

REV-SA01

Design Verification Report

Initiated by	Frank	Job Title	Engineer	Originate Date	2014/5/26
Reviewed by	Mars	Job Title	Engineer	Revision	QQ4-037 Rev.A7
	Clement		Engineer		
Approved by	Max	Job Title	Supervisor	DMR Task Number 版本	T21953-00 A1

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Product Information



DMR Task Number T21953-00

版本 A1

-			版		
	Test Unit Information				
Model	REV-SA01				
Description	SMARC Evaluation Carrrie	r Board			
PCB version	A1				
os	Ubuntu 12.04 LTS & Andro	id 4.3			
Kernel version	3.0.35	3.0.35			
Product phase	DVT Reversion, Supporting	DVT Reversion, Supporting			
Produced by	Frank				
CPU	Freescale i.MX6 Cortex-A9	Quad CPU , 800MHz			
PM IC	Wolfson WM8326G				
LAN chipset	Boardcom BCM54610	Connector location	CNx		
Touch	N/A	N/A			
LCD Panel Model	N/A				
Storage Size	4GB NAND Flash				
Internal Memory Size	DDR3L 1GB				

Product image





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版本 A1

Item		版本 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
	Power Consumption	Full load / Idel / Erp mode test	Pass
	Power Margin test	DC power source Upper / Middle / Low limit test	Limit
	Power interruption test	100/200/500/1000ms	Pass
	Room temperature Power on/off test	Room temperature / 4000times for system level	Pass
	High Temperature Test	85°C/24hrs IEC 60068-2-2 Test:Bb	Pass
	Low Temperature Test	-40°C /24hrs IEC 60068-2-1 Test:Ab	Pass
	Temperature cycle test	-40°C~85°C RH95% 8 cycles IEC 60068-2-14 Test:N	Pass
	Power on cycle test	-40°C / 1000times IEC 60068-2-1 Test:Ab	Pass
		85°C / 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

Misuse Test		Pass
Short Test		Pass
Thermal	1 Max. Loading at Room Temperature & 85°C 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

Audio Codec



DMR Task Number

T21953-00

Α1 REV-SA01 Availabi1ity Title **SMARC Evaluation Carrrier Board** SMARC specification compliant 3.5" formfactor Accepts 82mm x 50mm SMARC Modules Accepts 1.8V SMARC V_IO and 3.3V V_IO **√** HDMI port USB OTG mini USB connector - direct from SMARC ✓ USB 4 port from USB2514 (USB Type A x2, USB pin header x1, mPCle USB x1) SATA connector x1 GbE port with integrated magnetics **Features** I2S Audio codec (WM8962) RS232 support for all 4 SMARC serial ports (DB9x1, pin header x3) CAN Bus support (2) SD Card socket SIMM Socket Camera connector (CSI-2 signals + I2C + GPIOx2 + 3.3V or 5V) \checkmark RTC backup power sources - Lithiumcoin cell socket On-board accelerometer (MMA8451Q) +9~36V DC input LVDS connector (support 1x18/24 LVDS)(DF13-20DS-1.25C) **Specifications** System SMARC CPU Module socket: Accepts 82mm x 50mm SMARC Modules DB9 x1 DB15x1 HDMI x1 Edge conn Mini-USB x1 USB Type A x2 RJ45 x2 SD Socket x1 5V, GND, ENBKL, VR, PWM Backlight conn Hirose DF13-40DS-1.25, support 1x18/24bit LVDS LVDS connector HDMI HDMI connector VGA By Chrontel CH7055 (convert 24bit TTL signal to VGA) CAN BUS CAN BUS connector x2 (JST PHR-4) (CAN PHY TJA1041) **GPIO** 10bit GPIO(pin header) Audio connector Speaker out (L & R) USB Type A double deck x1 USB signal for mPCle (x1) **USB** USB 2.0 pin header (x1) Mini USB connector for USB OTG SATA SATA connector x1, 2pin wafer with 5V, 1A for SATA power CAN Bus CAN bus pin header x2 PCle mPCle socket x1 (with PClex1 & USB2.0 & USIM signal) RJ45 connector for GBE (with LED) Ethernet 2nd Ethernet From RTL8111E Camera connector with CSI-2 signals + I2C + GPIOx2 + 3.3V or 5V Camera Connector

WM8962, Line out, MIC in, Speaker out

RTC battery	CR2032, RTC chip is ISL1208	✓
Boot select	8 pin 2.0mm jumer	\checkmark
SD Socket	SD Socket, support SDHC	\checkmark
G-Sensor	MMA8451Q	\checkmark
LED	Power on LED	\checkmark
Ordering Information		
Notice		
Diagram		

LED indicator check



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	os	Note
lacksquare	Ubuntu 12.04	

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 requi	
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 on LED color check	✓		Green
Power LED indicator (LED indicator must be in the	Power LED Dark for system off	✓		Can't have Micro- Light lamp
darkroom confirmation)	Power LED Light for system turn on	✓		
	Power LED Flash for standby with ATX power	N/A		
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	✓		
	Data Rate , Green => 100Mbits/sec	✓		
Ethornot I ED indicator	Data Rate , Orange => 1000Mbits/sec	✓		
Ethernet LED indicator	Link / ACT , Off => not established	✓		
	Link / ACT , Yellow On => established	√		
	Link / ACT , Yellow Blinking => activity	✓		
Others LED indicator	Power on LED color check	N/A		
(LED indicator must be in the	LED Dark for system off	N/A		Can't have Micro- Light lamp
darkroom confirmation)	LED Light for system turn on	N/A		

Basic Function



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Test Engineer	Frank	Date:	2014/5/7	Result	Pass
Test Configuration					
Model name	REV-SA01				
PCB version	A1				
CPU Type	Freescale i.MX6 Quad CPU , 800MHz				
os	Ubuntu 12.04 LTS & Android 4.3				
Kernel Version	3.0.35				
Memory	Micron DDR3L 1GB				
NAND Flash	Micron 4GB				
Storage	8GB SDHC card				
MainBoard	SMA-iMX6 A1				
Adapter	FSP FSP060-DBAE1 AC/DC Adapter , 12	V/5A			

Subject	Test Item	Pass	Fail	Note
	*.wma	✓		
	*.H.264	✓		
	*.MP3	✓		
Audio Function	*.MP4	✓		
	Microphone	✓		
	Speaker adjust volume	✓		
	Alarm Colock volume	✓		
	Turn On/Off	N/A		
ViFi Function	Network notification	N/A		
VIFI FUNCTION	Download file from internet	N/A		
	WiFi Disconnect policy	N/A		
	Turn On/Off	N/A		
AN Function	Network notification	√		
AN FUNCTION	Download file from internet	√		
	Disconnect policy	√		
Sau 6	Device Enable/Disable	N/A		
Configuration	Encryption test	N/A		
ransmission	Read / Write Test(Upload/Download/Copy 10GB files)	N/A		
	Setup Installation	N/A		
nstallation & Un-installation	Upgrade Test	N/A		
	Add/Remove	N/A		
Connection	Download file from internet	✓		
inkt Conson	Brightness Level	N/A		
ight Sensor	Suspend mode	N/A		
	X · Y Reverse Test (90° · 180° · 360°)	✓		
S-Sensor	Gravity G-Sensor Calibration (SUFBS)	N/A		
	Zoom in / out image	N/A		
	Player image	N/A		
	Smart Auto	N/A		
	White balance	N/A		
	Color effect	N/A		
Camera	Camera settings	N/A		
	Date Style	N/A		
	Special shooting Function	N/A		
	REC Mode (Snapshot · Movie · Image Size)	N/A		

	Remove memory then power on, there is warning		
Speaker	beep from Buzzer (Speaker)	N/A	
Miss Operation	Mini Volume	✓	
	Max Volume	✓	
	Power off suddenly while OS is booting up.	✓	
Miss Operation	Reset system while OS is booting up.	✓	
	Reset system while OS is booting up.	✓	
	Auto detect	✓	
	System information is correct	✓	
SATA Device	Read/Write test (Copy 3GB file(s))	✓	have error message if the devices is NTFS format
	Confirm External Interface	✓	
	Reset system while OS is booting up.	✓	
	Auto detect	✓	
SD Cord	System information is correct	✓	
SD Card	SD Card Removable Devices	✓	
	Remove & Increase SD Card Device	✓	
	Hot plug function is normal (for all channels)	N/A	
	Read/Write test (Copy 1GB file(s))	N/A	
	Auto detect (for all channels)	✓	
	Hot plug function is normal (for all channels)	✓	
	System information is correct	✓	
	Read/Write test (Copy 3GB file(s))	✓	
	USB 2.0 Removable Devices	✓	
USB Port 1	Remove & Increase USB Device	✓	
	USB Keyboard / USB Mouse / USB HDD	√	have error message if the devices is NTFS
	Auto detect (for all channels)	√	_
	Hot plug function is normal (for all channels)	√	
	System information is correct	√	
	Read/Write test (Copy 3GB file(s))	√	
	USB 2.0 Removable Devices	√	
USB Port 2	Remove & Increase USB Device	√	
	USB Keyboard / USB Mouse / USB HDD	√	have error message if the devices is NTFS
	Auto detect (for all channels)	√	1,
	Hot plug function is normal (for all channels)	√	
	System information is correct	√	
	Read/Write test (Copy 3GB file(s))	√	
	USB 2.0 Removable Devices	√	
USB Port 3	Remove & Increase USB Device	√	
	USB Keyboard / USB Mouse / USB HDD	√	have error message if the devices is NTFS
	Send and receive messages	N/A	Used

CONFORT	Modem test	N/A	Debug
COM Port 2	Send and receive messages(Run serial_self)	✓	
COM Port 3	Send and receive messages(Run serial_self)	✓	
COM Port 4	Send and receive messages(Run serial self)	✓	
Can Bus	Send and receive messages(Run can.sh)	■	

Performance



Test Engineer	Frank	Date:	2014/5/7	Result	Pass			
Test Configuration								
Model name	REV-SA01							
PCB version	A1							
CPU Type	Freescale i.MX6 Quad CPU , 800MHz	reescale i.MX6 Quad CPU , 800MHz						
os	Ubuntu 12.04 LTS & Android 4.3	Ubuntu 12.04 LTS & Android 4.3						
Kernel Version	3.0.35							
Memory	Micron DDR3L 1GB							
NAND Flash	Micron 4GB							
Storage	8GB SDHC card							
MainBoard	SMA-iMX6 A1							
Adapter	FSP FSP060-DBAE1 AC/DC Adapter , 12V/5A							

benc	

Subject	Test Item	Sc	Score		
Subject	Test item	Solo	Quad		
	Min (ms)	3.01	3.01		
CPU	Avg (ms)	3.05	3.02		
CPU	Max (ms)	23.69	23.48		
	Approx. 95 percentile (ms)	3.05	3.02		
	Min (ms)	0.22	0.16		
Throad	Avg (ms)	238.23	140.42		
Thread	Max (ms)	1403.42	1336.20		
	Approx. 95 percentile (ms)	724.18	478.55		
	Min (ms)	0.05	0.06		
10	Avg (ms)	79.61	79.18		
10	Max (ms)	7411.04	6080.29		
	Approx. 95 percentile (ms)	390.77	530.29		
	Min (ms)	0.00	0.00		
Momony	Avg (ms)	0.00	0.00		
Memory	Max (ms)	15.61	4.04		
	Approx. 95 percentile (ms)	0.00	0.00		
	Min (ms)	3614.04	4197.29		
Mutov	Avg (ms)	4773.10	4365.48		
Mutex	Max (ms)	5148.26	4452.19		
	Approx. 95 percentile (ms)	5123.15	4436.15		

Power Consumption



DMR Task Number T21953-00

版本 A1

Test Engineer	Frank	Date :	2014/5/8	Result	Pass			
Test Configuration								
Model name	REV-SA01							
PCB version	A1	1						
CPU Type	Freescale i.MX6 Quad CP	eescale i.MX6 Quad CPU , 800MHz						
OS	Ubuntu 12.04 LTS & Andr	Jbuntu 12.04 LTS & Android 4.3						
Kernel Version	3.0.35							
Memory	Micron DDR3L 1GB							
NAND Flash	Micron 4GB							
Storage	8GB SDHC card	GB SDHC card						
MainBoard	MA-iMX6 A1							
Adapter	FSP FSP060-DBAE1 AC/DC Adapter , 12V/5A							

Testing Software (MAX. load)

1 Runing a Game

**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)					
Voltage/Condition	Power on - Boot procedure	ldle mode	Suspend Mode	S5 Mode	Max Load	Test Softw are	Note / Issue ID
+12V	0.54	0.35	0.20	N/A	0.55		
Total (Watt)	6.48	4.20	2.40	N/A	6.60		
+19V	0.37	0.28	0.15	N/A	0.38		Quad
Total (Watt)	7.03	5.32	2.85	N/A	7.22		Quau
+24V	0.31	0.21	0.13	N/A	0.32		
Total (Watt)	7.44	5.04	3.12	N/A	7.68	1	
+12V	0.32	0.28	0.14	N/A	0.35		
Total (Watt)	3.84	3.36	1.68	N/A	4.20		
+19V	0.22	0.17	0.11	N/A	0.23		Solo
Total (Watt)	4.18	3.23	2.09	N/A	4.37		3010
+24V	0.18	0.14	0.09	N/A	0.20		
Total (Watt)	4.32	3.36	2.16	N/A	4.80		

Condition		ERP T			
		Voltage Condition	Current (A)	Watt (W)	Note / Issue ID
	\checkmark	12V	N/A	N/A	

Power margin Test



DMR Task Number T21953-00

版本 A1

Test Engineer	Frank	Date	2014/5/7	Result	Limit	
Test Configuration						
Model name	REV-SA01					
PCB version	A1					
CPU Type	Freescale i.MX6 Quad CPU , 800MHz					
os	Ubuntu 12.04 LTS & Android 4.3					
Kernel Version	3.0.35					
Memory	Micron DDR3L 1GB					
NAND Flash	Micron 4GB					
Storage	8GB SDHC card					
MainBoard	SMA-iMX6 A1					
Adapter	FSP FSP060-DBAE1 AC/DC Adapter , 12V/5A					

Power margin Test

ltem	Voltage	Spec	Limit	Test Stage	Result	Note/Issue ID
DC power upper limit	37.80V	36V	+5%	DVT	Limit	Up to 37V
DC power middle value	22.5V	(upper limit + low limit) /2		DVT	Pass	
DC power low limit	8.55V	9V	-5%	DVT	Limit	Lowest to 9V

- 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 T21953-00

版本 A1

Test Engineer	Frank	Date	2014/5/7	Result	Pass				
Test Configuration									
Model name	REV-SA01								
PCB version	A1								
CPU Type	Freescale i.MX6	Quad CPU, 800N	ИНz						
os	Ubuntu 12.04 LT	Ubuntu 12.04 LTS & Android 4.3							
Kernel Version	3.0.35								
Memory	Micron DDR3L 1	GB							
NAND Flash	Micron 4GB	/licron 4GB							
Storage	BGB SDHC card								
MainBoard	SMA-iMX6 A1								
Adapter	FSP FSP060-DE	BAE1 AC/DC Adap	ter , 12V/5A	FSP FSP060-DBAE1 AC/DC Adapter , 12V/5A					

Power interruption test

Test Condition : Environment : 25° C ± 2° C ambient Humidity : $50 \pm 10^{\circ}$ RH

Test time: 10 times

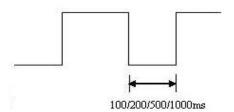
Interval time 100ms/200ms/500ms/1000ms

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
		100ms	AT	DVT	Pass	
Power interruption	FSP FSP060-	200ms	AT	DVT	Pass	
Test	DBAE1	500ms	AT	DVT	Pass	
		1000ms	AT	DVT	Pass	

Room Temp Power On/Off Test



DMR Task Number T21953-00

版本 A1

				710	X/T-711				
Test Engineer	Frank	Date	2014/5/16~2014/5/19	Result	Pass				
Test Configuration									
Model name	REV-SA01	REV-SA01							
PCB version	A1	v1							
CPU Type	Freescale i.M.	reescale i.MX6 Quad CPU , 800MHz							
os	Ubuntu 12.04	Ubuntu 12.04 LTS & Android 4.3							
Kernel Version	3.0.35								
Memory	Micron DDR3	L 1GB							
NAND Flash	Micron 4GB	Aicron 4GB							
Storage	8GB SDHC ca	BGB SDHC card							
MainBoard	SMA-iMX6 A1	SMA-iMX6 A1							
Adapter	FSP FSP060-	FSP FSP060-DBAE1 AC/DC Adapter , 12V/5A							

Test Condition:

Condition

1 Test temperature : Room temperature

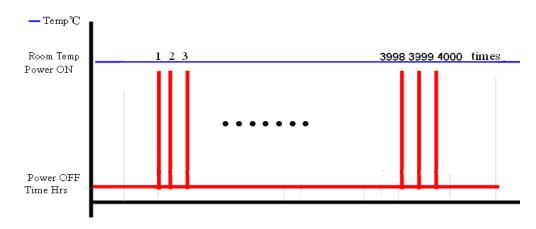
2 Number of test : 4000 times 3 Test software : Ubuntu

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 environment curve :



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 :

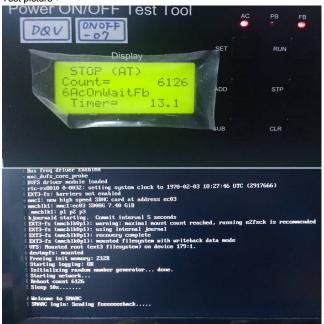
There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

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

Test picture :



High Temperature Operation Test



DMR Task Number T21953-00 版本 A1

				100	T- / ()
Test Engineer	Frank	Date	2014/5/8	Result	Pass
Test Configuration					
Model name	REV-SA01				
PCB version	A1				
CPU Type	Freescale i.M>	K6 Quad CPU, 8	00MHz		
OS	Ubuntu 12.04	LTS & Android 4	.3		
Kernel Version	3.0.35				
Memory	Micron DDR3L	_1GB			
NAND Flash	Micron 4GB				
Storage	8GB SDHC ca	ırd			
MainBoard	SMA-iMX6 A1				
Adapter	FSP FSP060-I	DBAE1 AC/DC A	dapter , 12V/5A		

Test Standard : Reference IEC60068-2-2 Testing procedures

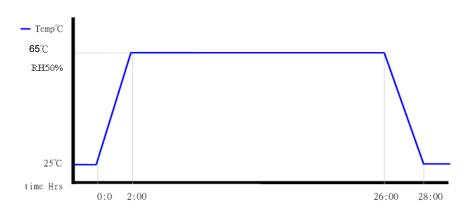
Test Bb : Dry Heat Test

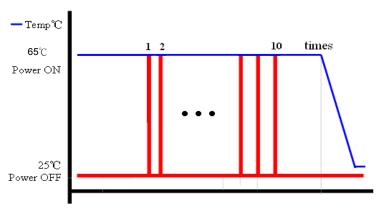
Test Condition : 1 Test Temperature : 65℃ for board level

2 Test Time : 24 hours

3 Test software: H.264 720P Video

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





Test equipment :

Programmable temperature & humidity chamber

. Togrammasio temperaturo a mammaty emamber										
use chamber		V								
Model:	Ten Billion FX1004	THS-D4T-150	THS-D4T-150+LN2	KSON THS-A4T-100						
Date of calibration :	2013/12/20	2013/6/13	2013/6/13	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 T21953-00

版本 A1

				102	1
Test Engineer	Frank	Date	2014/5/12	Result	Pass
Test Configuration					
Model name	REV-SA01				
PCB version	A1				
CPU Type	Freescale i.M	X6 Quad CPU, 80	00MHz		
os	Ubuntu 12.04	LTS & Android 4.3	3		
Kernel Version	3.0.35				
Memory	Micron DDR3	L 1GB			
NAND Flash	Micron 4GB				
Storage	8GB SDHC c	ard			
MainBoard	SMA-iMX6 A	1			
Adapter	FSP FSP060	-DBAE1 AC/DC Ac	dapter , 12V/5A		

Test Standard : Reference IEC60068-2-1 Testing procedures

Test Ab : Cold Test

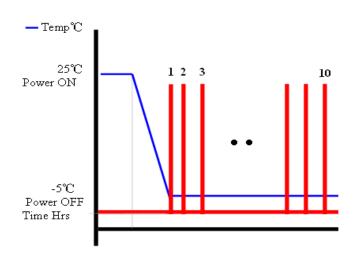
Test Condition : 1 Test Temperature : -5℃

2 Test Time : 24 hours 3 Test software : Mpeg video

Test procedure : 1 Power on at -5°C 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 $^{\circ}$ C 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	2013/6/13	2013/6/13	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 T21953-00

版本 A1

Test Engineer		Frank	Date	2014/5/9~2014/5/12	2 Result	Pass
Test Configuration						
Model name	REV-SA01					
PCB version	A1					
CPU Type	Freescale i.MX6 (Quad CPU, 800	MHz			
OS	Ubuntu 12.04 LTS	& Android 4.3				
Kernel Version	3.0.35					
Memory	Micron DDR3L 10	GB .				
NAND Flash	Micron 4GB					
Storage	8GB SDHC card					
MainBoard	SMA-iMX6 A1					
Adapter	FSP FSP060-DBA	AE1 AC/DC Ada	pter , 12V/5A		•	

Temperature cycle test

Test Standard : Reference IEC60068-2-14 Testing procedures

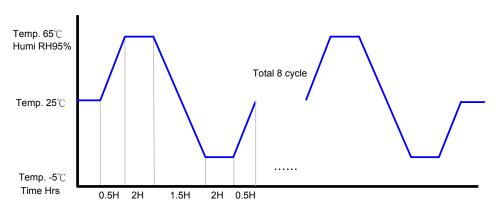
Test N : Change of temperature test

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 : Mpeg video 6 Test environment curve



Test equipment : Programmable temperature & humidity chamber

use chamber			V	
Model:	Ten Billion FX1004	THS-D4T-150	THS-D4T-150+LN2	KSON THS-A4T-100
Date of calibration :	2013/12/20	2013/6/13	2013/6/13	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 T21953-00

版本 A1

Test Engineer		Frank	Date	2014/5/19~2014/5/20	-5℃ Result	Pass
Test Configuration					65℃ Result	Pass
Model name	REV-SA01					
PCB version	A1					
CPU Type	Freescale i.MX6	Quad CPU, 800)MHz			
os	Ubuntu 12.04 LT	S & Android 4.3				
Kernel Version	3.0.35					
Memory	Micron DDR3L 1	GB				
NAND Flash	Micron 4GB					
Storage	8GB SDHC card					
MainBoard	SMA-iMX6 A1					
Adapter	FSP FSP060-DB	AE1 AC/DC Ada	apter, 12V/5A			

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

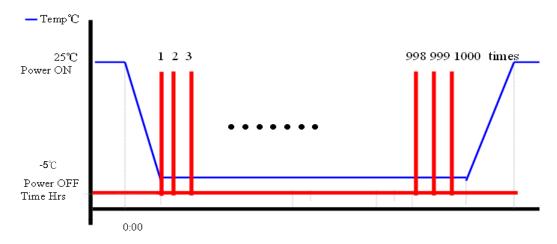
1 Test temperature : -5°C 2 Number of test : 1000 times 3 Test software : Ubuntu

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.

5 Test environment curve :



Condition II

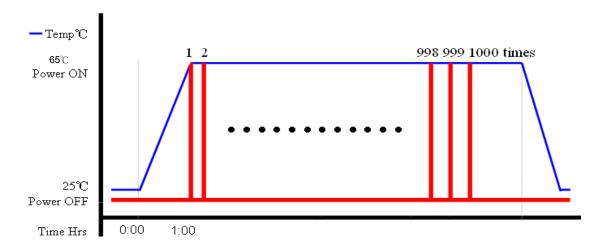
1 Test temperature : 65°C 2 Number of test : 1000 times 3 Test software : Ubuntu

 $4\ \mbox{Step}$: 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 :

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	2013/6/13	2013/6/13	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 : Quad



Storage test



DMR Task Number T21953-00

版本 A1

Test Engineer		Frank	Date	2014/5/2	3~2014/5/26	Result	Pass
Test Configuration							
Model name	REV-SA01						
PCB version	A1						
CPU Type	Freescale i.MX6 (Quad CPU , 80	00MHz				
os	Ubuntu 12.04 LTS	8 & Android 4.3	3				
Kernel Version	3.0.35						
Memory	Micron DDR3L 10	SB .					
NAND Flash	Micron 4GB						
Storage	8GB SDHC card						
MainBoard	SMA-iMX6 A1						
Adapter	FSP FSP060-DBA	AE1 AC/DC Ac	dapter, 12V/	5A			

Storage Test

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

Reference IEC60068-2-1 Cold test Test : Ab

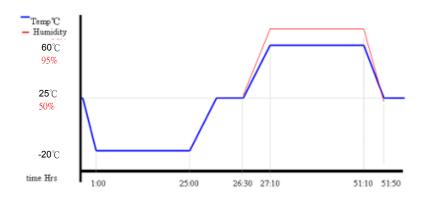
Test Condition : Condition

Low temperature setup

2 Test time: 24 hours

High temperature setup 1 Test temperature : 60°C 2 Test humidity : RH 95% 3 Test time : 24 hours

4 Temperature gradient 1 $^\circ\!\mathbb{C}$ /minute



Test equipment : Programmable temperature & humidity chamber

use chamber			V	
Model:	Ten Billion FX1004	THS-D4T-150	THS-D4T-150+LN2	KSON THS-A4T-100
Date of calibration :	2013/12/20	2013/6/13	2013/6/13	2013/12/20

Performance criteria :

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

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

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

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture :



Random Vibration Operation



DMR Task Number T21953-00

版本 A1

					/ [.	X字 AT
Test Engineer		Frank	Date	2014/5/15	Result	Pass
Test Configuration						
Model name	REV-SA01					
PCB version	A1					
CPU Type	Freescale i.MX6	Quad CPU, 80	0MHz			
os	Ubuntu 12.04 L	TS & Android 4.3	}			
Kernel Version	3.0.35					
Memory	Micron DDR3L	1GB				
NAND Flash	Micron 4GB					
Storage	8GB SDHC care	d				
MainBoard	SMA-iMX6 A1					
Adapter	FSP FSP060-D	BAE1 AC/DC Ad	apter , 12V/5A			

Random Vibration Operation

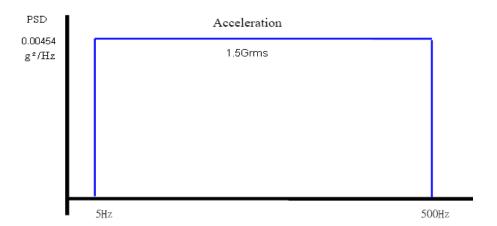
Test Standard : Reference IEC60068-2-64 Testing procedures

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: 2013/7/11

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

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

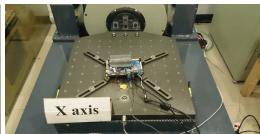
Test result : There is no damage in electronic and mechanical functions.

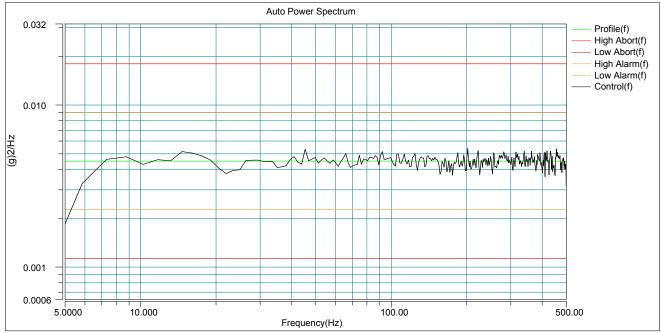
Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture :







 Current Level:
 100%

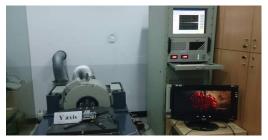
 Frame Time:
 0.682667 (s)

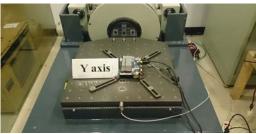
 DOF:
 150

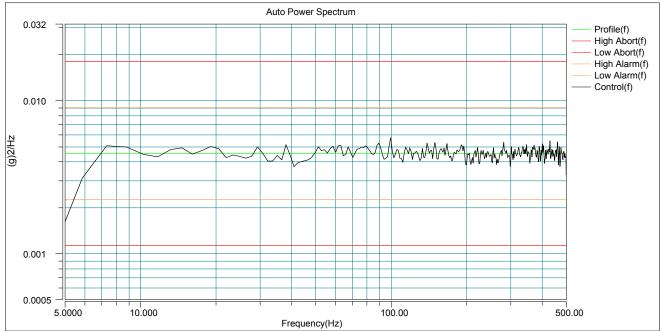
Demand RMS: 1.499 g
Lines: 400
Test Elapsed: 00:30:00

Control RMS: 1.49423 g
dF: 1.464844 Hz
Remaining Time: 00:00:00

Data was saved as a file at time: 2014-5-15 PM 02:52:08







Current Level: 100% Frame Time: 0.682667 (s)

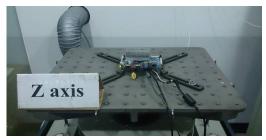
DOF:

Data was saved as a file at time: 2014-5-15 PM 03:30:57

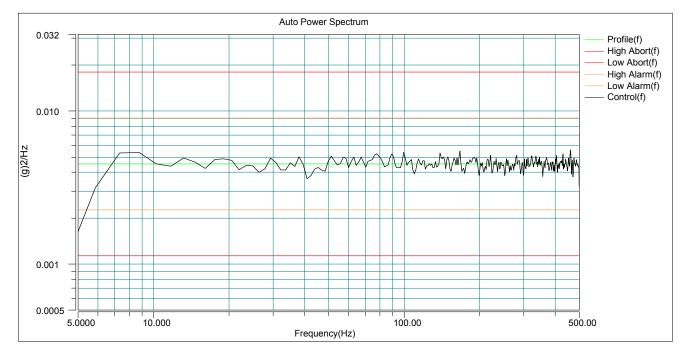
Demand RMS: 1.499 g Lines: 400 Test Elapsed: 00:30:00

1.49901 g Control RMS: 1.464844 Hz

Remaining Time: 00:00:00







 Current Level:
 100%

 Frame Time:
 0.682667 (s)

 DOF:
 150

Data was saved as a file at time: 2014-5-16 AM 10:52:54

Demand RMS: 1.499 g
Lines: 400
Test Elapsed: 00:30:00

Control RMS: 1.49774 g
dF: 1.464844 Hz
Remaining Time: 00:00:00

Random Vibration test (Non-operation)



DMR Task Number T21953-00

版本 A1

Test Engineer		Frank	Date	2014/5/15	Result	Pass
Test Configuration						
Model name	REV-SA01					
PCB version	A1					
CPU Type	Freescale i.MX	Quad CPU , 80	00MHz			
os	Ubuntu 12.04 L	TS & Android 4.	3			
Kernel Version	3.0.35					
Memory	Micron DDR3L	1GB				
NAND Flash	Micron 4GB					
Storage	8GB SDHC car	d				
MainBoard	SMA-iMX6 A1					
Adapter	FSP FSP060-D	BAE1 AC/DC A	dapter , 12V/5/	4		

Random Vibration Operation

Test Standard : Reference IEC60068-2-64 Testing procedures

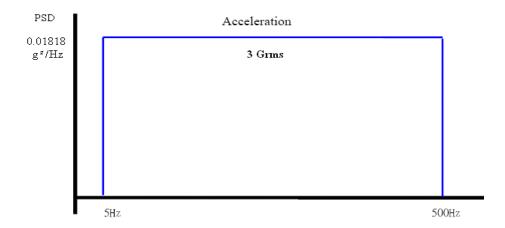
Test Fh: Vibration boardband random Test

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 equipment : Vibration simulator system

Model: VS-300VH

Date of calibration: 2013/7/11

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.

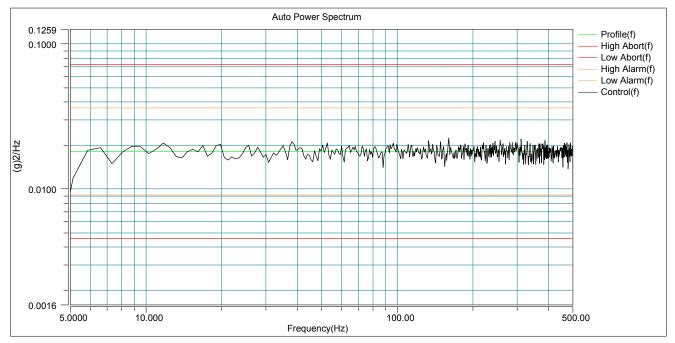
Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture :





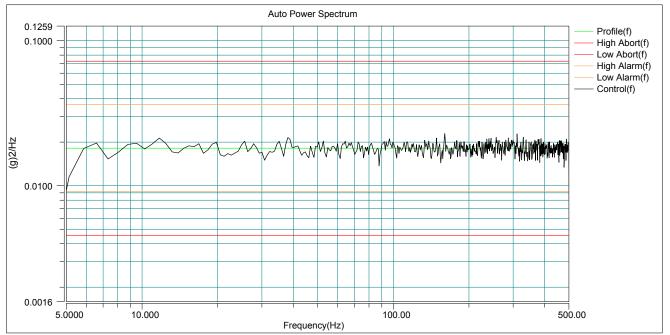


3.0001 g Current Level: 100% Demand RMS: Control RMS: 2.98974 g Frame Time: 1.365333 (s) Lines: 800 0.732422 Hz DOF: 150 Test Elapsed: 00:30:00 Remaining Time: 00:00:00

Data was saved as a file at time: 2014-5-15 PM 04:04:54





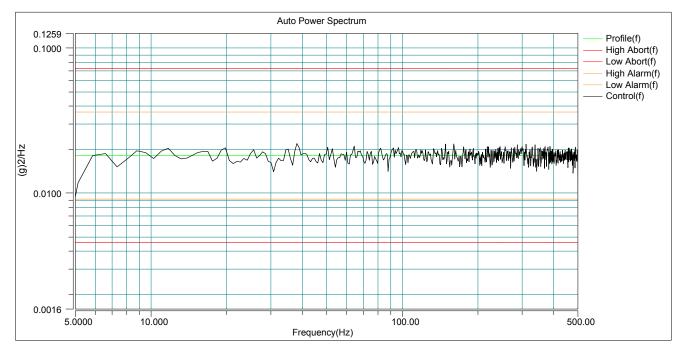


2.9929 g Current Level: 100% Demand RMS: 3.0001 g Control RMS: Frame Time: 1.365333 (s) Lines: 800 0.732422 Hz 00:00:00 DOF: Test Elapsed: 00:30:00 Remaining Time:

Data was saved as a file at time: 2014-5-15 PM 04:41:34







Current Level: 100% Demand RMS: 3.0001 g Control RMS: 2.99351 g Frame Time: 1.365333 (s) Lines: 800 dF: 0.732422 Hz DOF: 00:30:00 Remaining Time: 00:00:00 150 Test Elapsed:

Data was saved as a file at time: 2014-5-22 PM 03:27:36

Package vibration test



DMR Task Number T21953-00

版本 A1

Test Engineer		Frank	Date	2014/5	Resul	t Pass
Test Configuration						
Model name	REV-SA01					
PCB version	A1					
CPU Type	Freescale i.MX6 Quad CPU , 800MHz					
os	Ubuntu 12.04 LTS & Android 4.3					
Kernel Version	3.0.35					
Memory	Micron DDR3L 1GB					
NAND Flash	Micron 4GB					
Storage	8GB SDHC card					
MainBoard	SMA-iMX6 A1					
Adapter	FSP FSP060-DBAE1 AC/DC Adapter , 12V/5A					

Package Vibration Test

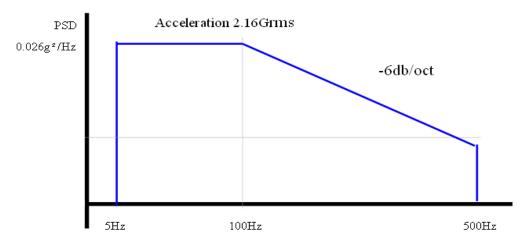
Test Standard : Reference IEC60068-2-64 Testing procedures

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: 2013/7/11

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

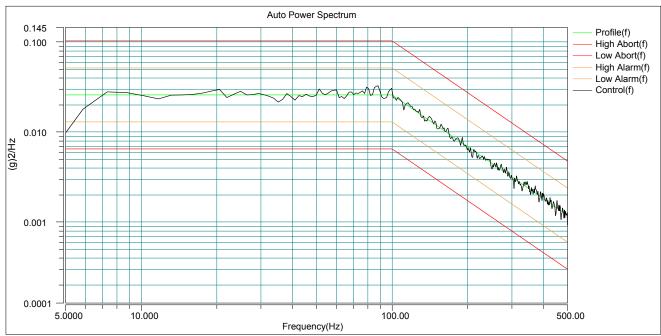
Test result : There is no damage in electronic and mechanical functions.

Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture :





 Current Level:
 100%

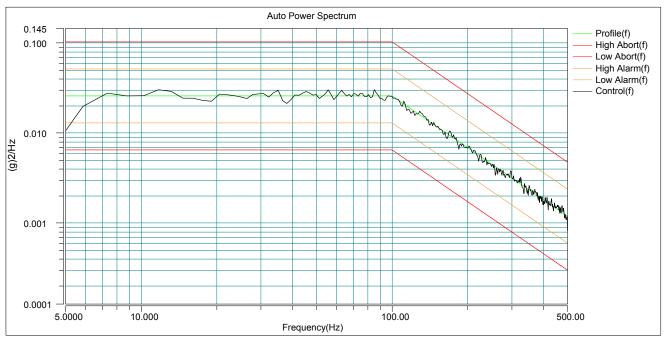
 Frame Time:
 0.682667 (s)

 DOF:
 150

Data was saved as a file at 2013-12-6 PM 02:11:12

Demand RMS: 2.16003 g Lines: 400 Test Elapsed: 00:30:00 Control RMS: 2.16906 g
dF: 1.464844 Hz
Remaining Time: 00:00:00





 Current Level:
 100%
 Demand RMS:

 Frame Time:
 0.682667 (s)
 Lines:

 DOF:
 150
 Test Elapsed:

Data was saved as a file at 2013-12-6 PM 04:35:47

 Imand RMS:
 2.16003 g
 Control RMS:

 Ides:
 400
 dF:

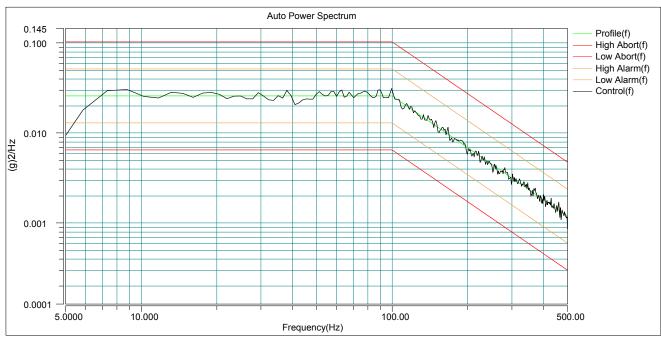
 st Elapsed:
 00:30:00
 Remaining Time:

2.1528 g

00:00:00

1.464844 Hz





 Current Level:
 100%

 Frame Time:
 0.682667 (s)

 DOF:
 150

Data was saved as a file at 2013-12-6 AM 11:06:14

Demand RMS: 2.16003 g
Lines: 400
Test Elapsed: 00:30:00

Control RMS: 2.16082 g
dF: 1.464844 Hz
Remaining Time: 00:00:00

Bump Test



DMR Task Number T21953-00

版本 A1

					///	∱ Al
Test Engineer		Frank	Date	2014/5/22	Result	Pass
Test Configuration						
Model name	REV-SA01					
PCB version	A1					
CPU Type	Freescale i.MX	6 Quad CPU , 800	MHz			
OS	Ubuntu 12.04 L	TS & Android 4.3				
Kernel Version	3.0.35					
Memory	Micron DDR3L	1GB				
NAND Flash	Micron 4GB					
Storage	8GB SDHC car	rd				
MainBoard	SMA-iMX6 A1					
Adapter	FSP FSP060-D	BAE1 AC/DC Ada	pter , 12V/5A			

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

Test Eb: Bump Test

Test Condition: Wave form: Half Sine wave

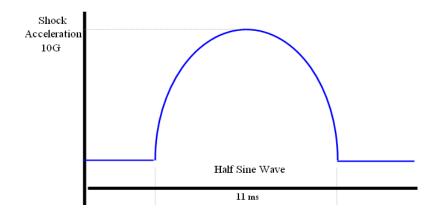
Acceleration Rate: 10g
Duration Time: 11ms

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: 2013/7/11

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.

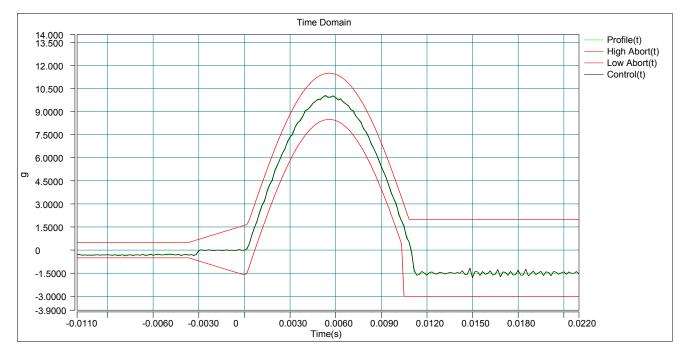
Degradation has no been found.

Performance is maintained with no incurable physical damage or degradation.

Test picture :







Shock Type: Half Sine
Current level: 100%
Block Size: 4096
Tested pulses: 1000

Data was saved as a file at 2014-5-22 PM 12:02:22

Amplitude: 10.000000 g
Demand peak: 10.000000 g
Frame Time: 0.682667 s
Output pulses: 1007

 Pulse Duration:
 11.000001 ms

 Control peak:
 10.060061 g

 dT:
 0.000167 s

 Remain pulses:
 0

Package Drop Test



DMR Task Number T21953-00

版本 A1

Test Engineer		Frank	Date	2014/5/22	Result	Pass
Test Configuration						
Model name	REV-SA01					
PCB version	A1					
CPU Type	Freescale i.MX6 (Quad CPU , 800	MHz			
os	Ubuntu 12.04 LTS	& Android 4.3				
Kernel Version	3.0.35					
Memory	Micron DDR3L 10	BB .				
NAND Flash	Micron 4GB					
Storage	8GB SDHC card					
MainBoard	SMA-iMX6 A1					
Adapter	FSP FSP060-DBA	AE1 AC/DC Ada	pter , 12V/5A			

Package Drop Test

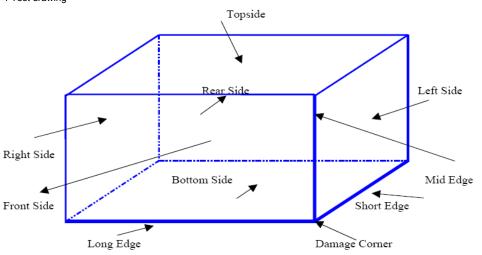
Test Standard : Reference ISTA 2A, Method : IEC-60068-2-32 Test:Ed

Test Ea: Drop Test

Test Condition: 1 Test phase: One corner, three edges, six faces

2 Test high: 96.5cm
3 Package weight: 0.2 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 :

One corner









Six faces













After test









Result: Surface is no impairment, Boot up to Windows is OK, Function OK.

Misuse Test



DMR Task Number T21953-00

版本 A1

Test Engineer	Frank Date	2014/5/15	Result	Pass
Model name	REV-SA01			
PCB version	A1			
CPU Type	Freescale i.MX6 Quad CPU , 800MHz			
OS	Ubuntu 12.04 LTS & Android 4.3			
Kernel Version	3.0.35			
Memory	Micron DDR3L 1GB			
NAND Flash	Micron 4GB			
Storage	8GB SDHC card			
MainBoard	SMA-iMX6 A1			
Adapter	FSP FSP060-DBAE1 AC/DC Adapter, 12	V/5A		

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

Test Procedure:

1 Simultaneous operation

- 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
	1-1	Keyboard		DVT	NA	
Simultaneous operation	1-2	Mouse		DVT	NA	
	1-3	Touch		DVT	NA	
	2-1	Mouse		DVT	NA	
Opposite operation	2-2	Keyboard		DVT	NA	
Opposite operation	2-3	Audio		DVT	NA	
	2-4	RJ11	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		12V		DVT	Pass	
FIOCEGUIE OIIIISSIOII	5-2	19V		DVT	Pass	
		24V		DVT	Pass	
Mrang procedure	6-1			DVT	NA	
Wrong procedure	6-2			DVT	NA	

Short Test



DMR Task Number T21953-00

版本 A1

Test Engineer	Frank Date	2014/5/15	Result	Pass
Model name	REV-SA01			
PCB version	A1			
CPU Type	Freescale i.MX6 Quad CPU , 800MHz			
OS	Ubuntu 12.04 LTS & Android 4.3			
Kernel Version	3.0.35			
Memory	Micron DDR3L 1GB			
NAND Flash	Micron 4GB			
Storage	8GB SDHC card			
MainBoard	SMA-iMX6 A1			
Adapter	FSP FSP060-DBAE1 AC/DC Adapter, 12\	V/5A	•	

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
- 6 Perform the USB port short test (VCC to GND)
- 7 Turn on the test item and startup into the OS
- 8 Perform the PS/2 ports short test (VCC to GND)
- 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 working well	DVT	Pass	
	COM2		DVT	N/A	
	COM3		DVT	N/A	
	COM4		DVT	N/A	
USB port	USB1	USB malfunction	DVT	Pass	
	USB2	USB malfunction	DVT	Pass	
	USB3			Pass	
PS/2	Keyboard		DVT	N/A	
	Mouse		DVT	N/A	
DC IN	12V	System shutdown	DVT	Pass	

Stability Test



DMR Task Number T21953-00

版本 A1

Test Engineer	Frank	Date	2014/5/14	Result	Pass			
Model name	REV-SA01							
PCB version	A1							
CPU Type	Freescale i.MX6 Qua	ad CPU , 800MHz	7_					
OS	Ubuntu 12.04 LTS &	Android 4.3						
Kernel Version	3.0.35							
Memory	Micron DDR3L 1GB							
NAND Flash	Micron 4GB							
Storage	8GB SDHC card	8GB SDHC card						
MainBoard	SMA-iMX6 A1	SMA-iMX6 A1						
Adapter	FSP FSP060-DBAE	1 AC/DC Adapter	, 12V/5A					

Power On/Off and Boot Test

Item	Comment	deta	ils	Test Stage	Result	Note/Issue ID
Timer	Time		\leq 2 sec/day	DVT	N/A	
Tilliel	RTC timer		\leq 2 sec/day	DVT	Pass	
Clock measured	32.768KHz	Range 32767.34464 ~32768.65536	32768 +/- 20 pp	DVT	Pass	32.76782
(Room temperature)	14.318MHz	Range 14.3186095454~ 14.3177504546	14.31818 +/- 30	DVT	N/A	
	25.0000MHz	Range 25.00075~24.9992	25.0000 +/- 30 p	DVT	Pass	24.99993
Power On/Off test (AT mode)	With CMOS battery		booting rate =10	DVT	Pass	
H/W Reset test (by reset button)	H/W reset		booting rate =10	DVT	Pass	

ltem	Voltage	Spec	Limit	Test Stage	Result	Note/Issue ID
DC power upper limit	37.8V	36V	+5%	DVT	Limit	Up to 37V
DC power low limit	8.55V	9V	-5%	DVT	Limit	Lowest to 9V

^{1.} Adjust DC power source to Upper/Low limit.

Adjust be power source to opper/towninit.
 ON/OFF test 10 cycles (1 minute ON and 1 minute OFF constitute 1 cycle)
 Turn on the system and startup into the OS Windows 8 professional make the product to maximum loaded condition, first confirm the functions then running PassMark Burn in test program (or specified test program) for 1hour.

LAN Port Stress Test

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

COM Port Stress Test									
System configuration									
COM Port	Testing condition	est Time(Hours	Test Stage	Result	Note/Issue ID				
COM1	1. Baud Rate: 115200		DVT	N/A					
COM2	2. Data Bits: 8 3. Parity: None	12	DVT	N/A					
COM3		12	DVT	N/A					
COM4	4. Stop Bits: 1		DVT	N/A					

Thermal and Capacitor Life time Calculation



DMR Task Number T21953-00

版本 A1

Test Engineer	Frank	Date	2014/5/16	Result	Pass
Test Configuration					
Model name	REV-SA01				
PCB version	A1				
CPU Type	Freescale i.MX6 Qua	d CPU , 800MHz			
os	Ubuntu 12.04 LTS &	Android 4.3			
Kernel Version	3.0.35				
Memory	Micron DDR3L 1GB				
NAND Flash	Micron 4GB				
Storage	8GB SDHC card				
MainBoard	SMA-iMX6 A1				
Adapter	FSP FSP060-DBAE1	AC/DC Adapter, 12	V/5A		

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

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

Lifetime (hours) of the capacitor to be estimated Base lifetime (hours) of the capacitor described in the specification sheet

To = Maximum rated operating temperature

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.)

 $\Delta To = Rise (^{\circ}C)$ in core temperature of the capacitor due to rated (permissible)

maximum ripple current.

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

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

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

Maximum rated operating temperature : 105°C for PX/PXA/PS/PSA series

 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.)

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

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

Tx = Actual ambient temperature (°C) of the capacitor

Coefficient standing for the ratio of the ΔTx to the (Ts - Tx)

For the Kc's, refer to the table below:

Capacitor diameter (mm) \$\dphi 5- \dphi 8\$ \$\dphi 10\$ \$\dphi 12.5\$ φ16 ф18 1.10 1.15 1.20 1.25 1.30

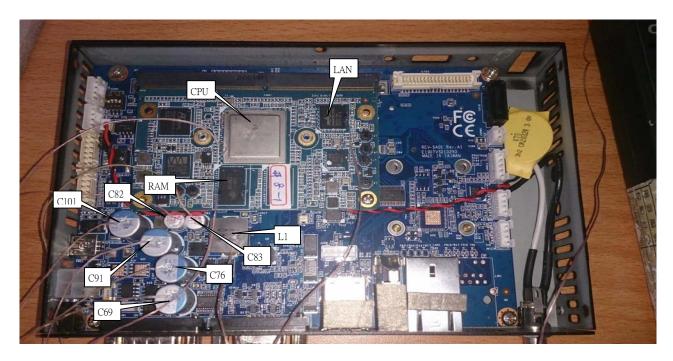
Test procedure:

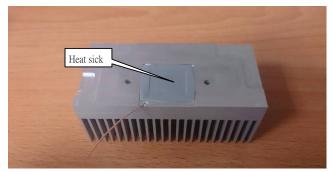
- 1. Room Temperature Thermal and Capacitor Life time Calculation & battery , Panel , Inverter or Converter
- 2. Product Spec Temperature Thermal and Capacitor Life time Calculation & battery , Panel , Inverter or Converter

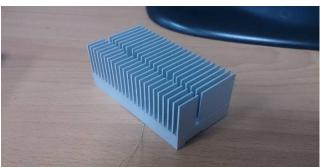
Measure in chamber 60°C

Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
60 °C	C82	C83	C69	C76	C74	C101
Ts(°ℂ)	72.40	72.90	69.40	70.80	70.90	70.40
Tx(°ℂ)						
Lo(hours)	2000	2000	3000	3000	3000	3000
Kc						
ΔTx (°ℂ)						
Lx(hours)	85316	80543	180768	153858	152097	161110
Life(years)	9.74	9.19	20.64	17.56	17.36	18.39
Result	Pass	Pass	Pass	Pass	Pass	Pass

Chamber	CPU	RAM	LAN	L1	Heat sick
60℃					
SPEC(Tc)	105.00	95.00	85.00	125.00	
Ts	78.60	81.70	78.20	74.10	74.20
SPEC - Ts	26.40	13.30	6.80	50.90	
Result	Pass	Pass	Pass	Pass	







Thermal and Capacitor Life time Calculation



DMR Task Number T21953-00

版本 A1

			102	V 1 · · ·				
Test Engineer	Frank Date	2014/5/16	Result	Pass				
Test Configuration								
Model name	REV-SA01							
PCB version	A1	A1						
CPU Type	Freescale i.MX6 Quad CPU , 800MHz	Freescale i.MX6 Quad CPU , 800MHz						
OS	Ubuntu 12.04 LTS & Android 4.3							
Kernel Version	3.0.35							
Memory	Micron DDR3L 1GB							
NAND Flash	Micron 4GB							
Storage	8GB SDHC card							
MainBoard	SMA-iMX6 A1							
Adapter	FSP FSP060-DBAE1 AC/DC Adapter, 12	V/5A						

 $\Delta Tx = (Ts - Tx) x Kc$ Where:

Ts =

Tx =

Surface temperature (°C) of the case

For the Kc's, refer to the table below:

Capacitor diameter (mm)

Actual ambient temperature (°C) of the capacitor Coefficient standing for the ratio of the ΔTx to the (Ts - Tx)

φ5- φ8

φ10 φ12.5

1.10 1.15 1.20 1.25 1.30

φ16

ф18

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

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

Lifetime (hours) of the capacitor to be estimated Base lifetime (hours) of the capacitor described in the specification sheet

To = Maximum rated operating temperature

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.) $\Delta To = Rise (^{\circ}C)$ in core temperature of the capacitor due to rated (permissible)

maximum ripple current.

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

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

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

Maximum rated operating temperature : 105°C for PX/PXA/PS/PSA series

 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.)

Test procedure:

- 1. Room Temperature Thermal and Capacitor Life time Calculation & battery , Panel , Inverter or Converter
- 2. Product Spec Temperature Thermal and Capacitor Life time Calculation & battery , Panel , Inverter or Converter

Measure in chamber 25°C

Chamber	aluminum	aluminum	aluminum	aluminum	aluminum	aluminum
25 ℃	C82	C83	C69	C76	C74	C101
Ts(°ℂ)	40.40	40.70	36.70	38.10	36.60	35.60
Tx(°C)						
Lo(hours)	2000	2000	3000	3000	3000	3000
Kc						
ΔTx (°ℂ)						
Lx(hours)	3396487	3281180	7800479	6639284	7890804	8853628
Life(years)	387.73	374.56	890.47	757.91	900.78	1010.69
Result	Pass	Pass	Pass	Pass	Pass	Pass

Chamber	CPU	RAM	LAN	L1	Heat sick
25 ℃					
SPEC(Tc)	105.00	95.00	85.00	125.00	
Ts	45.30	48.00	45.10	41.80	43.30
SPEC - Ts	59.70	47.00	39.90	83.20	
Result	Pass	Pass	Pass	Pass	Pass

