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RITY10R1

Design Verification Report

Initiated by	Jeffery Chen	Job Title	Senior Engineer	Originate Date	2014/11/19
Reviewed by	Max Chen	Job Title	Supervisor	Revision	QQ4-037 Rev.A7
Approved by	Simon Lin	Job Title	Manager	DMR Task Number 版本	T25044-00 A1

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Product Information

DMR Task Number T25044-00

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版本 A1

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	Test Unit Information			
Model	RITY8R1			
Description	N/A			
PCB version	A02			
os	Android 4.3			
Kernel version	3.0.35			
Product phase	N/A			
Produced by	Jeffery			
CPU	Freescale i.MX6 Cortex-A9 Dual lite/Quad 1GHz CPU			
PM IC	N/A			
LAN chipset	Micrel KSZ9031RNX	Connector location	CN1	
Touch	PCT-100F-03G-01 (EETI 7900 series)			
LCD Panel Model	10.1" CHIMEI LCD N101BGE-L21			
Storage Size	Micron eMMC 4GB			
Internal Memory Size	Onboard Up to 1GB(Dual Lite) or	2GB(Quad) DDR3 106	6/1333 SDRAM	

Product image



105 (Tj)



Summary

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Item		版本 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
	Power interruption test	100/200/500/1000ms	Pass
	Room temperature Power on/off test	Room temperature / 4000times for system level	Pass
	High Temperature Test	45℃/24hrs IEC 60068-2-2 Test:Bb	Pass
	Low Temperature Test	-5℃/24hrs IEC 60068-2-1 Test:Ab	Pass
	Temperature cycle test	-5℃~45℃ RH95% 8 cycles IEC 60068-2-14 Test:N	Pass
	Power on cycle test	-5℃ / 1000times IEC 60068-2-1 Test:Ab	Pass
		45°C / 1000times for system level IEC 60068-2-2 Test:Bb	Pass
	Storage test	-5℃ 24hrs 60℃/ RH95% 24hrs IEC 60068-2-3 Test:Ca	Pass

Random Vibration Operation	 PSD: 0.00454G²/Hz , 1.5 Grms operation mode Test Frequency : 5-500Hz Test Axis : X,Y and Z axis 30 minutes per each axis IEC 60068-2-64 Test:Fh Storage : CF or SSD 	Pass
Random vibration test (Non-operation)	 Test Acceleration : 2G Test frequency : 5~500 Hz Sweep : 1 Oct/ per one minute. (logarithmic) Test Axis : X,Y and Z axis Test time :10 min. each axis System condition : Non-Operating mode Reference IEC 60068-2-6 Testing procedures 	Pass
Package vibration test	 PSD: 0.026G²/Hz , 2.16 Grms Non-operation mode Test Frequency : 5-500Hz Test Axis : X,Y and Z axis 30 min. per each axis IEC 60068-2-64 Test:Fh 	Pass
Bump Test	 Wave form : Half Sine wave Acceleration Rate : 10g for operation mode Duration Time : 11ms No. of Shock : Z axis 1000 times Test Axis: Z axis Operation mode 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

DMR Task Number T25044-00

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Title	RITY10R1				
	Freescale i.MX6 Cortex-A9 Dual lite/Quad 1GHz CPU				
	4~64GB eMMC				
	Up to 1GB or 2GB DDR3 SDRAM				
	Dual Display (LVDS + VGA(Quad core only) or LVDS+HD	N/I			
	Optional Dual GLAN	/1011			
System Features	Support Cash Drawer				
	19~24V DC input				
	Support 2x RS232(TX,RX,CTS,RTS,GND)/422/485, 2x				
RS232(TX,RX,CTS,RTS,GND)					
	USB Touch Controller EETI 7900 series	Questine			
	Specifications	Confirm			
	Component				
Mother Board	Freescale i.MX6 Platform	V			
CPU	Freescale i.MX6 Cortex-A9 Dual Lite/ Quad 1GHz	V			
CPU Cooler (Type)		N/A			
Memory	Onboard Up to 1GB(Dual Lite) or 2GB(Quad) DDR3	V			
Power Supply	N/A	N/A			
Adapter	DC 19V power input by Power 2.5mm DC Jack	V			
System Fan	Fanless	V			
Microphone	Option	N/A			
Speaker	On back x 2	V			
Camera	Supported optional	N/A			
Wireless LAN	Supported optional	N/A			
Bluetooth	N/A	N/A			
Operating System	Linux : Linux Kernel 2.6.x & 3.0.x	Android 4.3			
	Android 4X				
Expansion Card	N/A	N/A			
Other Component	N/A	N/A			
	Storage				
Floppy Disk Drive	N/A	N/A			
Hard Disk Drive	N/A	N/A			
Optical Disk Drive	N/A	N/A			
Solid State Drive	N/A	N/A			
Other Stoage Device	MSATA by Mini PCI-e interface optional	N/A			
Other Stoage Device	Panel	IN/A			
	10.1" CHIMEI LCD N101BGE-L21				
LCD Panel	1366 x 768	V			
LCD Control Board	Panel built in	V			
B/L Inverter/Converter		V			
	105 (Tj)	-			
Touch Screen	5-wires Resistive / PCT	PCT			
Touch Controller	#VALUE!	V			
Others		N/A			
	External I/O	N1/A			
PS/2 KB & Mouse	N/A	N/A			
Serial Port	X2	V			
Parallel Port	N/A	N/A			
USB Port	USB Type A Double Deck x1	V			
1394 Port	N/A	N/A			
PCMCIA Port	N/A	N/A			

DIO Port	N/A	N/A
Video Port	HDMI x1	V
Audio Port	N/A	N/A
LAN Port	G LAN x1	V
Wireless LAN Antenna	Supported optional	N/A
Switch	Right side with cover	V
Indicator Light	PWR/ LAN/ WIFI	PWR/LAN
Expansion Slots	Mini PCI Express slot x1	N/A
Others		N/A
	Mechanical	-
Power Type	DC 19-24V power input	V
Power Connector Type	2.5mm DC Jack	V
Dimension	260mm x 178mm x 42mm	N/A
Weight	1.6 Kgs	N/A
Color	Black /White	V
Fanless	Yes	V
Others	N/A	N/A
	Reliability	
EMI Test	CE/FCC Class B	N/A
Safety	All design for this project have to comply with UL / CB /	N/A
Dust and Rain Test	IP 65 for front panel, IP 41 for back	V
Vibration Test	Base on Customer test standard	V
Mechanical Shock Test	Base on Customer test standard	V
Drop Test	Base on Customer test standard	V
Operating Temperature	0~40 degree	V
Operating Humidity	0% ~ 90% Relative Humidity, Non-condensing	V
Storage Temperature	0~60 degree	V
Other Test	N/A	N/A



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	OS			Note
\checkmark	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.

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

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

Subject	Test Item	Pass	Fail	Note
Power LED indicator	Power on LED color check	\checkmark		
(LED indicator must be in the	Power LED Dark for system off	\checkmark		Can't have Micro- Light lamp
darkroom confirmation)	Power LED Light for system turn on	\checkmark		
HDD LED indicator	HDD LED Flash for HDD active Read / Write	N/A		
(LED indicator must be in the darkroom confirmation)	HDD LED Dark for HDD no active	N/A		Can't have Micro- Light lamp
	Data Rate , Off => 10Mbits/sec	\checkmark		QQ4-037 Rev.A7
	Data Rate , Green => 100Mbits/sec	\checkmark		
	Data Rate , Orange => 1000Mbits/sec	\checkmark		
Ethernet LED indicator	Link / ACT , Off => not established	\checkmark		
	Link / ACT , Yellow Off => established	\checkmark		
	Link / ACT , Yellow Blinking => activity	\checkmark		LED flash is too fast when transmitting data

Basic Function

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DMR Task Number T25044-00

Test Engineer	Jeffery	Date :	2014/10/27	Result	Pass
Test Configuration				rtootait	1 400
Model name	RITY10R1				
PCB version	A02				
СРИ Туре	Freescale i.MX6 Cortex-A9	Dual lite CPU 1GHz			
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (M	1T41K256M16HA-125:E)			
Storage	Micron 4GB eMMC (MTFC	4GMVEA-4M)			
Adapter	FSP090-DMAB1 19V 4.74	4 90W			

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

	Auto detect (for all channels)	\checkmark	
	Hot plug function is normal (for all channels)	\checkmark	
	System information is correct	\checkmark	
	Read/Write test (Copy 1GB file(s))	\checkmark	Test data by emmc size
	USB 2.0 Removable Devices	\checkmark	
	Remove & Increase USB Device	\checkmark	
USB Port 2	USB Keyboard / USB Mouse / USB HDD	~	Only show one USB storage information when inserting two USB storages
HDMI Port	Display function	\checkmark	
	Audio output	\checkmark	
VGA Port	Display function	\checkmark	
	Open	\checkmark	24V cash drawer
Cash drawer Port	Close	\checkmark	
	Status	\checkmark	Open & Close status
	Function Check for RS-232	\checkmark	Loopback test
COM 1	Function Check for RS-422	\checkmark	Loopback test
	Function Check for RS-485	\checkmark	Loopback test
	Function Check for RS-232	\checkmark	Loopback test
COM 2	Function Check for RS-422	\checkmark	Loopback test
	Function Check for RS-485	\checkmark	Loopback test

Performance

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Test Engineer	James	Date :	2014/10/22	Pass
Test Configuration				
Model name	RITY10R1			
PCB version	A02			
СРИ Туре	Freescale i.MX6 Cortex-A9	Dual lite CPU 1GHz		
OS	Android 4.3			
Kernel Version	3.0.35			
Memory	Micron DDR3 1600 1GB (M	T41K256M16HA-125:E)		
Storage	Micron 4GB eMMC (MTFC4	IGMVEA-4M)		
Adapter	FSP090-DMAB1 19V 4.74A	. 90W		

Application	Test Item	Mbps	Note
	Maximum	333.337	
NetIQ Chariot 8.0 Throughput	Minimum	87.972	
	Average	302.461	
Application	Test Item	Score	Note
	System	11585	
	Multitask	2467	
	Runtime	783	
	CPU (multi-thread) integer	624	
	CPU (multi-thread) float-point	766	
	CPU (single thread) integer	800	
AnTuTu Benchmark 4.3.3	CPU (single thread) float-point	886	
	RAM Operation	701	
	RAM Speed	778	
	Storage I/O	590	
	Database I/O	545	
	2D Graphics Test	535	
	3D Graphics Test	1663	1366x768
Performance test lite 1.4	CPU Test	7	
	Ice Storm Extreme	749	
	Graphics	614	
3D Mark	Phyaics	3253	
	Graphics test1	3.4	
	Graphics test2	2.2	
	Phyaics test	10.4	

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Power Consumption



DMR Task Number T25044-00

				版本 A1
Test Engineer	James	Date :	2014/10/23	Pass
Test Configuration				
Model name	RITY10R1			
PCB version	A02			
CPU Type	Freescale i.MX6 Cor	rtex-A9 Dual lite CPL	I 1GHz	
OS	Android 4.3			
Kernel Version	3.0.35			
Memory	Micron DDR3 1600	1GB (MT41K256M16	iHA-125:E)	
Storage	Micron 4GB eMMC	(MTFC4GMVEA-4M)		
Adapter	FSP090-DMAB1 19	V 4.74A 90W		
Testing Software	1 Runing H 264 10	80P video		

(MAX. load)

1 Runing H.264 1080P video

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

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

Condition:

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

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

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

		Power	Consumption (A)		
Condition	Power on - Boot procedure	ldle mode	Max Load	Test Softw are	Note / Issue ID
+19V	0.503	0.378	0.539	1	
Total	9.557	7.182	10.241		
+24V	0.437	0.338	0.456	1	
Total (Watt)	10.488	8.112	10.944		

	USB Power measurement (mA)				Note / Issue
Condition	Voltage (4.75v~5.00v)	Current	Power On	Result	ID
USB1	4.979	510mA	5.15	Pass	
USB2	4.981	510mA	5.15	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 T25044-00 版本 A1

Test Engineer	James	Date	2014/10/23	Result	Pass
	James	Dale	2014/10/23	Result	r d55
Test Configuration					
Model name	RITY10R1				
PCB version	A02				
СРИ Туре	Freescale i.M	X6 Cortex-A9 Du	ual lite CPU 1GHz		
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3	1600 1GB (MT4	1K256M16HA-125:E)		
Storage	Micron 4GB e	MMC (MTFC4G	MVEA-4M)		
Adapter	FSP090-DMA	B1 19V 4.74A 9	OW		

Power margin Test

24V	+5%	DVT	Pass	
(upper limit +	· low limit) /2	DVT	Pass	
19V	-5%	DVT	Pass	
	(upper limit +	(upper limit + low limit) /2	(upper limit + low limit) /2 DVT	(upper limit + low limit) /2 DVT Pass

1. Adjust DC power source to specified voltage with Upper/Low limit.

2. ON/OFF test 10 cycles (1 minute ON and 1 minute OFF constitute 1 cycle)

3. Turn on the system and startup into the OS and make the product to maximum loaded

condition with running H.264 1080P video

Power interruption Test

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Test Engineer	Jeffery	Date	2014/10/23	Result	Pass
Test Configuration					
Model name	RITY10R1				
PCB version	A02				
СРИ Туре	Freescale i	.MX6 Cortex-A9	9 Dual lite CPU 1GHz		
OS	Android 4.3	3			
Kernel Version	3.0.35				
Memory	Micron DDI	R3 1600 1GB (N	MT41K256M16HA-125:E)		
Storage	Micron 4GE	B eMMC (MTFC	C4GMVEA-4M)		
Adapter	FSP090-DI	MAB1 19V 4.74	A 90W		

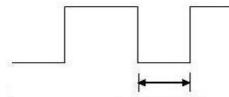
Power interruption test

Test Condition :

Environment : $25^{\circ}C \pm 2^{\circ}C$ ambient Humidity : $50 \pm 10\%$ RH

Procedure :

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



100/200/500/1000ms

Judgment Criteria :

There must be no danger of fire.
 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
		100ms	AT	DVT	Pass	
Power interruption Test	FSP090-	200ms	AT	DVT	Pass	
rower interruption rest	DMAB1	500ms	AT	DVT	Pass	
		1000ms	AT	DVT	Pass	

Room Temp Power On/Off Test



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Test Engineer	Jeffery	Date	2014/10/17~2014/10/20	Result	Pass
Test Configuration					
Model name	RITY10R1				
PCB version	A02				
CPU Type	Freescale i.	MX6 Cortex-A9	Dual lite CPU 1GHz		
OS	Ubuntu 12.0	04			
Kernel Version	3.0.35				
Memory	Micron DDF	R3 1600 1GB (M	T41K256M16HA-125:E)		
Storage	Micron 4GE	B eMMC (MTFC4	1GMVEA-4M)		
Adapter	FSP090-DN	MAB1 19V 4.74A	490W		
Test Condition :	Condition				

Lest Condition

1 Test temperature : Room temperature

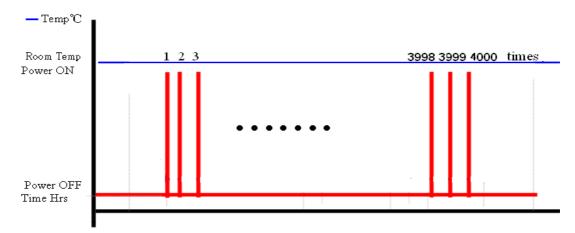
2 Number of test : 4000 times

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.

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Degradation has no been found. #VALUE!

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



1.7551b1 EAT3-fs: barriers not snabled
L 1.9766821 hub 2-1:1.0: USB hub found
l 1.9796651 hub 2-1:1.0; 7 ports detected [2.2551931 usb 2-1.2: new full speed USB device number 3 using fs1-ehci
L 2.3161211 kjournald starting. Comit interval 5 seconds
[2.316309] EXT3-fs (mmcblk0p1): warning: maximal mount count reached, running eZfsck is recommended
[2.317480] EXT3-Fs (nncblk0p1): using internal journal [2.317500] EXT3-Fs (nncblk0p1): recovery complete
E 2.3163007 EXISTS (mmcDir0p1): nounted filesystem with writeback data mode
[2.318397] VFS: Mounted root (ext3 filesystem) on device 179:1.
[2.319677] devtmpfs: mounted
[2.319828] Freeing init menory: 212K [2.391977] input: eGalax Inc. eGalaxTouch EXC2210-1193-44.00.00 as /devices/platform/fsl-ebci.1/usb2/2-1/2-1.
[2.337377] Input: coalad inc. coalationand products in the second state inc. coalaxTouch EXC [2.337341] generic-usb 0003:06EF:B100.0001: input. hidraw0: USB HID v2.10 Device [eGalax inc. eGalaxTouch EXC
Bad inittab entry at line 37
Starting logging: OK
Initializing random number generator done.
Starting network [2.495168] usb 2-1.4: new full speed USB device number 4 using fsl-ehci
Rebot court 4313
Sleep 195 [2.619651] input: DIALOGUE INC PenMount USB as /devices/platform/fsl-ehci.1/usb2/2-1/2-1.4/2-1.4:1.0/input.
I 2.6106513 Input: DIALOGUE INC Penhount USB as /aeutoss/platform/isi-cherto same of the
Nelcome to SMARC
SMORC Login: [2.622808] generic-usb 0003:14E1:0000.0002. There inter war
2 0051931 ush 2-1.7: new low speed USB device number 3 using is a start 1 2/2-1 7:1 0/input/input3
a 4442001 immet / ISB ISB Kelikoard as /ucoices/procedure to the head of the head of the
[3.1531/9] generic-usb 0003:1C4F:0002.0004: input.hidraw3: USB HID v1.10 Device [USB USB Reykoard] on us [3.189714] generic-usb 0003:1C4F:0002.0004: input.hidraw3: USB HID v1.10 Device [USB USB Reykoard] on us
[3.100714] generic-usb 0003:1047:0002.00071 Augustana

High Temperature Operation Test



DMR Task Number T25044-00 版本 A1

				1	成 本 A1
Test Engineer	Jeffery	Date	2014/10/9~2014/10/10	Result	Pass
Test Configuration					
Model name	RITY10R1				
PCB version	A02				
CPU Type	Freescale i.I	MX6 Cortex-A9	Dual lite CPU 1GHz		
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR	3 1600 1GB (N	1T41K256M16HA-125:E)		
Storage	Micron 4GB	eMMC (MTFC	4GMVEA-4M)		
Adapter	FSP090-DM	IAB1 19V 4.74A	A 90W		
Test Standard :	Reference IEC	60068-2-2 Testing	procedures		
	Test Bb : Dry H	leat Test			

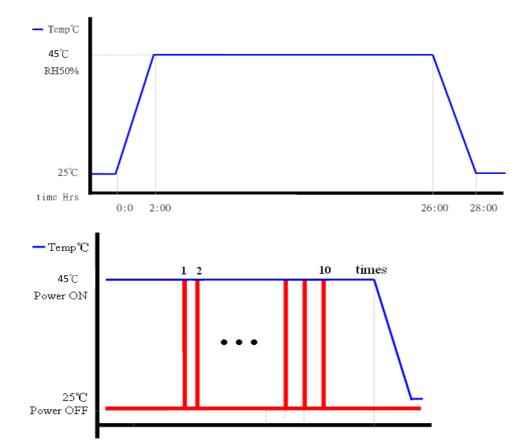
Test Condition :

1 Test Temperature :45°C for board level

2 Test Time : 24 hours

3 Test software : H.264 video

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



Test equipment :

Programmable temperature & humidity chamber

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

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

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

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

 Degradation has no been found.
 Performance is maintained with no incurable physical damage or degradation.





Low Temperature Operation Test



DMR Task Number T25044-00

					版本 A1
Test Engineer	Jeffery	Date	2014/10/10~2014/10/11	Result	Pass
est Configuration					
lodel name	RITY10R1				
CB version	A02				
PU Type	Freescale i.M	IX6 Cortex-A9 Du	al lite CPU 1GHz		
S	Android 4.3				
Cernel Version	3.0.35				
lemory	Micron DDR	3 1600 1GB (MT4	1K256M16HA-125:E)		
torage	Micron 4GB	eMMC (MTFC4G	//VEA-4M)		
dapter	FSP090-DM	AB1 19V 4.74A 90	W		
est Standard :	Reference IEC6	0068-2-1 Testing proc	edures		
	Test Ab : Cold 1	Test			
est Condition :	1 Test Tempera	ture : -5℃			
	2 Test Time : 24	1 hours			
	3 Test software				
est procedure :	1 Power on at -!	5° into OS by manual	ly and check device manager list, there are s	hould be no " ! " or " ? " m	ark display
p. 0000010	2 Peripheral che				
			lower chamber temperature at -5 $^\circ\!{ m C}$ and running	na test program	
	and poliphon			J	
	— Temp°	C			
	- Temp	ΎΙ			
	25°		1 2 3 10		
	Power ON				
	-5 ℃				
	Power ÖI Time Hrs	F			
	Time Hrs				
		-			
	— Temp℃				
	05%				
	25 ℃				
					/
				/	
				/	
	-5 ℃	\		/	
	Time Hrs	1 Hr	24 Hrs	1 Hr	

Test equipment :	Programmable temp	erature & humidity chamb	ber		
	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 :	5	ns must be checked with a o abnormalities, which co			·
Test result :	There are should be	no " ! " or " ? " mark displ	ay at device manager		
	There is no damage	in electronic and mechan	ical functions.		
	Degradation has no	been found.			
	Performance is mair	ntained with no incurable p	physical damage or degi	adation.	





Temperature cycle test

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				D	MR Task Num	
						反本 A1
est Engineer		Jeffery	Date	2014/10/11~2014/10/13	Result	Pass
est Configuration						
odel name	RITY10R1					
CB version	A02					
PU Type	Freescale i.MX6 0	Cortex-A9 Dual lit	e CPU 1GHz			
S	Android 4.3					
ernel Version	3.0.35					
lemory	Micron DDR3 160)		
torage	Micron 4GB eMM		A-4M)			
dapter	FSP090-DMAB1 1	19V 4.74A 90W				
emperature cycle test						
est Standard :	Reference IEC60068-2	2-14 Testing procedu	res			
	Test N : Change of ter	mperature test				
ant Condition :	1 Test Temperature	lich tomporature 45°	C DU059/ / Low tom	poroture E°C		
est Condition :	1 Test Temperature : I	• •		perature -o		
	2 Test dwell Time : 2 h					
	3 Temperature slope :	-	ng 1 hour			
	4 Test cycle : 8 cycles					
	5 Test software : H.26					
	6 Test environment cu	irve				
	Tomp 25°C			cle		
	Temp. 25℃ Temp5℃ Time Hrs				<u> </u>	
		2H 1.5H	2Н 1.5Н		<u> </u>	
est equipment :	Temp5°C		2H 1.5H		<u> </u>	
st equipment ∶	Temp5℃ Time Hrs 1.5H		2H 1.5H		/	
est equipment :	Temp5℃ Time Hrs 1.5H Programmable temper		2H 1.5H mber	THS-D4T-150+LN2	KSON THS-A4T	-100
est equipment :	Temp5°C Time Hrs 1.5H Programmable temper use chamber Model:	rature & humidity cha Ten Billion FX1004	2H 1.5H mber V		KSON THS-A4T 2013/12/20	
est equipment :	Temp5℃ Time Hrs 1.5H Programmable temper use chamber	rature & humidity cha	2H 1.5H mber V THS-D4T-150	THS-D4T-150+LN2		
əst equipment :	Temp5°C Time Hrs 1.5H Programmable temper use chamber Model: Date of calibration :	rature & humidity cha Ten Billion FX1004	2H 1.5H mber V THS-D4T-150	THS-D4T-150+LN2		
	Temp5°C Time Hrs 1.5H Programmable temper use chamber Model: Date of calibration :	rature & humidity cha Ten Billion FX1004 2013/12/20	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2 2014/6/26	2013/12/20	
	Temp5°C Time Hrs 1.5H Programmable temper use chamber Model: Date of calibration : 105 (Tj) 1 All system functions	rature & humidity cha Ten Billion FX1004 2013/12/20	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2	2013/12/20	
	Temp5°C Time Hrs 1.5H Programmable temper use chamber Model: Date of calibration :	rature & humidity cha Ten Billion FX1004 2013/12/20	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2 2014/6/26	2013/12/20	
erformance criteria :	Temp5°C Time Hrs 1.5H Programmable temper use chamber Model: Date of calibration : 105 (Tj) 1 All system functions #VALUE!	Ten Billion FX1004 2013/12/20 must be checked wit	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2 2014/6/26	2013/12/20	
erformance criteria :	Temp5°C Time Hrs 1.5H Programmable temper use chamber Model: Date of calibration : 105 (Tj) 1 All system functions #VALUE! There is no damage in	Ten Billion FX1004 2013/12/20 must be checked wit	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2 2014/6/26	2013/12/20	
erformance criteria :	Temp5°C Time Hrs 1.5H Programmable temper Use chamber Model: Date of calibration : 105 (Tj) 1 All system functions #VALUE! There is no damage in Degradation has no be	Ten Billion FX1004 2013/12/20 must be checked wit n electronic and mech- cen found.	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2 2014/6/26	2013/12/20	
est equipment : erformance criteria : est result :	Temp5°C Time Hrs 1.5H Programmable temper use chamber Model: Date of calibration : 105 (Tj) 1 All system functions #VALUE! There is no damage in	Ten Billion FX1004 2013/12/20 must be checked wit n electronic and mech- cen found.	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2 2014/6/26	2013/12/20	
erformance criteria :	Temp5°C Time Hrs 1.5H Programmable temper Use chamber Model: Date of calibration : 105 (Tj) 1 All system functions #VALUE! There is no damage in Degradation has no be	Ten Billion FX1004 2013/12/20 must be checked wit n electronic and mech- cen found.	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2 2014/6/26	2013/12/20	
erformance criteria :	Temp5°C Time Hrs 1.5H Programmable temper Use chamber Model: Date of calibration : 105 (Tj) 1 All system functions #VALUE! There is no damage in Degradation has no be	Ten Billion FX1004 2013/12/20 must be checked wit n electronic and mech- cen found.	2H 1.5H mber V THS-D4T-150 2014/6/26	THS-D4T-150+LN2 2014/6/26	2013/12/20	







Power on cycle test

avalue

DMR Task Number T25044-00

Test Engineer		Jeffery	Date	2014/10/20~2014/10/21	-5℃ Result	Pass
Test Configuration					45℃ Result	Pass
Model name	RITY10R1					
PCB version	A02					
CPU Type	Freescale i.MX6	Cortex-A9 Dual	lite CPU 1GHz			
OS	Ubuntu 12.04					
Kernel Version	3.0.35					
Memory	Micron DDR3 16	00 1GB (MT41k	(256M16HA-125:E)			
Storage	Micron 4GB eMM	IC (MTFC4GM)	/EA-4M)			
Adapter	FSP090-DMAB1	19V 4.74A 90W	/			
Power On/Off Test						

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 :

1 Test temperature : -5°C

Condition

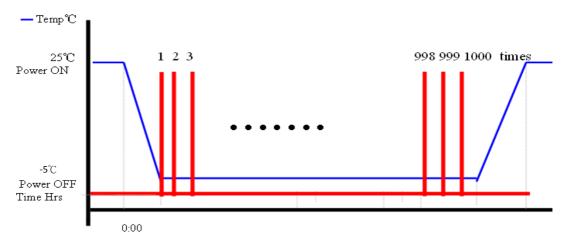
2 Number of test : 1000 times

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°C

2 Number of test : 1000 times

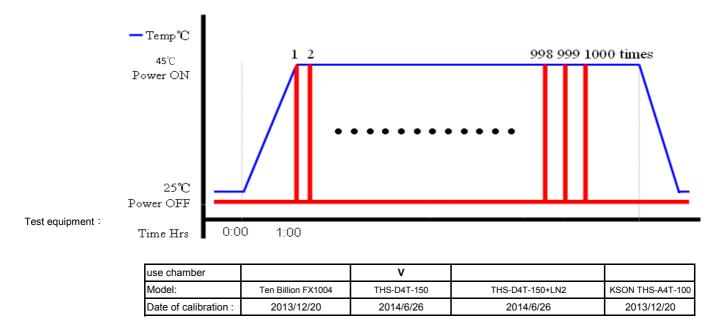
105 (Tj)

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

FVALUE:

C) Recycle step A and B for 1000 times.

5 Test environment curve :

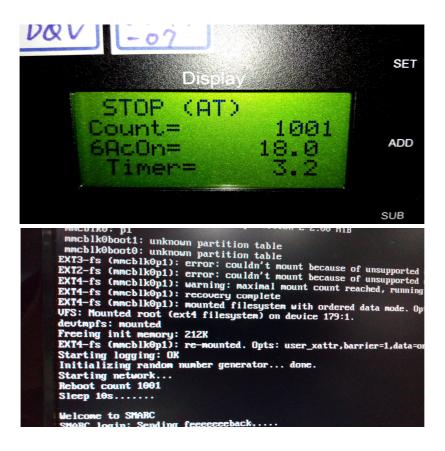


Performance criteria :

teria: 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.





Storage test

evalue

DMR Task Number T25044-00

Test Engineer							i ber T25044-00 反本 A1
		Jeffery	Date	2014/10/24~20	14/10/27	Result	Pass
est Configuration	n						
lodel name	RITY10R1						
CB version	A02						
PU Type	Freescale i.MX6	Cortex-A9 Dua	al lite CPU 1GHz				
)S	Android 4.3						
Cernel Version	3.0.35						
lemory	Micron DDR3 16	600 1GB (MT41	K256M16HA-125	:E)			
Storage	Micron 4GB eMI	MC (MTFC4GM	IVEA-4M)	· · ·			
Adapter	FSP090-DMAB1	1 19V 4.74A 90\	N				
torage Test							
est Standard :	Reference IEC6006	8-2-3 High tempera	ture & Humidity stora	ge test Test : Ca			
	Reference IEC6006	8-2-1 Cold test Tes	t : Ab				
est Condition :	Condition						
	Low temperature se	tup					
	1 Test temperature	: -5° $\mathbb C$ (if system has	s LCD panel,storage	temperature depend o	on panel spec.)		
	2 Test time : 24 hou	irs	-				
	3 Temperature grad	ient 1℃/minute					
	High temperature s						
	1 Test temperature						
	2 Test humidity : RH 3 Test time : 24 hou						
	4 Temperature grad						
	60°C 95% 25°C 50% -5°C		26:30 27:10	51-10	51:50		
	time Hrs 1:00	25:00	20.50 27.10	51.10	51.50		
est equipment :	time Hrs 105 (1)) Programmable temp			51.10	51.50		
est equipment :	105 (1J)			51.10	28.30	7	
est equipment :	וטס (ון) Programmable temp		chamber V	THS-D4T-150+LN2	KSON THS-A4T-100	-	







Random Vibration Operation

DMR Task Number T25044-00

版本 A1

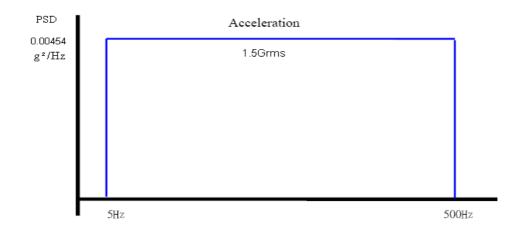
				j.	값本 Α1		
Test Engineer	James	Date	2014/10/15	Result	Pass		
Test Configuration							
Model name	RITY10R1						
PCB version	A02						
CPU Type	Freescale i.MX6 Cortex-A9 Dual lite	e CPU 1GHz					
OS	Android 4.3						
Kernel Version	3.0.35						
Memory	Micron DDR3 1600 1GB (MT41K25	licron DDR3 1600 1GB (MT41K256M16HA-125:E)					
Storage	Micron 4GB eMMC (MTFC4GMVE	A-4M)					
Adapter	FSP090-DMAB1 19V 4.74A 90W						
Random Vibration Operat	ion						
Test Standard :	Reference IEC60068-2-64 Testing procedu	res					
	Test Fh : Vibration boardband random Test						
Test Condition :	1 Test PSD : 0.00454G²/Hz , 1.5 Grms						
	2 Test frequency : 5~500 Hz						
	2 Test suis / V and 7 suis						

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
	105 (Tj)

Performance criteria :

105

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.



Sine Vibration test (Non-operation)

DMR Task Number

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					版本	0
Test Engineer	James	Date	2014/10/15	Result		Pass
Test Configuration						
Model name	RITY10R1					
PCB version	A02					
СРИ Туре	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz					
OS	Android 4.3					
Kernel Version	3.0.35					
Memory	Micron DDR3 16	00 1GB (MT41K	256M16HA-125:E)			
Storage	Micron 4GB eMM	IC (MTFC4GM\	/EA-4M)			
Adapter	FSP090-DMAB1	19V 4.74A 90W				

Random Vibration Operation

Test Standard :	Reference IEC60068-2-6 Testing procedures							
	Test Fc : Vibration sinusoidal							
Test Condition :	1 Test Acceleration : 2G							
	2 Test frequency : 5~500 Hz							
	3 Sweep : 1 Oct/ per one minute. (logarithmic)							
	4 Test axis : X,Y and Z axis							
	5 Test time :10 min. each axis							
	6 System condition : Non-Operating mode							
	7 Test curve							
	g Sine Test Control Profile							
	1.000							
	0.1000							
	0.0100 0.000 10.000 Frequency(Hz)							
Testessiensente								
Test equipment :	Vibration simulator system							
	105 (Tj)							
	Model : VS-300VH							
	#VALUE!							
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 :

Test picture :

There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.



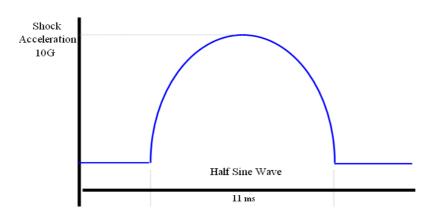
Bump Test



DMR Task Number T25044-00 版本 A1

)	
Test Engineer	James	Date	2014/10/17	Result	Pass
Test Configuratio	n				
Model name	RITY10R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Du	al lite CPU 1GHz			
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT4	1K256M16HA-12	5:E)		
Storage	Micron 4GB eMMC (MTFC4GM	MVEA-4M)			
Adapter	FSP090-DMAB1 19V 4.74A 90	W(
Test Standard :	Reference IEC 60068-2-29 Tes	sting procedures			
	Test Eb : Bump Test				
Test Condition :	Wave form : Half Sine wave				
	Acceleration Rate : 10g				
	Duration Time : 11ms				
	No. of Shock : Z axis 1000 tim	es			

Test curve :



System condition : operation (running burn in test program)

Test equipment :

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

Test Axis: Z axis

105 (Tj)

105

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.



Package vibration test

DMR Task Number T25044-00 版木 A1

avalue

				版本 A1				
Test Engineer	Jeffery	Date	2014/10/17	Result Pass				
Test Configuratior	n i							
Model name	RITY10R1							
PCB version	A02							
СРИ Туре	Freescale i.MX6 Cortex-A9	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz						
OS	Android 4.3							
Kernel Version	3.0.35							
Memory	Micron DDR3 1600 1GB (M	1T41K256M16HA	-125:E)					
Storage	Micron 4GB eMMC (MTFC	4GMVEA-4M)						
Adapter	FSP090-DMAB1 19V 4.74	4 90W						
Package Vibration Test								
Test Standard :	Reference IEC60068-2-64 Testing	g procedures						
	Test Fh : Vibration boardband ran	ndom Test						
Test Condition :	1 Test PSD : 0.026G²/Hz , 2.16 G	Brms						
	2 Test frequency : 5~500 Hz							
	3 Test axis : X,Y and Z axis							
	4 Test time : 30 minutes each axi	s						
	5 Test curve							
	I	Acceleration 2.1	Chrona					
	1.52	Acceleration 2.10	ooms					
	0.026g²/Hz							
			-6	db/oct				
	5Hz	100H	Iz	500Hz				
Test equipment :	Vibration simulator system							
	Model : VS-300VH							
	Date of calibration : 2014/8/18							
Performance criteria :	105 (Tj)							
	2 There should be no abnormalitie	es, which couldn't affe	ct the product specified functions	and performances				
	#VALUE!							
	4 All screws should be tightened up appropriately							
	5 All gaps on the surface are app							
	6 The assembling / disassembling	g of the system enclos	sure must be smooth and no defo	rmed parts should be found				
Test result :	There is no damage in electronic	and mechanical function	ons.					
	Degradation has no been found.							
	Performance is maintained with n	o incurable physical d	amage or degradation.					
			0					



Package Drop Test



DMR Task Number T25044-00

				DMR Task Nun	1ber T25044-00 版本 A1
Test Engineer	Jeffery	Date	2014/10/17	Result	Pass
Test Configuration					
Model name	RITY10R1				
PCB version	A02				
CPU Type	Freescale i.MX6 Cortex-A9 Du	al lite CPU 1GHz	7		
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1600 1GB (MT4	1K256M16HA-12	25:E)		
Storage	Micron 4GB eMMC (MTFC4GM	VVEA-4M)			
Adapter	FSP090-DMAB1 19V 4.74A 90	W			
Package Drop Test					
Test Standard :	Reference ISTA 2A, Method : IEC-600 Test Ea : Drop Test				
Test Condition :	1 Test phase : One corner, three edge	es, six faces			
	2 Test high : 96.5cm				
	3 Package weight : 3Kg				
	4 Test drawing Right Side	Topsia Rear Side	de	Left Side	
	Front Side	Bottom Side	Short Eo Damage Corner	Mid Edge dge	
Test equipment :	Drop test machine J.T.M Tech. Model : JTM-1775				
Performance criteria :	 All system functions must be checked (Tj) The cover and connectors should we #VALUE! All gaps on the surface are appropriate The assembling / disassembling of the surface 	ork properly without a	any interference		
Test result :	There is no damage in electronic and Degradation has no been found. Performance is maintained with no inc				



Misuse Test



DMR Task Number T25044-00

版本 🖌	\1	
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				110,			
Test Engineer	Jeffery	Date	2014/10/17	Result	Pass		
Model name	RITY10R1						
PCB version	A02						
CPU Type	Freescale i.MX6	Cortex-A9 Dual lite	CPU 1GHz				
OS	Android 4.3						
Kernel Version	3.0.35						
Memory	Micron DDR3 16	00 1GB (MT41K256	6M16HA-125:E)				
Storage	Micron 4GB eMM	MC (MTFC4GMVEA	-4M)				
Adapter	FSP090-DMAB1	19V 4.74A 90W					

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

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

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



1-1 Turn on the system and press any two keys simultaneous until system into OS.

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

2 Opposite operation

2-1 PS/2 keyboard connector connect with PS/2 mouse then power on and boot into the OS.

2-2 PS/2 mouse connector connect with PS/2 keyboard then power on and boot into the OS.

2-3 Audio line out connector connect with MIC then turn on system and play music file.

2-4 Cash drawer cable RJ11 connect to RJ45 connector then power on and boot into the OS.

3 Halfway

3-1 Directly turn off power at system starting boot up into OS.

- 3-2 Insert devices at system starting boot up.
- 3-3 Removed devices at system executing closing.

4 Incomplete operation

105 (Tj)

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
	1-1	Keyboard		DVT	Pass	
Simultaneous operation	1-2	Mouse		DVT	Pass	
	1-3	Touch		DVT	Pass	
	2-1	Mouse		DVT	NA	
Opposite operation	2-2	Keyboard		DVT	NA	
Opposite operation	2-3	Audio		DVT	Pass	
	2-4	RJ45	RJ11 cable	DVT	Pass	
Halfway	3-1			DVT	Pass	
	3-2	USB Key/Mous		DVT	Pass	
	3-3	USB Key/Mous		DVT	Pass	
Incomplete operation	4-1			DVT	Pass	
	4-2	USB Key/Mous		DVT	Pass	
	5-1			DVT	Pass	
Procedure omission		19V		DVT	Pass	
		24V		DVT	NA	
Wrong procedure	6-1			DVT	Pass	
Wrong procedure	6-2			DVT	Pass	



DMR Task Number T25044-00

版本 A1

				- 「人又・	4 A1
Test Engineer	Jeffery	Date	2014/10/17	Result	Pass
Model name	RITY10R1				
PCB version	A02				
CPU Type	Freescale i.MX6	6 Cortex-A9 Dual lite	CPU 1GHz		
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1	600 1GB (MT41K256	M16HA-125:E)		
Storage	Micron 4GB eM	MC (MTFC4GMVEA	-4M)		
Adapter	FSP090-DMAB	1 19V 4.74A 90W			
Adapter					

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°C ± 2°C ambient Humidity : 60 ± 10% RH

Test Procedure:

1 Adjust the serial port DC output to +5V by jumper cap.

2 Turn on the test item and startup into the OS

3 Perform the short test +5V to GND

4 Adjust the serial port DC output to +12V by jumper cap, then repeat step 2 and 3.

5 Turn on the test item and startup into the OS

9 Turn on the test item and startup into the OS

10 Turn on the test item and startup into the OS

11 Perform the DC IN short test. (DC IN power supply only)

Judgment Criteria:

1 There must be no danger of fire.

2 It must not catch fire.

3 It must not produce smoke. (If the product is equipped with a protective device, smoke is allowed in an amount not exceeding that produced by the burning end of a cigarette for 10 seconds.)

4 Solder must not have been melted by heating of components.

5 The case must not deform from the generated heat.

6 The product must not present a danger of electric shock.

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

Thermal and Capacitor Life time Calculation



DMR Task Number T25044-00

版本 A1	Σ A1	版本
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Test Engineer	James	Date	2014/11/5	Result	Pass		
Test Configuration							
Model name	RITY10R1						
PCB version	A02						
CPU Type	Freescale i.MX6	Freescale i.MX6 Cortex-A9 Dual lite CPU 1GHz					
OS	Android 4.3						
Kernel Version	3.0.35						
Memory	Micron DDR3 1	600 1GB (MT41K25	6M16HA-125:E)				
Storage	Micron 4GB eM	MC (MTFC4GMVEA	A-4M)				
Adapter	FSP090-DMAB	1 19V 4.74A 90W					

∆Tx=(Ts-Tx) x Kc

Where:

Ts =

Tx =

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

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

Where: Lx = Lifetime (hours) of the capacitor to be estimated Lo = Base lifetime (hours) of the capacitor described in the specification sheet

- То = Maximum rated operating temperature
- Тх

= Actual ambient temperature (°C) 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 (°C) 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 × 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 ;

2000 Hours for PX/PXAPS/PSA series
 Maximum rated operating temperature (105/C for PX/PXAPS/PSA series
 Tx = Actual ambient temperature (*C) 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.)

	Coefficient standing For the Kc's, refer				o the (Ts	s - Tx)
Kc :	Capacitor diameter (mm)	φ5- φ8	φ10	φ12.5	φ16	¢18
	Kc	1.10	1.15	1.20	1.25	1.30

Actual ambient temperature (°C) of the capacitor

Surface temperature (°C) of the case

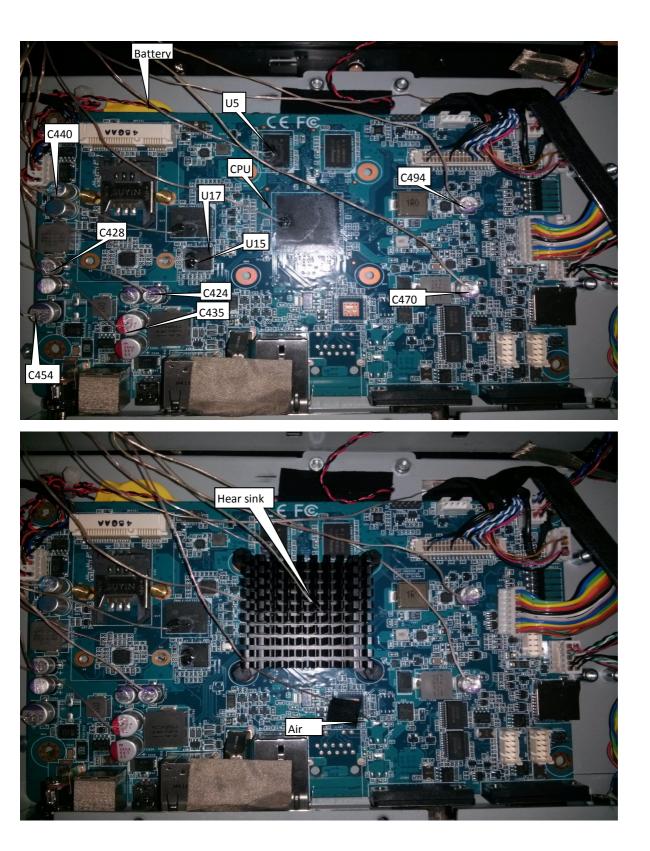
Test procedure :	Fest procedure : 1. Room Temperature Thermal and Capacitor Life time Calculation & battery, Panel, Inverter or Converter						
Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
25 ℃	C424	C428	C435	C440	C454	C470	C494
Ts(°C)	54.70	50.60	52.90	50.20	49.60	49.50	49.40
Tx(°C)							
Lo(hours)	5000	5000	2000	5000	5000	5000	5000
Kc							
Δ Τx(°C)							
Lx(hours)	1636703	2624037	805434	2747704	2944218	2978311	3012798
Life(years)	186.84	299.55	91.94	313.66	336.10	339.99	343.93
Result	Pass	Pass	Pass	Pass	Pass	Pass	Pass

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Chamber	Freescale iMX6 Duallite 1G Hz	Micron DDR3	Micron DDR3
25 ℃	U1	U5	U6
SPEC(Tc)	105 (Tj)	95.00	95.00
Ts	58.10	57.60	56.90
SPEC - Ts	46.90	37.40	38.10
Result	Pass	Pass	Pass

Chamber	SMSC USB2517- JZX	Micron emmc 4G	Micrel KSZ9031R NXCA	PenMount 6000- 6001017 Ver.6.0.0	Wolfson WM8962BE CSN/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	62.90	56.40	54.50	62.70	48.60	40.00	38.50	42.10	57.30





Thermal and Capacitor Life time Calculation



版本 A1

DMR Task Number T25044-00

Test Engineer	James	Date	2014/11/5	Result	Pass
Test Configuration					
Model name	RITY10R1				
PCB version	A02				
CPU Type	Freescale i.MX6	6 Cortex-A9 Dual lite	e CPU 1GHz		
OS	Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3 1	600 1GB (MT41K25	6M16HA-125:E)		
Storage	Micron 4GB eM	MC (MTFC4GMVE/	4-4M)		
Adapter	FSP090-DMAB	1 19V 4.74A 90W			

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

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

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 (°C) 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 (°C) in core temperature of the capacitor due to rated (permissible)

maximum ripple current.

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

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

Test procedure :

= 2000 × 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 ;

2000 Hours for PX/PXAPS/PSA series
 Maximum rated operating temperature (105/C for PX/PXAPS/PSA series
 Tx = Actual ambient temperature (*C) 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.)

Chamber	aluminum						
40 °C	C424	C428	C435	C440	C454	C470	C494
Ts(℃)	66.70	63.60	65.90	63.20	62.70	63.40	63.40
Tx(°C)							
Lo(hours)	5000	5000	2000	5000	5000	5000	5000
Kc							
Δ Τx(°C)							
Lx(hours)	411121	587449	180314	615134	651583	601132	601132
Life(years)	46.93	67.06	20.58	70.22	74.38	68.62	68.62
Result	Pass						

∆Tx=(Ts-Tx) x Kc

Where: Ts = Surface temperature (°C) of the case

- Tx = Actual ambient temperature (°C) 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	¢18
	Kc	1.10	1.15	1.20	1.25	1.30

Chamber	Freescale iMX6 Duallite 1G Hz	Micron DDR3	Micron DDR3
40 ℃	U1	U5	U6
SPEC(Tc)	105 (Tj)	95.00	95.00
Ts	71.90	70.80	69.90
SPEC - Ts	33.10	24.20	25.10
Result	Pass	Pass	Pass

Chamber	SMSC USB2517- JZX	Micron emmc 4G	Micrel KSZ9031R NXCA	PenMount 6000- 6001017 Ver.6.0.0	Wolfson WM8962BE CSN/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	75.40	69.60	67.70	62.70	61.90	54.80	52.70	59.20	69.30



