ~32768.65536	32768 +/- 20 ppm	DVT	Pass	
	14.318MHz	Range 14.3186095454~ 14.3177504546	14.31818 +/- 30 ppm	DVT	N/A	
	25.0000MHz	Range 25.00075~24.99925	25.0000 +/- 30 ppm	DVT	N/A	
Power On/Off test (AT mode)	With CMOS battery		booting rate =100%	DVT	Pass	
H/W Reset test (by reset button)	H/W reset		booting rate =100%	DVT	Pass	

Power margin Test (only for single DC voltage input products)

LAN Port Stress Test

LAN Port	Testing condition	Test Time(Hours)	Test Stage	Result	Note/Issue ID
LAN 1	High_Performance_Through (Iperf test)	12	DVT	Pass	
LAN 2	High_Performance_Through (Iperf test)	12	DVT	N/A	未上件

Random Vibration Operation

DMR Task Number T23327-00

版本 A1

Test Engineer		Eagle Chen	Date	2014/9/30	Result	Pass
Test Configuration						
Model name	ACP-IMX6POS					
PCB version	A02					
CPU Type	Freescale iMX6 Quad 1G Hz					
OS	Android 4.3					
Kernel Version	3.0.35					
Memory	Micron DDR3L 1600 512M*4 2GB					
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.					
Adapter	FSP FSP060-DBAE1 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

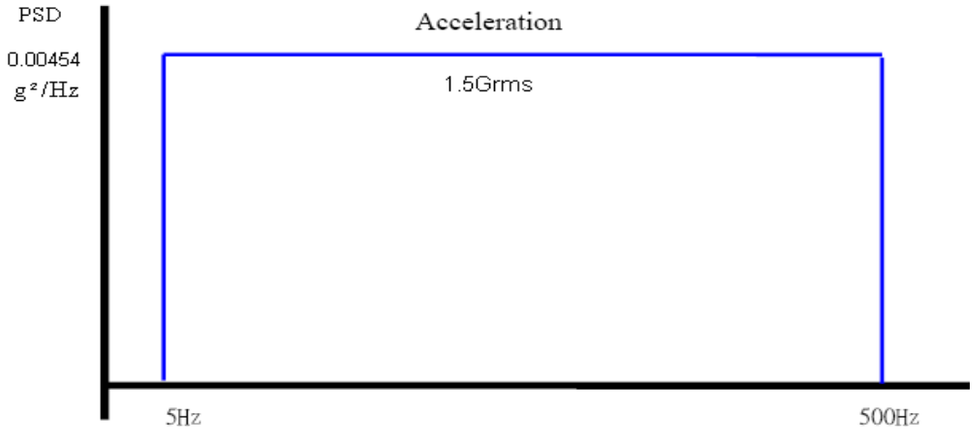
2 Test frequency : 5~500 Hz

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 : 8/23/2013

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

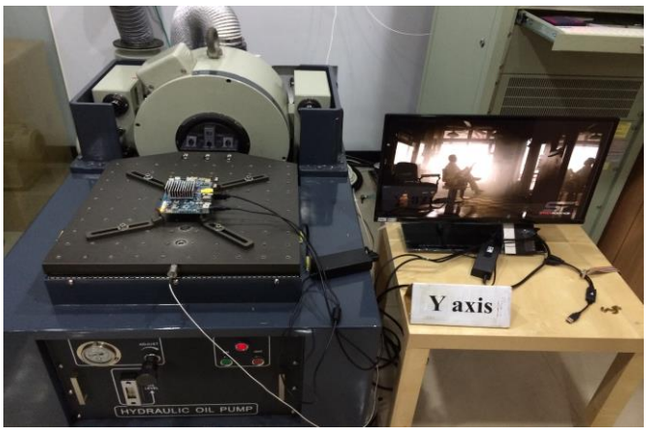
Test result：

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：



Random Vibration test (Non-operation)

DMR Task Number T23327-00

版本 A1

Test Engineer		Eagle Chen	Date	2014/9/30	Result	Pass
Test Configuration						
Model name	ACP-IMX6POS					
PCB version	A02					
CPU Type	Freescale iMX6 Quad 1G Hz					
OS	Android 4.3					
Kernel Version	3.0.35					
Memory	Micron DDR3L 1600 512M*4 2GB					
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.					
Adapter	FSP FSP060-DBAE1 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 : 0.01818G²/Hz 3 Grms

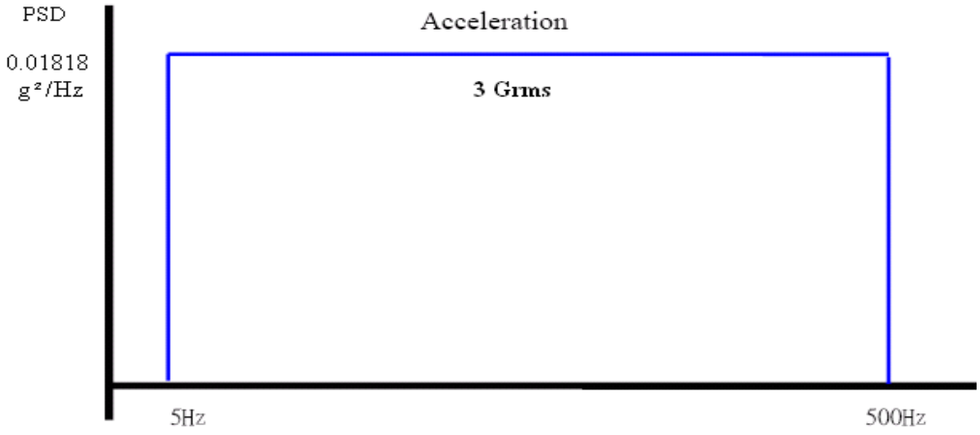
2 Test frequency : 5~500 Hz

3 Test axis : X,Y and Z axis

4 Test time : 30 min. each axis

5 System condition : Non-Operation mode

Test curve：



Test equip

Model : VS-300VH

Date of calibration : 8/23/2013

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

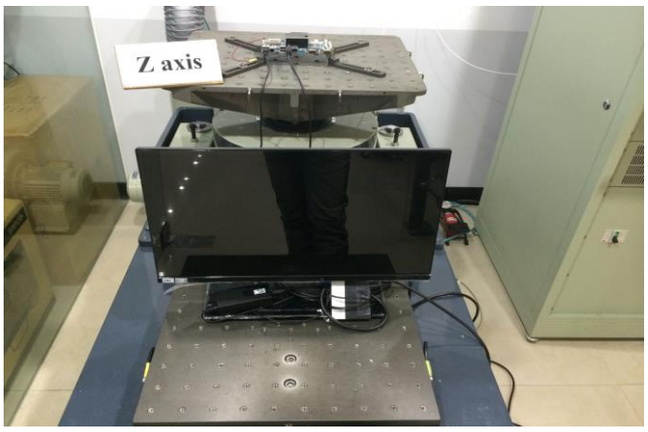
6 The assembling / disassembling of the system enclosure must be smooth and no deformed parts should be found

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 T23327-00

版本 A1

Test Engineer	Eagle Chen	Date	2014/9/29	Result	Pass
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 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	NA	
Opposite operation	2-1	Mouse		DVT	NA	
	2-2	Keyboard		DVT	NA	
	2-3	Audio		DVT	NA	
	2-4	RJ11	RJ11 cable	DVT	NA	
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	
	5-2	12V		DVT	Pass	
		19V		DVT	NA	
		24V		DVT	Pass	
Wrong procedure	6-1			DVT	Pass	
	6-2			DVT	Pass	

Short Test

DMR Task Number T23327-00

版本 A1

Test Engineer	Eagle Chen	Date	2014/9/30	Result	Pass
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 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 GPIO
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 GPIO, 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
Serial port	COM1	System shutdown	DVT	Pass	
	COM2	System shutdown	DVT	Pass	
	COM3	System shutdown	DVT	Pass	
	COM4	System shutdown	DVT	Pass	
USB port	USB1	USB malfunction	DVT	Pass	
	USB2	USB malfunction	DVT	Pass	
	USB3	USB malfunction	DVT	Pass	
	USB4	USB malfunction	DVT	Pass	
	USB5	USB malfunction	DVT	Pass	
DC IN	24V	System shutdown	DVT	Pass	

Thermal and Capacitor Life time Calculation

DMR Task Number T23327-00

版本 A1

Test Engineer	Eagle Chen	Date	2014/9/30	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 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.

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.)

ΔTx = (Ts - Tx) x 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： H.264 video + Ping IP

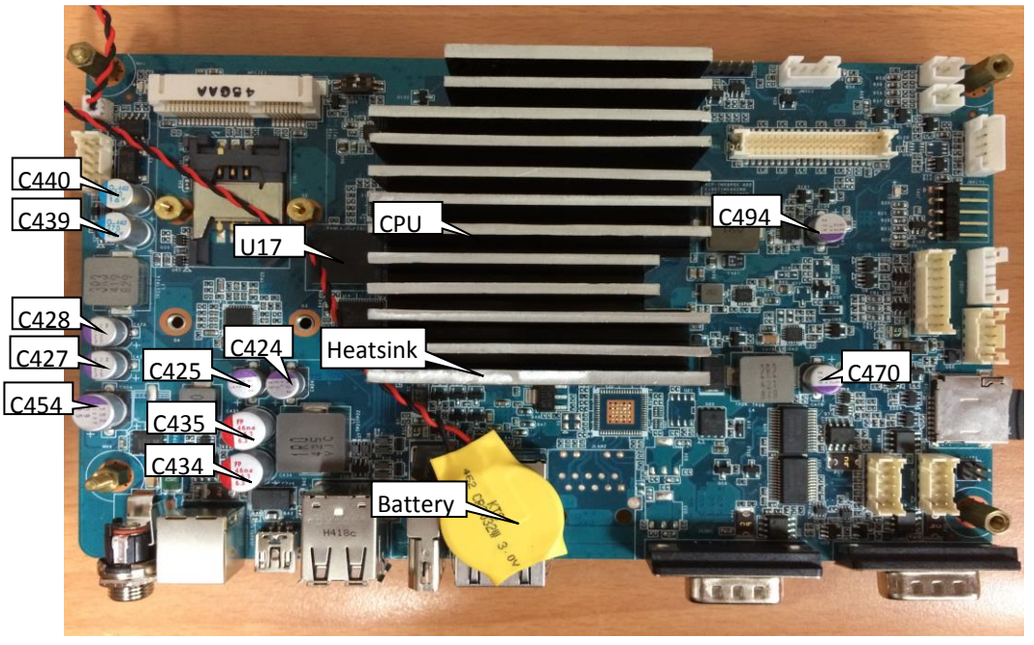
Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
25℃	C439	C440	C427	C428	C424	C425	C470	C494	C454
Ts(℃)	49.60	49.50	45.30	45.20	50.90	50.80	42.80	41.60	46.30
Tx(℃)									
Lo(hours)	5000	5000	5000	5000	5000	5000	5000	5000	5000
Kc									
ΔTx(℃)									
Lx(hours)	2944218	2978311	4830254	4886186	2534954	2564307	6441248	7395542	4304969
Life(years)	336.10	339.99	551.40	557.78	289.38	292.73	735.30	844.24	491.43
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Chamber	aluminum	aluminum							
25℃	C434	C435							
Ts(℃)	50.60	50.70							
Tx(℃)									
Lo(hours)	2000	2000							
Kc									
ΔTx(℃)									
Lx(hours)	1049615	1037600							
Life(years)	**119.82**	**118.45**							
Result	Pass	Pass							

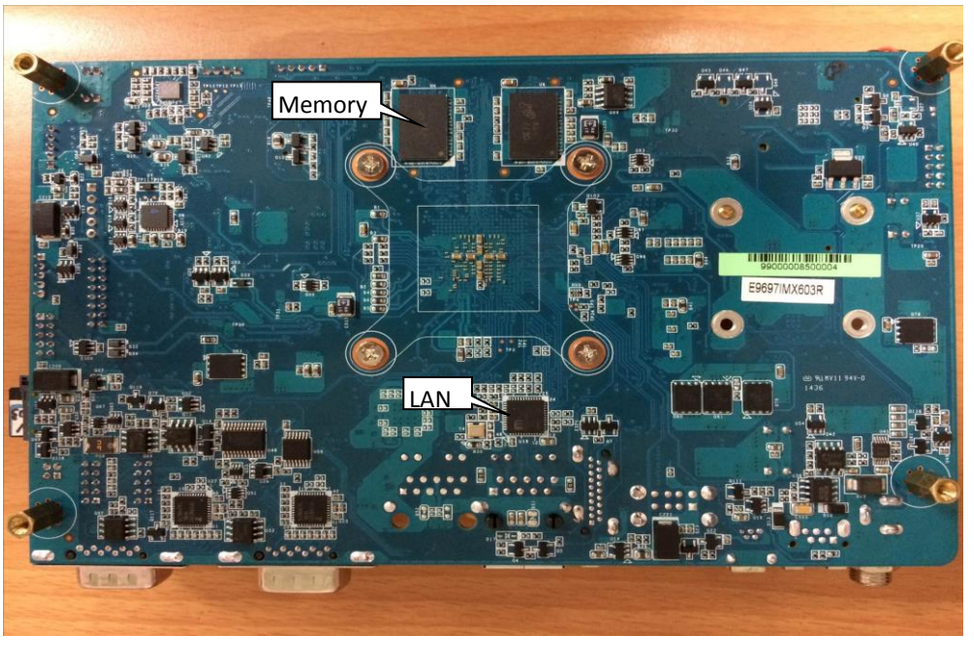
Chamber	Micron 3YE77 D9PXV	
25℃	Memory	
SPEC(Tc)	95.00	
Ts	50.80	
SPEC - Ts	44.20	
Result	Pass	

Chamber	Freescale iMX6 Quad 1G Hz	SMSC USB2517	Micron emmc 4G	KSZ9031RNX	KTR CR2032W	Heatsink			
25℃	CPU	U15	U17	LAN	Battery				
SPEC(Ta)	85.00	70.00	85.00	70.00	60.00				
Ts	64.60	58.40	50.80	46.60	30.20	47.10			

TOP:



Bottom:



Thermal and Capacitor Life time Calculation

DMR Task Number T23327-00

版本 A1

Test Engineer	Eagle Chen	Date	2014/9/30	Result	Pass
Test Configuration					
Model name	ACP-IMX6POS				
PCB version	A02				
CPU Type	Freescale iMX6 Quad 1G Hz				
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1600 512M*4 2GB				
Storage	Micron MTFC4GMVEA-4M eMMC 4GB , Transcend 8GB micro SD.				
Adapter	FSP FSP060-DBAE1 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： H.264 video + Ping IP

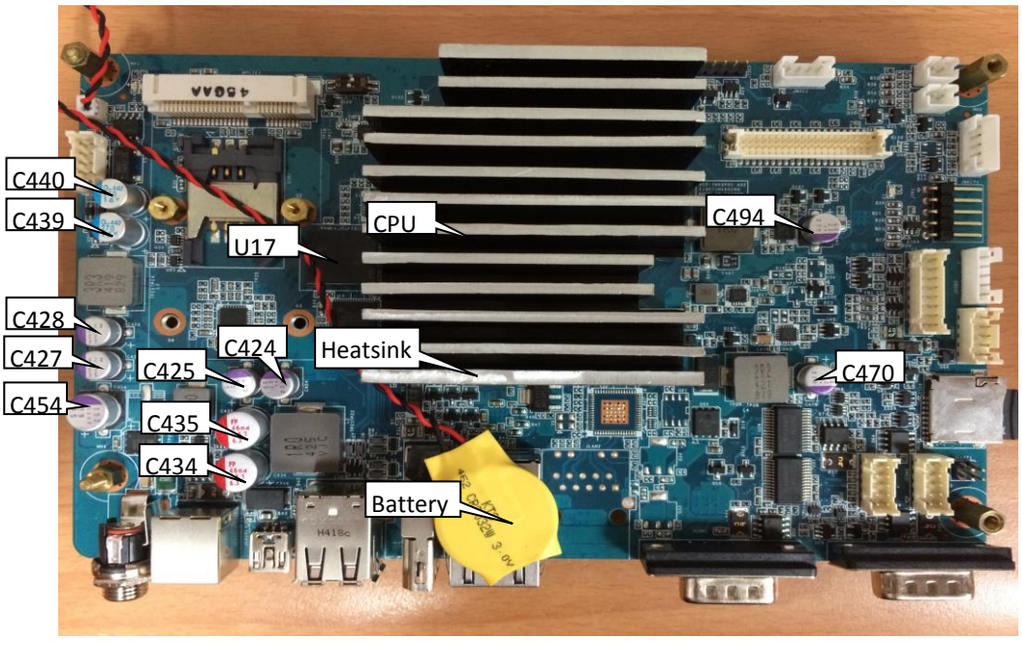
Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
60℃	C439	C440	C427	C428	C424	C425	C470	C494	C454
Ts(℃)	79.00	79.10	74.80	74.60	77.80	77.70	71.30	72.40	73.90
Tx(℃)									
Lo(hours)	5000	5000	5000	5000	5000	5000	5000	5000	5000
Kc									
ΔTx(℃)									
Lx(hours)	99763	98621	161797	165566	114543	115870	242086	213290	179461
Life(years)	11.39	11.26	18.47	18.90	13.08	13.23	27.64	24.35	20.49
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Chamber	aluminum	aluminum							
60℃	C434	C435							
Ts(℃)	77.60	77.60							
Tx(℃)									
Lo(hours)	2000	2000							
Kc									
ΔTx(℃)									
Lx(hours)	46885	46885							
Life(years)	**5.35**	**5.35**							
Result	Pass	Pass							

Chamber	Micron 3YE77 D9PXV	
60℃	Memory	
SPEC(Tc)	95.00	
Ts	80.00	
SPEC - Ts	15.00	
Result	Pass	

Chamber	Freescale iMX6 Quad 1G Hz	SMSC USB2517	Micron emmc 4G	KSZ9031RNX	KTR CR2032W	Heatsink			
60℃	CPU	U15	U17	LAN	Battery				
SPEC(Ta)	85.00	70.00	85.00	70.00	60.00				
Ts	93.90	87.50	80.00	75.40	61.20	77.40			

TOP:



Bottom: