

Report NO: 17I010010

# FWS-2271

INTEL Apollo Lake  
6 LANs Network Appliance

Firewall Product  
P5  
Compatibility Test Report

Summary	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Pass with Deviation (Comment: _____)			
	Test Results Category			
	Critical	Major	Minor	Enhancement
Defect Found	0	0	0	0
Defect Unsolved	0	0	0	0

Issue date

2017-06-16

QE Manager

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Test Engineer

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**Summary Table of DTS:**

Defect No.	Severity	Description	Issue status

**Version Released Records**

Date	Version	Change History	Note
01/27/2016	A0	1. First release	

**Note :**

For all test items in this report, 3 results have been defined and described as following:

- Pass:**            Functionality work perfectly
- Fail:**            Functionality failed and must be resolved in the next version
- N/A:**            Functionality Not Applicable or Not Available

This test report would be updated when re-test completed in product next change version.

## Specification Validation

### Main Specification

Item	Specification	Result			Note
		Pass	Fail	N/A	
Form Factor	Desktop 4/6-port Network Appliance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Processor	Onboard Intel Apollo Lake SoC N3550/N4200	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Chipset	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
System Memory	1 x 204-pin DDR3L 1867MHz, SODIMM Up to 16GB	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Graphics controller	Intel Integrated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ethernet	INTEL i211 (Co-lay with INTEL i210), Gigabit Ethernet x 4 (BOM Optional 6 Ports)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Bypass	Supports up to 2 pairs bypass function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
BIOS	AMI BIOS ROM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Serial ATA	1 x SATA II port on board	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Serial Port	1 x RJ-45 Console	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LCM	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Keyboard and Mouse	Reserve pin-header	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Universal Serial Bus	2 x USB 3.0 Type A on I/O side	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Expansion Interface	Mini-Card socket (full-size) with SIM socket x 2 6 LAN ports : 1X full-size mini card w/ USB interface and 1X full-size mini card w/ PCIe + USB interface(CN30) 4 LAN ports : 2X full-size mini card w/ PCIe + USB interface	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RTC	Internal RTC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
TPM	BOM Optional TPM2.0 9665	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Display	HDMI x 1 VGA box header for analog display output	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Watchdog Timer	1~255 step by software programmable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Storage	CompactFlash™ socket x 1 (Co-lay for BOM Optional CFast socket x 1) 2.5" HDD Bay x 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GPIO	Reserve internal pin header 8-bit Digital I/O interface (4-in /4-out)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Software Button	1 x GPIO Programmable push button	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Power Requirement	1 x 12V DC power in connector / 40W Power Adapter 4-pin DC power out connector for HDD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Rear I/O panel	2 x USB 3.0 Ports 4 x RJ-45 Ports with LEDs (BOM Optional 6 x RJ-45 Ports with LEDs) 1 x RJ-45 Console 1 x 12V DC Power Input 1 x Software Programmable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	button 1 x HDMI				
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**O.S. Support**

Item	Specification	Result			Note
		Pass	Fail	N/A	
Microsoft Windows	WINDOWS 10 Enterprise 64bit (UEFI)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Linux	CentOS7-1611 kernel: 3.10.0-514.el7.x86_64	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Testing environment 1. Linux as first priority
	Ubuntu16.10 x86_64 kernel 4.8.0-32-generic #34	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### Platform Information

Item	Device Information	Note
Product of department	NSD	
System Model	FWS-2271	
PCB Model / Version	FWB-2271 Rev A0.2 FWB-2271 Rev A1.0	
BIOS / Version	FWS-2271 R0.4 (K271AM04) (12/20/2016) FWS-2271 R0.5 (K271AM05) (01/16/2017) FWS-2271 R1.0(K271AM10) (02/10/2017)	
Driver folder	X:\Products\FWS-2271\20160929 X:\Products\FWS-2271\20170125	
CPU Type	Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz) Intel® Celeron® Processor N3350 (2M Cache, up to 2.4 GHz)	
Memory Type	Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB	
SATA SSD	Transcend.TS128GSSD370 2.5" SATA3 SSD.128GB.MLC.	
USB DVD-ROM	BUFFALO BDXL-PC6U2	
HMDI Monitor	LG Flatron E2260 / 1920*1080 / 22" monitor	
	Asus PA238Q / 1920*1080 / 23" monitor	
	BENQ BL2710 / WQHD 2560 x 1440 / 27" monitor	
Compact Flash	Innodisk iCF9000 64GB	
CFast	Innodisk.DECFA-64GD07RC2DC-26 SATA3.MLC.64GB.CFAST	
Operating System	<input checked="" type="checkbox"/> CentOS7-1611 kernel: 3.10.0-514.el7.x86_64	
	<input checked="" type="checkbox"/> Ubuntu16.10 x86_64 kernel 4.8.0-32-generic	
	<input checked="" type="checkbox"/> Windows 10 Enterprise 64bit English version(64bit)	
Power Supply	ATX Power Supply : N/A	
	Adapter : FSP040-RHAN2 / 12V=3.33A / 40W	
<b>Chipset Information</b>		
Chip	Intel Apollo Lake SoC	
Super IO Chipset	ITE 8728	
Ethernet Chipset	INTEL i211 Gigabit Ethernet	

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# 1. Mechanism Construction Test

## 1.1. Mechanism construction check

Procedure:

Step1. Insert NIM, CF and expansion card.

Step2. Check the symbol of front and rear I/O

Test result:

No.	Test item	Result			Remark
		Pass	Fail	N/A	
1	System case shouldn't interfere with assembly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	NIM slot shouldn't interfere with assembly	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	CF slot shouldn't interfere with assembly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Expansion slot shouldn't interfere with assembly	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	I/O symbol should correct.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



## 2. Basic Function Test

### 2.1. CPU Function Test

Configuration:

CPU: Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)

Memory: Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB

Procedure:

Step1. Connected CPU with product specification max supported.

Step2. Boot into BIOS manual and check CPU information is correct.

Step4. Confirm CPU max speed can meet CPU specification in OS environment.

```
<#watch -n 1 "cat /proc/cpuinfo | grep MHz">
```

Step5. Install and execute benchmark AP "sysbench", recode the benchmark.

<Reference: [http://wiki.mikejung.biz/Benchmarking#Install\\_Sysbench\\_on\\_CentOS\\_7](http://wiki.mikejung.biz/Benchmarking#Install_Sysbench_on_CentOS_7)>

```
<# wget http://ftp.gnome.org/mirror/fedora/epel/6/x86\_64/sysbench-0.4.12-5.el6.x86\_64.rpm>
```

```
<#wget
```

```
  http://downloads.mysql.com/archives/mysql-5.1/MySQL-shared-compat-5.1.49-1.rhel5.x86\_64.rpm>
```

```
<#rpm -iv MySQL-shared-compat-5.1.49-1.rhel5.x86_64.rpm>
```

```
<#yum install postgresql-libs.x86_64>
```

```
<#rpm -iv sysbench-0.4.12-5.el6.x86_64.rpm>
```

```
<1 thread #sysbench --test=cpu --cpu-max-prime=20000 run>
```

```
<8 threads #sysbench --test=cpu --cpu-max-prime=20000 --num-threads=8 run>
```

Test result:

No.	Test item	Result			Remark
		Pass	Fail	N/A	
1	System can boot properly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	BIOS\CPU information is correct.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	CPU speed should meet specification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Recode CPU Benchmark	Intel 1.1G	1 thread	N/A s	
			8 threads	N/A s	

### 2.2. Memory Function Test

Configuration:

CPU: Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)

Memory: Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB

Procedure:

Step1. Connected memory with product specification max supported.

Step2. Boot into BIOS manual and check memory information is correct.

Step3. Slot test.

Step4. Execute benchmark AP" sysbench", recode the benchmark.

<Reference: <http://ssorc.tw/4882>>

```
<read # sysbench --test=memory --memory-block-size=8K --memory-total-size=1G --memory-oper=read run >
```

```
<write # sysbench --test=memory --memory-block-size=8K --memory-total-size=1G run >
```

Test result:

No.	Test item	Result			Remark
		Pass	Fail	N/A	
1	System should boot properly.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2	BIOS\Memory information is correct.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Slot 1	System should boot up properly.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Slot 2		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Slot 3		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Slot 4		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Slot 1 + 3		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Slot 2 + 4		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Slot 1+2+3+4		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4.	Recode Memory Benchmark	read	Transferred:33243.4MB/s Total time:0.0308 s			
		write	Transferred:8612.76MB/s Total time:0.1189s			

### 2.3. SATA / CF Function Test

Configuration:

SSD: Innodisk SATA SSD 3MG2-P L95 DGS25-64GD81SCAQN

CF: Innodisk iCF9000 64GB

CFast: Innodisk.DECFA-64GD07RC2DC-26 SATA3.MLC.64GB.CFAST.

Procedure:

Step1. Connect SATA HDD / SSD and CF.

Step2. Boot into BIOS manual and check SATA/CF information is correct.

Step3. Install Linux OS with SATA storage / CF.

Step4. Check SATA/CF read/write speed can meet the specification.

<update# yum update>

<install# yum install hdparm -y> /

< # apt-get install hdparm -y ; Ubuntu install >

< check HDD# fdisk -l >

<Read command # hdparm -tT /dev/sdaX>

< # hdparm -tT /dev/sda >

<Write command # time dd if=/dev/zero of=/var/test bs=2k count=1000000>

Test result:

No.	Test item	Result			Remark
		Pass	Fail	N/A	
1	SATA storage and CF information should correct during POST and OS.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	SATA ports speed should meet specification. (SATAII max read speed > 150MB/s) (SATAIII max read speed> 300MB/s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SATA Port Read: 460.13MB/s Write: 88.1 MB/s
3	CF R/W speed should meet specification.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Read: 84.27MB/s Write: 63.8MB/s
4	CFast R/W speed should meet specification.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Read: MB/s Write: MB/s
5	mSATA R/W speed should meet specification	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Read: MB/s Write: MB/s

## 2.4. Video Function Test

Procedure:

- Step1. Connect VGA monitor.
- Step2. Install Linux OS to DUT system.
- Step3. After installation and boot to Linux OS for test X-windows mode and Text mode.

Test result:

No.	Test item		Result			Remark
			Pass	Fail	N/A	
1	Display shouldn't loss during OS installation.	VGA	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
		HDMI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Display shouldn't flicker during POST and OS.	VGA	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
		HDMI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	VGA should display normal with x-window and text mode.		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	800*600
4	HDMI should display normal with x-window and text mode.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	800*600

## 2.5 Console Function Test

Procedure:

- Step1. Execute "Hyper-Terminal" in HOST PC.
- Step2. Boot up DUT system and press ESC key of HOST keyboard to boot into BIOS manual.
- Step3. To check HOST keyboard can control properly in BIOS manual.
- Step4. DUT boot to DOS (USB flash) and check console redirection work properly.
- Step5. Under Linux OS, install minicom AP and check console transmission.

Test Result:

No.	Test item	Result			Remark
		Pass	Fail	N/A	
1	Console support BIOS display and control.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test with 9600/38400/115200
2	Console support DOS display and command typing.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Test with 9600/38400/115200
3	Under Linux OS, console support minicom transmission.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Test with 9600/38400/115200 ttyS0

## 2.6 Com Port Function Test

Procedure:

- Step1. Execute "Hyper-Terminal" in Server PC.
- Step2. Install "minicom" on DUT. <apt-get install minicom or yum install minicom>
- Step3. To run "minicom" and set com port for test. (#minicom -s )(com1=ttyS0; com2=ttyS1....)
- Step4. Connect "Null cable" between Server PC and DUT.
- Step5. Transmit words between server and DUT.

Test Result:

No.	Test item	Result			Remark
		Pass	Fail	N/A	

1	Transmission words should not loss or error.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	COM1: ttyS0
---	--	--------------------------	--------------------------	-------------------------------------	-------------

## 2.7 USB ports Function Test

Procedure:

- Step1. Connect USB keyboard and check it works properly under BIOS/DOS/Linux.
- Step2. Connect USB DVD ROM, check system can boot from USB DVD ROM and USB DVD ROM can work properly under Linux OS.
- Step3. Connect USB2.0/3.0 Flash, check system can boot from USB flash and USB flash can work properly under Linux OS.
- Step4. Check USB2.0/3.0 flash read speed can meet the Flash specification.  
<Read command#: hdparm -t /dev/sdaX>

Test Result:

No.	Test item	Result			Remark
		Pass	Fail	N/A	
1	Boot from USB DVD ROM and drive should work properly.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	USB1/2/3/4
2	USB 1.1 / 2.0 /3.0 devices (Flash, keyboard, mouse, DVD ROM) can work properly on USB 3.0 ports.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	USB1/2/3/4
3	USB3.0 R/W speed should meet specification.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	USB1/2/3/4 Read: 38.71 MB/s

## 2.8 LED / LCM / Button Function Test

Procedure:

- Step1. Check power LED when system power on.
- Step2. Check HDD LED blinks when install OS to HDD/CF.
- Step3. Check Bypass LED when AAEON Test AP set Bypass status.
- Step4. Check Test AP resume are correct which press LCM function button.  
(Up/Down/ESC/Enter)
- Step5. Check Test AP resume is correct which press program reset button.  
SDK: Button <1.#make clean 2# make 3# ./button>
- Step6. Check status LED action same with Test AP setting.
- Step7. To check Ethernet LED status can follow below methods.
  - A. Use LAN cable to connect 1GB switch between Server PC and DUT, transmit some packets between Server PC and DUT.
  - B. Use LAN cable to connect 100MB switch between Server PC and DUT, transmit some packets between Server PC and DUT.
  - C. Use LAN cable to connect 10MB switch between Server PC and DUT, transmit some packets between Server PC and DUT.

	Speed LED
10GB/s	Color Blue
1GB/s	Color Orange
100MB/s	Color Green
10MB/s	Color Blank

	Link/Act LED
Un-Linked	TBD

Linked	TBD
Transmit	LED Blink

Result:

No.	Test item	Result			Remark
		Pass	Fail	N/A	
1	Power LED should turn on when system power on.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	HDD LED should blinks when install OS to HDD and CF.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Bypass LED should turn on when SDK set bypass status.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Status LED color and action should same with SDK setting.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SDK: LED
5	Reset value of SDK should show high when press the program Reset button.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Open: show high Press: show low
6	LCM value of SDK should show correct when press LCM function button.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	SDK: LCM ./lcm -getkey return ./lcm -lcm on ./lcm -lcm off ./lcm -set String
7	10G connection LAN LED action as below: Speed LED: Green Link LED: Blue / Blinking	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	1000M connection LAN LED action as below: Speed LED: Orange Link LED: Yellow / Blinking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9	100M connection LAN LED action as below: Speed LED: Green Link LED: Yellow / Blinking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10	10M connection LAN LED action as below: Speed LED: blank Link LED: Yellow / Blinking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### 2.9. Bypass Function Test

Procedure:

- Step1. Under Linux, execute AAEON SDK(LanByPass) to test Bypass function under power on and power off mode.
- Step2. SDK set "power on" is "PassTru" and "power off" is "ByPass, and remove the AC power cord. (G3 status)
- Step3. BIOS set power on is "PassTru" and power off is "Bypass", boot up system from G3 status.
- Step4. SDK set "power on" is "PassTru" and "WDT-ByPass", execute watch Dog.

Test result:

No.	Test item	Power on	Power off	Result			Remark
				Pass	Fail	N/A	
1	PassTru / ByPass should work properly by SDK control.	Bypass	Bypass	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SDK: LanByPass onboard: NIM:
		Bypass	PassTru	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		PassTru	Bypass	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		PassTru	PassTru	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

2	LAN should switch to ByPass mode when system AC loss.( G3 status)	PassTru	ByPass	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Boot up from G3, LAN should switch to PassTru.	PassTru	ByPass	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	WDT ByPass should work properly.			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### 2.10. LAN Function Test

Configuration:

- 1G switch: D-Link DGS-1210-16
- 100M switch D-Link DES-1008A
- 10M HUB SVEC FD916H
- 100 meters CAT6 cable

Procedure:

(PXE and WOL support or not, define in SPEC)

- Step1. Each LAN port connect DHCP server.
  - Step2. Connect internet and ping Google (8.8.8.8).
  - Step3. Each LAN port connect host PXE PC and DUT BIOS enable PXE function.
  - Step4. BIOS select boot from LAN.
  - Step11. Test each LAN port WOL function properly which from OS shutdown and Dos power off.
  - Step12. Client PC to install and execute iperf and host PC execute iperf -s (Windows OS)
  - Step13. Iperf test with 1G, 100M, 10M switch/Hub.
- ```
<#yum install iperf>
<#iperf -c 192.168.3.58 -w 100M -t 60 -i 1>
```

Test result:

| Test item                                                                                         | LAN 1~2_1G                          |                          |                                     | LAN 3~6_1G                          |                          |                                     | Note |
|---------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|------|
|                                                                                                   | Pass                                | Fail                     | N/A                                 | Pass                                | Fail                     | N/A                                 |      |
| Internet Browser (DHCP Server)<br>Ping website(8.8.8.8) should work properly                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |      |
| LAN Boot (PXE)<br>Boot from LAN should work properly                                              | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| Wake On LAN<br>WOL should work properly when resume from S5/Dos off                               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |      |
| 10Gbps connection<br>Iperf test result should not loss and max bandwidth must be in 9GB or more.  | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| 1Gbps connection<br>Iperf test result should not loss and max bandwidth must be in 900MB or more. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |      |

|                                                                                                    |                                     |                          |                          |                                     |                          |                          |  |
|----------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|--------------------------|--|
| 100Mbps connection<br>Iperf test result should not loss and max bandwidth must be in 90MB or more. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| 10Mbps connection<br>Iperf test result should not loss and max bandwidth must be in 9MB or more.   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |

### 2.11. IPMI Function Test

Procedure:

- Step1. Connect LAN cable between IPMI and Host.
- Step2. Use web page to link IPMI firmware.
- Step3. Test reset, OS shutdown, forced shutdown function by Host control.
- Step4. Link FRU page, to check board and product information.
- Step5. Link SOL page, to check SOL function.
- Step6. Link Sensor page, to check H/W monitor value and UI control function.
- Setp7. Link KVM page, to check keyboard, mouse, display control function.

Test result:

| No. | Test item                                  |                                                    | Result                   |                          |                                     | Remark                              |
|-----|--------------------------------------------|----------------------------------------------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|
|     |                                            |                                                    | Pass                     | Fail                     | N/A                                 |                                     |
| 1   | Power manager control should work properly | Reset                                              | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |
| 2   |                                            | OS shutdown                                        | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |
| 3   |                                            | Forced shutdown                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |
| 4   | FRU                                        | Board and product information should show correct. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |
| 5   | SOL                                        | Text mode should work properly.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |
| 6   | Sensor                                     | HW monitor value should show correct.              | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |
| 7   |                                            | UI control should work properly.                   | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |
| 8   | KVM control should work properly.          |                                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

### 2.12. Digital IO Function Test

Procedure:

- Step1. Use SDK to set DIO high/low output.
- Step2. Use meter to measure DIO output value.

Test result:

| No. | Test item                                      | Result                              |                          |                          | Remark            |
|-----|------------------------------------------------|-------------------------------------|--------------------------|--------------------------|-------------------|
|     |                                                | Pass                                | Fail                     | N/A                      |                   |
| 1   | DIO ports should be controlled correct by SDK. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | BIOS control pass |

### 2.13. TPM1.2 Function Test

Procedure:

- Step1. Enable BIOS\TPM device and status.
- Step2. Download tpm-tool in Linux environment.  
  - <Ubuntu# sudo apt-get install tpm-tool >
  - <CentOS # rpm -iv tpm-tools-1.3.8-6.el7.i686.rpm>

- Step3. Type “tpm\_version” to see the information of TPM module in used. Then, use “tpm\_takeownership” to add password to TPM module.
- Step4. Generate a text file, then use “tpm\_sealdata –i file\_name –o key\_name” to encrypt the file.
- Step5. Use “tpm\_unsealdata –i key\_name –o file\_name\_2” to decryption the key to previous file. Please use “diff file\_name file\_name\_2” to see if there’s any difference between 2 files.

Test result:

| No. | Test item                                            | Result                   |                          |                                     | Remark   |
|-----|------------------------------------------------------|--------------------------|--------------------------|-------------------------------------|----------|
|     |                                                      | Pass                     | Fail                     | N/A                                 |          |
| 1   | TPM version should show correct.                     | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 1.2.4.40 |
| 2   | Add ownership password should work normal.           | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |          |
| 3   | Encryption and decryption file should work properly. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |          |

### 2.14. TPM2.0 Function Test

Procedure:

- Step1. Enable BIOS\TPM device and status.
- Step2. \$ wget https://drive.google.com/open?id=0B2qBRy2H60mEaF9NTG5tWWVIRzA  
<#get eltt2 >
- Step3. \$ unzip ELTT2\_v1.0\_Released.zip.
- Step4. \$ dmesg | grep -i tpm  
<# to check if tpm module has been loaded during boot process>
- Step5. Do the following command to rebuild the tool:
  - a. \$ cd ./eltt2/eltt2/
  - b. \$ make clean
  - c. \$ make
- Step6. \$ sudo ./eltt2 - g  
#to read the tpm information:
- Step7. \$ ls /dev/tpm\*  
# check if the tpm device has been included in the system devices
- Step8. \$ sudo ./eltt2 - a 61  
# encrypt ascii 61 with sha-1 algorithm

Test result:

| No. | Test item                                                     | Result                              |                          |                                     | Remark |
|-----|---------------------------------------------------------------|-------------------------------------|--------------------------|-------------------------------------|--------|
|     |                                                               | Pass                                | Fail                     | N/A                                 |        |
| 1   | TPM 2.0 information should show correct.                      | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |        |
| 2   | “hash value extracted from tpm response” should show correct. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |        |

### 2.15. Jumper and connector Function Test

Configuration:

Procedure:

- Step1. Connect power button cable to CN1, check if power on /off can work properly.



- Step2. Connect PS/2 keyboard / mouse to CN12, check if keyboard / mouse can work properly
- Step3. Connect PWB/Reset/HDD LED/PWR LED cable to FP1, check if each function can work properly
- Step4. JP1 jumper set 2-3 close, check if system auto power on when insert AC power cord.
- Step5. Use meter to measure the CFD voltage.
- Step6. Connect IPMI module and open JP3, check if IPMI function can work properly.
- Step7. Remove AC cable and CMOS jumper set 2-3 close, check if CMOS all data will be cleaned.

Test result:

| No. | Test item                                                        | Result                              |                          |                          | Remark |
|-----|------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|--------|
|     |                                                                  | Pass                                | Fail                     | N/A                      |        |
| 1   | JP1: CFD voltage 1-2 5V<br>2-3 3.3V                              | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |
| 2   | JP2: Auto power 1-2 Don't use Auto PWRBTN<br>2-3 Use Auto PWRBTN | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |
| 3   | CN12: 1-2 Normal<br>2-3 Clear CMOS                               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |

## 4. Time Accuracy Test

### 4.1. System Clock & RTC Clock Test

Procedure:

Step1. Check RTC time deviation after 24 hrs at power on status.

Step2. Check RTC time deviation after 24 hrs at power off status.

Step3. Press power button to check system with “beep” sound.

Step4. Run watchdog timer test with last version SDK.

<#chmod 777 superio>

<#./superio -w 10> to set time for 10sec, 60sec, 255sec

Test Result:

Under Room Temperature: 26 °C

| No. | Test item                                   | Actual |     | Result                              |                          |                          | Remark |
|-----|---------------------------------------------|--------|-----|-------------------------------------|--------------------------|--------------------------|--------|
|     |                                             |        |     | Pass                                | Fail                     | N/A                      |        |
| 1   | RTC Clock in Power On less 2 sec deviation  | -1     | Sec | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |
| 2   | RTC Clock in Power Off less 2 sec deviation | +1     | Sec | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |
| 3   | System boot on in 60 sec                    | 17.4   | Sec | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |
| 4   | Watch dog time in 10 +/-10% sec             | 10.7   | Sec | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |
| 5   | Watch dog time in 60 +/-10% sec             | 60.3   | Sec | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |
| 6   | Watch dog time in 255 +/-10% sec            | 256.6  | sec | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |        |

## 5. Power Consumption Test

| Configuration |                                                           |
|---------------|-----------------------------------------------------------|
| CPU           | Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz) |
| Memory        | Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB             |
| Storage       | Transcend.TS128GSSD370 2.5" SATA3 SSD.128GB.MLC.          |
| O.S           | Ubuntu16.10 x86_64 kernel 4.8.0-32-generic                |

### 5.1. Power Consumption

| Test Equipment                                                                                        |                        |      |                                 |
|-------------------------------------------------------------------------------------------------------|------------------------|------|---------------------------------|
| Equipment                                                                                             | Programmable AC Source |      |                                 |
| Manufacturer                                                                                          | Chroma                 |      |                                 |
| Model name                                                                                            | 62012P-600-8           |      |                                 |
| Test Environment                                                                                      |                        |      |                                 |
| ATX Power Model                                                                                       |                        |      |                                 |
| Power Supply                                                                                          | P                      | Note |                                 |
| Full Loading Mode<br>Test AP: Stress Test                                                             | +12VAC<br>60Hz<br>11.3 | W    | # stress -c 4 (CPU total cores) |
| Win. Idle mode: Measure the current value when system in windows mode and without running any program | +12VAC<br>60Hz<br>8.4  | W    |                                 |
| S5 mode: Measure the current value when system in S5 mode of windows and without running any          | +12VAC<br>60Hz<br>1.4  | W    |                                 |

### 5.2. PC Health Status

Procedure:

- Step1. Use meter to measure each voltage of H/W monitor supported.
- Step2. Use thermometer to measure each Temp of H/W monitor supported.
- Step3. Use Tachometer to measure each FAN speed of H/W monitor supported.

Test Result:

| H/W monitor                                  | Result                              |                          |                          | BIOS     | Actual   | Note |
|----------------------------------------------|-------------------------------------|--------------------------|--------------------------|----------|----------|------|
|                                              | Pass                                | Fail                     | N/A                      |          |          |      |
| (+) Vcore<br>Actual and monitor must be ±5%  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 0.708 V  | 1.354 V  |      |
| (+) VMEM<br>Actual and monitor must be ±5%   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1.368 V  | 1.368 V  |      |
| (+) 12V<br>Actual and monitor must be ±5%    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 12.096 V | 11.952 V |      |
| (+) 5V<br>Actual and monitor must be ±5%     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5.040 V  | 5.00 V   |      |
| (+) 5VDual<br>Actual and monitor must be ±5% | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5.040 V  | 5.00 V   |      |
| VBAT<br>Actual and monitor must be ±5%       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3.072 V  | 3.216 V  |      |

|                                                   |                          |                          |                                     |     |     |     |     |  |
|---------------------------------------------------|--------------------------|--------------------------|-------------------------------------|-----|-----|-----|-----|--|
| CPU Fan1 Speed<br>Actual and monitor must be ±10% | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | N/A | rpm | N/A | rpm |  |
| CPU Temp<br>Actual and monitor must be ±15°C      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 44  | °C  | 48  | °C  |  |
| System Temp<br>Actual and monitor must be ±5°C    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 32  | °C  | 36  | °C  |  |

### 5.3. CMOS Battery Test

Procedure:

Step1. DUT AC loss, use meter to measure voltage of CMOS battery

Step2. Use ammeter to measure current of CMOS battery.

Test Result:

(Calculate result=225mA/measured current / 365days/24hours)

| Check item                                                                                | Measured Voltage |   | Measured Current |    | Calculate Result |       | Result                              |                          |                          | Note |
|-------------------------------------------------------------------------------------------|------------------|---|------------------|----|------------------|-------|-------------------------------------|--------------------------|--------------------------|------|
|                                                                                           |                  |   |                  |    |                  |       | Pass                                | Fail                     | N/A                      |      |
| Battery leakage<br>1. Voltage should be >3V.<br>2. Calculated result should be > 5 years. | 3.17             | V | 4.2              | uA | 5.4              | years | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

## 6. Hardware Compatibility Test

### 6.1. CPU Compatibility Test

Procedure:

Step1. Check CPU information and frequency should show correct value during POST screen and O.S.

<Linux CPU info # dmidecode -t processor|grep "Version:">

Step2. CPU supported must meet specification.

Test Result:

| Test item                                                     | Result                              |                          |                          | Note |
|---------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                               | Pass                                | Fail                     | N/A                      |      |
| Below CPU information and frequency should show correct value |                                     |                          |                          |      |
| Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

### 6.2. Memory Compatibility Test

Procedure:

Step1. Boot up function test

Step2. Check Memory frequency should show correct value during POST screen and O.S.

<<Linux Memory info # dmidecode -t memory|grep "Size:">

Step3. Memory supported must meet specification.

Test Result:

| Test item                                                            | AAEON P/N  | Result                              |                          |                          | Note |
|----------------------------------------------------------------------|------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                                      |            | Pass                                | Fail                     | N/A                      |      |
| a. Boot up normal.                                                   |            |                                     |                          |                          |      |
| b. Below Memory Information and frequency should show correct value. |            |                                     |                          |                          |      |
| U-DIMM                                                               |            |                                     |                          |                          |      |
| Innidisk / SEC K4B2G0846Q / DDR3L-1600 / 2GB                         | 968D3002GX | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Innidisk / SEC K4B4G0846D / DDR3L-1600 / 4GB                         | 968D3004GZ | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Innidisk / SEC K4B4G0846D / DDR3L-1600 / 8GB                         | 968D3008GW | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Transcend / SEC K4B2G0846Q / DDR3L-1600 / 2GB                        | 968D3002GK | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Transcend / SEC K4B4G0846D / DDR3L-1600 / 4GB                        | 968D3004G6 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB                        | 968D3008G7 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

### 6.3. SATA Compatibility Test

#### 6.3.1 SATA IDE / AHCI Mode

Procedure:

Step1. BIOS select IDE mode, check SATA devices information/ size should show correct value in BIOS setup.

Step2. BIOS select AHCI mode, check SATA devices information/ size should show correct value in BIOS setup.

Step3. Boot into OS, check SATA devices information/size should show correct value.

OS: [Ubuntu16.10 x86\\_64 kernel 4.8.0-32-generic](#)

Test Result:

| Test item                                                                            |                                                                                         | Result                              |                                     |                          | Note                     |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
|                                                                                      |                                                                                         | Pass                                | Fail                                | N/A                      |                          |
| b. Below SATA devices information and size should show correct value with AHCI mode. |                                                                                         |                                     |                                     |                          |                          |
| SSD                                                                                  | OCZ / TRN100-25SAT3-240G 2.5" SATA 3 6Gb/s                                              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                          |
| SSD                                                                                  | Intel® SSD 530 Series (120GB, 2.5in SATA 6Gb/s, 20nm, MLC)                              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                          |
| SSD                                                                                  | Transcend TS32GSSD370<br>2.5".32GB.SATA III SSD MLC.                                    | 968C032G2D                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SSD                                                                                  | Transcend.TS64GSSD370<br>2.5".64GB. SATA III.SSD.MLC                                    | 968C64G003                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SSD                                                                                  | Transcend.TS128GSSD370<br>2.5" SATA3 SSD.128GB.MLC.                                     | 968C128G0W                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SSD                                                                                  | 2.5" .16GB 3MG2-P 15nm.SATA III MLC SSD.Innodisk MLC .0°C ~ +70°C .DGS25-16GD81BC3SC-26 | AP-SS968C016G3K                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SSD                                                                                  | (TF)2.5".32GB 3MG2-P 15nm.SATA SSD MLC.0~70°C.HIGH IOPS.innodisk.DGS25-32GD81BC3DC-26   | AP-SS968C032G1P                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SSD                                                                                  | (TF)2.5".64GB.SATA MLC SSD .3MG2-P 15nm.0~70°C.HIGH IOPS.innodisk.DGS25-64GD81BC3QC-26  | 968C064G39                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SSD                                                                                  | 2.5" MLC SSD 128GB 3MG2-P 15nm.SATA 0°C~+70°C .InnoDisk.DGS25-A28D81BC3QC-26            | AP-SS968C128G1P                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SSD                                                                                  | 2.5".256GB.SATA MLC SSD 3MG2-P 15nm.0~70°C.HIGH IOPS.innodisk.DGS25-B56D81BC3QC-26      | AP-SS968C256G16                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6.3.2 SATA RAID Mode

Procedure:

- Step1. BIOS select RAID mode and press Ctrl +I during POST screen for RAID setting.
- Step2. Test with RAID 0 / 1 / 5 /10 respectively, check RAID function is work properly.

Test Result:

| Test item                                                                                           |   | Result                   |                          |                                     | Note |
|-----------------------------------------------------------------------------------------------------|---|--------------------------|--------------------------|-------------------------------------|------|
|                                                                                                     |   | Pass                     | Fail                     | N/A                                 |      |
| a. RAID 0 function should work properly and storage information and size should show correct value. |   |                          |                          |                                     |      |
| RAID-0 (HDDx2) Striping/Span Test                                                                   | 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |
|                                                                                                     | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| b. RAID 1 function should work properly and storage information and size should show correct value. |   |                          |                          |                                     |      |
| RAID-1 (HDDx2) Mirror Test                                                                          | 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |
|                                                                                                     | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| c. RAID 5 function should work properly and storage information and size should show correct value. |   |                          |                          |                                     |      |
| RAID-5 (HDDx3) Striping/Span Test                                                                   | 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |
|                                                                                                     | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |

|                                                                                                     |   |                          |                          |                                     |  |
|-----------------------------------------------------------------------------------------------------|---|--------------------------|--------------------------|-------------------------------------|--|
| Rotation Parity                                                                                     | 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |  |
| d. RAID10 function should work properly and storage information and size should show correct value. |   |                          |                          |                                     |  |
| RAID-10 (HDDx4)<br>Striping/Span Test<br>Mirroring                                                  | 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |  |
|                                                                                                     | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |  |
|                                                                                                     | 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |  |
|                                                                                                     | 4 | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |  |

### 6.4. Flash Card Compatibility Test

Procedure:

- Step1. Connect Flash card and boot into BIOS, check Flash card information is correct.
- Step2. Boot into OS.
- Step3. Test Flash read / write function.

OS: CentOS7-1611 kernel: 3.10.0-514.el7.x86\_64

#### Test Result

| Test Item                                                | AAEON P/N        | Result                              |                          |                          | Note |
|----------------------------------------------------------|------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                          |                  | Pass                                | Fail                     | N/A                      |      |
| a. CF information and size should show correct value.    |                  |                                     |                          |                          |      |
| b. RW function should work properly.                     |                  |                                     |                          |                          |      |
| Innodisk iCF9000 64GB                                    | N/A              | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Innodisk iCF9000 32GB                                    | N/A              | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Transcend CF220I 4GB                                     | N/A              | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| a. CFast information and size should show correct value. |                  |                                     |                          |                          |      |
| b. RW function should work properly.                     |                  |                                     |                          |                          |      |
| Innodisk.DECFA-04GD07AC2DT-26 4G.SLC                     | 968C004G0P       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| InnoDisk.DECFA-08GD07RC2SC-26 8GB.MLC.3ME.               | AP-SS968C00 8G10 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Innodisk.3ME.DECFA-16GD07RC2DC-26 16GB.MLC.              | 968C016G4C       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Innodisk.DECFA-32GD07RC2DC-26 SATA3.MLC.32GB             | 968C032G2B       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Innodisk.DECFA-64GD07RC2DC-26 SATA3.MLC.64GB.CFAST.      | AP-SS968C06 4G2T | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Innodisk.DECFA-A28D07RC2DC-26 SATA3.MLC.128GB            | AP-SS968C12 8G19 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

### 6.5. USB Compatibility Test

Procedure:

- Step1. Insert USB device to USB2.0 / 3.0 ports.
- Step2. Test each USB device function.

OS: Ubuntu16.10 x86\_64 kernel 4.8.0-32-generic

#### Test Result

| Test Item                                  |                                     | Result                              |                          |                          | Note |
|--------------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                            |                                     | Pass                                | Fail                     | N/A                      |      |
| USB devices function should work properly. |                                     |                                     |                          |                          |      |
| keyboard                                   | Logitech K240                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Mouse                                      | Logitech M212                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| DVD ROM                                    | BUFFALO BDXL-PC6U2                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| HUB                                        | Mini 4ports HUB High speed USB2.0   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| HDD                                        | Transcend TS500GSJ25D3 USB3.0 500GB | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

|              |                                    |                                     |                          |                          |  |
|--------------|------------------------------------|-------------------------------------|--------------------------|--------------------------|--|
| USB2.0 Flash | TDK Media 32GB USB2.0              | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| USB3.0 Flash | Apacer / AH450 32GB USB3.0         | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
|              | SanDisk CZ80 Extreme / 64GB USB3.0 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |

### 6.6. PCI-Express Compatibility Test:

Procedure:

Step1. Connect PCI-e device and boot into OS.

Step2. Test PCI-e card basic function.

OS: Windows 10 Enterprise English Version 64Bit

Test result:

| Mini PCI-Express card                              | Result                              |                          |                          | Note                       |
|----------------------------------------------------|-------------------------------------|--------------------------|--------------------------|----------------------------|
|                                                    | Pass                                | Fail                     | N/A                      |                            |
| Function should work properly as below item        |                                     |                          |                          |                            |
| AAEON PER-C11L Intel 82574 Gigabit LAN card        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (USB Interface) (CN10)     |
| AAEON PER-C41C RS-232 Com port card                | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (USB Interface) (CN10)     |
| AzureWave AW-NB159H Wireless / Bluetooth           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (PCI - e Interface) (CN30) |
| AzureWave AW-NB161H Wireless / Bluetooth           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (PCI - e Interface) (CN30) |
| MSI MS-6877 Wireless Card IEEE 802.11b/g Mini Card | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (USB Interface) (CN10)     |
| Quectel UC20 3G Card                               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (PCI - e Interface) (CN30) |
| Sierra Wireless AirPrime MC734 Qualcomm 4G         | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | (PCI - e Interface) (CN30) |

### 6.7. NIM Card Compatibility Test

Procedure:

(SPEC define which NIM module in P2 and P3 perform test)

Step1. Connect NIM device and boot into Linux OS.

Step2. Test NIM device basic function.

(Supported NIM module, define in SPEC)

Test result:

| NIM card information and test item | Result                                                                                             |                          |                          | Note                                |                              |
|------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------------------|------------------------------|
|                                    | Pass                                                                                               | Fail                     | N/A                      |                                     |                              |
| NIM-C13B                           | Visit Web-side should work properly                                                                | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                              |
|                                    | ByPass should work properly                                                                        | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                              |
|                                    | Wake On LAN<br>WOL should work properly when resume from S5/Dos off                                | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                              |
|                                    | 1Gbps connection<br>Iperf test result should not loss and max bandwidth must be in 900MB or more.  | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Test max bandwidth: 942 MB/s |
|                                    | 100Mbps connection<br>Iperf test result should not loss and max bandwidth must be in 90MB or more. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Test max bandwidth: 94MB/s   |
|                                    | 10Mbps connection<br>Iperf test result should not loss and max bandwidth must be in 9MB or more.   | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Test max bandwidth: 9.4 MB/s |
|                                    |                                                                                                    |                          |                          |                                     |                              |



## 7. O.S Compatibility Test

### 7.1. Linux OS Compatibility Test

Procedure:

Step1. Install Linux x86 & x64 serial from USB DVD ROM.

Step2. Enter lspci command detect H/W.

Step3. Enter dmesg or dmesg|more, review dmesg log to find out the error and warning key words.

Step4. Install all required driver to system.

Step5. Execute the following command to test driver and verify

Step 5.1 Driver install

(1) checked whether the command "Insmod drivename" can function normally, or not.

(2) checked whether the command "rmmod drivename" can successful uninstall the driver, or not

Step 5.2 Force speed

(1) Execute command "ethtool -s ethx autoneg off speed 1000" ,link cable to confirm speed light is orange

(2) Execute command "ethtool -s ethx autoneg off speed 100" ,link cable to confirm speed light is green

(3) Execute command "ethtool -s ethx autoneg off speed 10" ,link cable to confirm speed light is blank

Step 5.3 ifconfig Ethernet

(1) Execute command "ifdown ethx" close ethernet interface

(2) Execute command "ifup ethx" start ethernet interface

Step 5.4 Jumbo Frame

Setting #ifconfig LAN mtu 9000

Check #ifconfig LAN (mtu will change from 1500 to 9000)

Step 6 Enter ping Google command (ping 8.8.8.8), test network function is whether normal

Step 7 Execute command "init 0" or "shutdown -h" to shutdown system.

Step 8 Execute command "init 6" or "reboot" to reset system.

Test result:

7.1.1 CentOS7- 1611 kernel: 3.10.0-514.el7.x86\_64

| Test Item                                               | Result                                                                                                 |                                     |                          | Note                         |                                    |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|------------------------------|------------------------------------|
|                                                         | Pass                                                                                                   | Fail                                | N/A                      |                              |                                    |
| System should not any error during install process.     | <input checked="" type="checkbox"/>                                                                    | <input type="checkbox"/>            | <input type="checkbox"/> |                              |                                    |
| lspci to check H/W device.                              | <input checked="" type="checkbox"/>                                                                    | <input type="checkbox"/>            | <input type="checkbox"/> |                              |                                    |
| Record log file which was error or warring key words.   | <input checked="" type="checkbox"/>                                                                    | <input type="checkbox"/>            | <input type="checkbox"/> |                              |                                    |
| System should not error during LAN driver installation. | <input checked="" type="checkbox"/>                                                                    | <input type="checkbox"/>            | <input type="checkbox"/> | # modinfo igb<br>igb-5.3.0-k |                                    |
| Force speed                                             | LAN connection speed should show 1000Mb when execute command " ethtool -s ethx autoneg off speed 1000" | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | enp1s0 ~ enp3s0<br>enp6s0 ~ enp8s0 |
|                                                         | LAN connection speed should show 100Mb when execute command " ethtool -s ethx autoneg off speed 100"   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | enp1s0 ~ enp3s0<br>enp6s0 ~ enp8s0 |
|                                                         | LAN connection speed should show 10Mb when execute command " ethtool -s ethx autoneg off speed 10"     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | enp1s0 ~ enp3s0<br>enp6s0 ~ enp8s0 |

|                                                                                |                                                                        |                                     |                          |                          |  |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|--|
| Ifconfig                                                                       | Ethernet interface should be closed when execute command “ifdown ethx” | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
|                                                                                | Ethernet interface should be started when execute command “ifup ethx”  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| Jumbo                                                                          | Jumbo function should work properly                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| Connected internet and ping the website should work properly.(Google: 8.8.8.8) |                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| Shutdown                                                                       | System should be shutdown when execute command "init 0"                | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| Reboot                                                                         | System should be reset when execute command "init 6"                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |

7.1.2 Ubuntu16.10 x86\_64 kernel 4.8.0-32-generic #34

| Test Item                                                                      | Result                                                                                                 |                                     |                          | Note                                |                                                            |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|-------------------------------------|------------------------------------------------------------|
|                                                                                | Pass                                                                                                   | Fail                                | N/A                      |                                     |                                                            |
| System should not any error during install process.                            |                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
| lspci to check H/W device.                                                     |                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
| Record log file which was error or warring key words.                          |                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
| System should not error during LAN driver installation.                        |                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | # modinfo igb<br>igb-5.3.0-k                               |
| Force speed                                                                    | LAN connection speed should show 1000Mb when execute command “ ethtool -s ethx autoneg off speed 1000” | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
|                                                                                | LAN connection speed should show 100Mb when execute command “ ethtool -s ethx autoneg off speed 100”   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
|                                                                                | LAN connection speed should show 10Mb when execute command “ ethtool -s ethx autoneg off speed 10”     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
| Ifconfig                                                                       | Ethernet interface should be closed when execute command ““sudo nmcli networking off”                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Ubuntu16.04 is not support ifdown ethx ; ifup ethx command |
|                                                                                | Ethernet interface should be started when execute command ““sudo nmcli networking on”                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
| Jumbo                                                                          | Jumbo function should work properly                                                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
| Connected internet and ping the website should work properly.(Google: 8.8.8.8) | Onboard port1~6                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
|                                                                                | NIM module: port 1~8 <NIM-C13B>                                                                        | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |                                                            |
| Shutdown                                                                       | System should be shutdown when execute command "init 0"                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |
| Reboot                                                                         | System should be reset when execute command "init 6"                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |                                                            |

## 7.2. Windows OS Compatibility Test

Procedure:

- Step1. Install Windows OS from USB DVD ROM.
- Step2. Install all required driver to system.
- Step3. Connect internet, check each LAN port function.
- Step4. Insert USB flash, check each USB port function.
- Step5. ACPI S5 and reset function test.
- Step6. ACPI S3 and S4 function test if support graphics driver.

Test result:

### 7.2.1 Windows 10 Enterprise 64bit English version

| Test Item                                                                          | Result                                                                                   |                                     |                          | Note                                |  |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|-------------------------------------|--|
|                                                                                    | Pass                                                                                     | Fail                                | N/A                      |                                     |  |
| System should not any error during install process.                                | <input checked="" type="checkbox"/>                                                      | <input type="checkbox"/>            | <input type="checkbox"/> | UEFI mode                           |  |
| All required driver should be installed.                                           | <input checked="" type="checkbox"/>                                                      | <input type="checkbox"/>            | <input type="checkbox"/> | ME driver                           |  |
| Connected internet and ping the website should work properly.<br>(Google: 8.8.8.8) | Onboard port1~6                                                                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |  |
|                                                                                    | NIM module: port 1~8<br><NIM-C13B>                                                       | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |  |
| USB ports should work properly.                                                    | <input checked="" type="checkbox"/>                                                      | <input type="checkbox"/>            | <input type="checkbox"/> | USB 3.0 x 2                         |  |
| Shutdown                                                                           | System should be shutdown when click "shutdown" icon                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |  |
| Reboot                                                                             | System should be reset when click "Reset" icon.                                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |  |
| S3                                                                                 | System should be sleep when click "Sleep" icon and resume function should work properly. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |  |
| S4                                                                                 | System should be sleep when click "Sleep" icon and resume function should work properly. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |  |

## 8. BIOS Function Test

Procedure:

- Step1. Flash BIOS process will complete and run correctly
- Step2. Press Keyboard “DEL” Key into BIOS.
- Step3. To ensure the BIOS setting can be controlled correctly.
- Step4. Please add or del test item from your test BIOS Version.

Test Result:

### 8.1. Flash BIOS

| Test Item<br>(Following item should work properly) | Result                              |                          |                          | Note |
|----------------------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                    | Pass                                | Fail                     | N/A                      |      |
| *Execute Go.bat for flash BIOS                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| *Press keyboard Del into BIOS setup                | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

### 8.2. Advanced Test

| Test Item<br>(Following item should work properly) | Result                          |                                     |                                     | Note                     |                                                                               |                  |
|----------------------------------------------------|---------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------------------------------------------------|------------------|
|                                                    | Pass                            | Fail                                | N/A                                 |                          |                                                                               |                  |
| CPU Configuration                                  | CPU info.                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
|                                                    | Intel Virtualization Technology | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
|                                                    | Intel VT-d                      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
|                                                    | EIST                            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
| Trusted Computing                                  | security device support         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Enabled /Disabled                                                             |                  |
|                                                    | Pending operation               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | None / TPM Clear                                                              |                  |
|                                                    | Device Select                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Auto / TPM 1.2 / TPM 2.0                                                      |                  |
| SATA Configuration                                 | Chipset SATA                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
| USB Config.                                        | Legacy USB support              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | Enabled /Disabled                                                             |                  |
| HW Monitor                                         | Temperature                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
|                                                    | Value                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
| DIO                                                |                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | 0~7                                                                           |                  |
| SIO configuration                                  | Serial Port                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
| Serial port console redirection                    | Enable / disable                | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
|                                                    | Baud rate:<br>9600/38400/115200 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
| LAN Bypass Config                                  | LAN Bypass Status LED           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | LED off/RED on/RED Blink/RED Fast Blink/Green on/Green Blink/Green Fast blink |                  |
|                                                    | LAN kit1                        | Power on                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                                                      | PassTru / Bypass |
|                                                    |                                 | Power off                           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                                                      | PassTru / Bypass |
|                                                    | LAN kit2                        | Power on                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                                                      | PassTru / Bypass |
|                                                    |                                 | Power off                           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                                                      | PassTru / Bypass |
|                                                    | WDT                             | System Reset                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                                                      |                  |
| Force Bypass                                       |                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |                                                                               |                  |
| Power                                              | Power Mode                      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | AT/ATX                                                                        |                  |

|                               |                         |              |                                     |                          |                          |                |
|-------------------------------|-------------------------|--------------|-------------------------------------|--------------------------|--------------------------|----------------|
| manager                       | AC power loss           | Power on     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|                               |                         | Power off    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|                               |                         | Last state   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|                               | RTC wake system from S5 | Fixed Time   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|                               |                         | Dynamic Time | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| Digital IO Port Configuration | DIO Port 1 ~ 8          |              | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Output / Input |
|                               | Output Level            |              | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | High / Low     |

### 8.3. Chipset Test

| Test Item<br>(Following item should work properly) |                    | Result                              |                          |                          | Note       |
|----------------------------------------------------|--------------------|-------------------------------------|--------------------------|--------------------------|------------|
|                                                    |                    | Pass                                | Fail                     | N/A                      |            |
| North Bridge                                       | Memory Information | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |            |
|                                                    | Primary Display    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | IGD / PCIe |

### 8.4. Boot Test

| Test Item<br>(Following item should work properly) | Result                              |                          |                          | Note |
|----------------------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                    | Pass                                | Fail                     | N/A                      |      |
| Quiet Boot                                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Launch Intel PXE OpROM                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Boot From Hard Disk                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Boot From USB HDD                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Boot From USB CD-ROM                               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Boot from LAN                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| Disable                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

### 8.5. CMOS Backup / Clear CMOS Test

| Test Item<br>(Following item should work properly) | Result                              |                          |                          | Note                        |
|----------------------------------------------------|-------------------------------------|--------------------------|--------------------------|-----------------------------|
|                                                    | Pass                                | Fail                     | N/A                      |                             |
| Clear CMOS Test by Jumper                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Clear All data and password |
| Clear CMOS Test by remove CMOS battery             | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Clear All data and password |

### 8.6. AAEON Tag Check Utility

| Test Item<br>(Following item should work properly) | Result                              |                          |                          | Note         |
|----------------------------------------------------|-------------------------------------|--------------------------|--------------------------|--------------|
|                                                    | Pass                                | Fail                     | N/A                      |              |
| Check AAEON BIOS OK                                | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | AONCHECK.EXE |

### 8.7. Supervisor / User Password Test

| Test Item<br>(Following item should work properly) | Result                              |                          |                          | Note |
|----------------------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                    | Pass                                | Fail                     | N/A                      |      |
| Administrator Password                             | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |
| User Password                                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

## 8.8. Negative Test

### 8.8.1 USB Keyboard Negative Test

| Methods                                                                                                                         | Result                              |                          |                          | Note |
|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                                                                                                 | Pass                                | Fail                     | N/A                      |      |
| 1. Boot into BIOS setup manual.<br>2. Press NumLock or ScrLk and press arrow key.<br>3. confirm arrow key function are normally | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

### 8.8.2 UEFI Mode Negative Test

| Methods                                                                                                                                                        | Result                              |                          |                          | Note |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                                                                                                                                | Pass                                | Fail                     | N/A                      |      |
| 1. Install Windows with UEFI mode.<br>2. Clear CMOS.<br>3. Confirm BIOS\Boot device was not loss "Windows boot manager" and should boot into Windows properly. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

## 9. Stability Test

### 9.1. LAN Endurance Test

Configuration:

CPU: Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)  
 RAM: Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB  
 Storage: Transcend.TS128GSSD370 2.5" SATA3 SSD.128GB.MLC  
 Graphics: Onboard Graphics  
 OS: CentOS5.6 Kernel 2.6.18-238.el5PAE  
 LAN: Intel I211AT  
 NIM module: N/A

Procedure:

- Step1. Use SmartBits to test LAN endurance.
- Step2. Test Group: <LAN1-LAN2 bi-directional> ; <LAN3-LAN4 bi-directional>  
 <LAN5-LAN6 bi-directional>; <LAN7-LAN8 bi-directional>
- Step3. To set Frame size=1518 / loading=100 / time=43200sec
- Step4. Repeat step1~3 for NIM slot endurance test.

Test Result:

| Test item                                                                | Result                   |                          |                                     | Note |
|--------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------------------|------|
|                                                                          | Pass                     | Fail                     | N/A                                 |      |
| Onboard LAN1~8 Endurance Test<br><Test result should not frame loss.>    | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |
| NIM Module LAN1~8 Endurance Test<br><Test result should not frame loss.> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |      |

### 9.2. Cold Boot Test

#### 9.2.1 ACPI G3 Cold Boot Test

Configuration:

CPU: Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)  
 RAM: Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB  
 Storage: Transcend.TS128GSSD370 2.5" SATA3 SSD.128GB.MLC  
 Graphics: Onboard Graphics  
 OS: DOS

Procedure:

- Step1. Set auto power on jumper for enable or set BIOS\restore AC loss for always on.
- Step2. Set power on with 90 second and power off with 20 second.
- Step3. Run the on/off test over 1000 cycles to test system boot up stability at room temp.

Test Result:

| Test item                                                        | Result                              |                          |                          | Note                                                                                                                 |
|------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------|
|                                                                  | Pass                                | Fail                     | N/A                      |                                                                                                                      |
| AC loss cold boot over 1000 cycles<br><loss rate: 0 /1000 times> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Jumper set auto power button<br><input checked="" type="checkbox"/> BIOS select " power on" |

### 9.2.2 Power Button Cold Boot Test

**Configuration:**

CPU: Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)  
 RAM: Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB  
 Storage: Transcend.TS128GSSD370 2.5" SATA3 SSD.128GB.MLC  
 Graphics: Onboard Graphics  
 OS: DOS

**Procedure:**

- Step1. Set auto power on jumper for disable.
- Step2. Set each ON/OFF cycle with 180 second.
- Step3. Run the power button on/off test over 500 cycles to test system boot up stability at room temp.

**Test Result:**

| Test item                                                      | Result                              |                          |                          | Note |
|----------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                                | Pass                                | Fail                     | N/A                      |      |
| Power button boot over 500 cycles<br><loss rate: 0 /500 times> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

### 9.3. Memory Test

**Configuration:**

OS: DOS

Tool: Memtest86+ V5.01 above

Memory information: Transcend DDR3-1600 8GB SO-DIMM (SEC-231-HYKO-K4B4G084GB)

| Test item                                                                | Result                              |                          |                          | Note |
|--------------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|------|
|                                                                          | Pass                                | Fail                     | N/A                      |      |
| Memory Test for 3 loops.<br>< Memtest result should not error or hang..> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |      |

Remark: If system support UEFI mode only, the test tool is [Memtest86 Version 5.0 Experimental UEFI Beta]



## 10. LAN Performance Test

### 10.1 DUT and Test Equipments

#### 10.1.1. DUT Specification

##### Hardware:

- Model name: FWS-2271 (FWS-2271 A0.2) / FWS-2271 (FWS-2271 A1.0)
- CPU: Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)
- Intel® Celeron® Processor N3350 (2M Cache, up to 2.4 GHz)
- RAM: Transcend / SEC K4B4G0846D / DDR3L-1600 / 8GB
- HDD: Transcend.TS128GSSD370 2.5" SATA3 SSD.128GB.MLC.
- NIM module: N/A

##### Software:

- BIOS: FWS-2271 R0.4 (K271AM04) (12/20/2016)
- Operating System: CentOS5.6 Kernel 2.6.18-238.el5PAE
- NIM LAN driver: N/A

#### 10.1.2. Test Equipments Specification

##### SPIRENT Smartbits

- Chassis: SPIRENT Smartbits 600B
- Chassis Version: 2.80.003 (Cur) 2.50.000
- Chassis Serial #: 06014047
- Library: 6.00-29
- API: 5.50.42.01
- File: 0550042
- Module: 2 \* LAN-3324A SmartMetrics XD 4-Port 10/100/1000Base-T Gigabit Ethernet
- Test Software: SmartFlow5.50.42.1

## 10.2 RFC-2544 performance test (2 port)

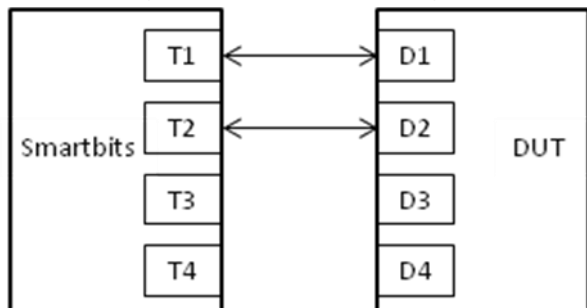
### 10.2.1.Throughput test (2 port) [CPU: Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)]

#### Test Description:

1. In DUT System, set routing function enabled.

<# echo 1 > /proc/sys/net/ipv4/ip\_forward>

2. Test Configuration as below Figure.



3. Smartflow\Test Group to add port1<->port2 with Bi-directional,

4. The tester set loading traffic from 1% to 100% and the traffic step is 50%.

5. Interaction Constants Duration Time Set to 60 Sec.

6. Test all LAN ports performance.

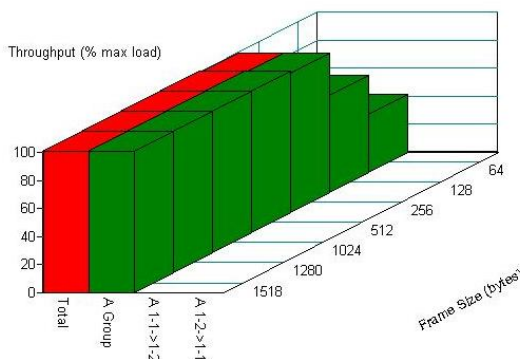
#### Test Result:

Test Group: <LAN1-LAN2 bi-directional>

| Speed:<br>1000_Full | Frame Size(bytes) |            |            |           |            |            |           |
|---------------------|-------------------|------------|------------|-----------|------------|------------|-----------|
| LAN ports           | 64                | 128        | 256        | 512       | 1024       | 1280       | 1518      |
| 1-2                 | 41.21875          | 69.0625    | 99.2265625 | 100       | 100        | 100        | 100       |
| 3-4                 | 41.21875          | 69.0625    | 83.7578125 | 82.984375 | 95.359375  | 99.2265625 | 100       |
| 5-6                 | 41.9921875        | 68.2890625 | 69.8359375 | 69.0625   | 85.3046875 | 85.3046875 | 89.171875 |

Throughput Summary Report

|                             |                               |                                     |                                    |                                    |
|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|
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|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|

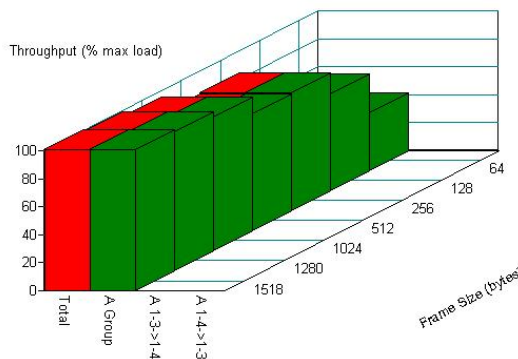


Throughput vs Frame Size

| Name/Framesize | 64       | 128     | 256        | 512 | 1024 | 1280 | 1518 |
|----------------|----------|---------|------------|-----|------|------|------|
| Total          | 41.21875 | 69.0625 | 99.2265625 | 100 | 100  | 100  | 100  |
| A Group        | 41.21875 | 69.0625 | 99.2265625 | 100 | 100  | 100  | 100  |
| A 1-1->1-2     | N/A      | N/A     | N/A        | N/A | N/A  | N/A  | N/A  |
| A 1-2->1-1     | N/A      | N/A     | N/A        | N/A | N/A  | N/A  | N/A  |

**Throughput Summary Report**

|                             |                               |                                     |                                    |                                    |
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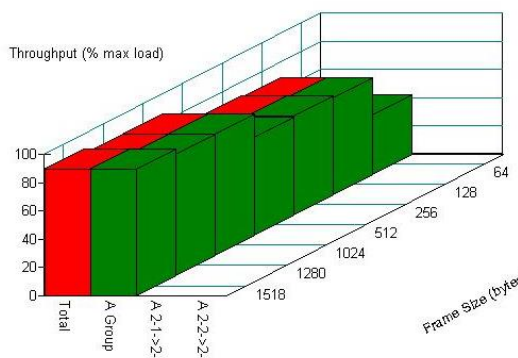


Throughput vs Frame Size

| Name/FrameSize | 64       | 128     | 256        | 512       | 1024      | 1280       | 1518 |
|----------------|----------|---------|------------|-----------|-----------|------------|------|
| Total          | 41.21875 | 69.0625 | 83.7578125 | 82.984375 | 95.359375 | 99.2265625 | 100  |
| A Group        | 41.21875 | 69.0625 | 83.7578125 | 82.984375 | 95.359375 | 99.2265625 | 100  |
| A 1-3->1-4     | N/A      | N/A     | N/A        | N/A       | N/A       | N/A        | N/A  |
| A 1-4->1-3     | N/A      | N/A     | N/A        | N/A       | N/A       | N/A        | N/A  |

**Throughput Summary Report**

|                             |                               |                                     |                                    |                                    |
|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|
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|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|



Throughput vs Frame Size

| Name/FrameSize | 64         | 128        | 256        | 512     | 1024       | 1280       | 1518      |
|----------------|------------|------------|------------|---------|------------|------------|-----------|
| Total          | 41.9921875 | 68.2890625 | 69.8359375 | 69.0625 | 85.3046875 | 85.3046875 | 89.171875 |
| A Group        | 41.9921875 | 68.2890625 | 69.8359375 | 69.0625 | 85.3046875 | 85.3046875 | 89.171875 |
| A 2-1->2-2     | N/A        | N/A        | N/A        | N/A     | N/A        | N/A        | N/A       |
| A 2-2->2-1     | N/A        | N/A        | N/A        | N/A     | N/A        | N/A        | N/A       |

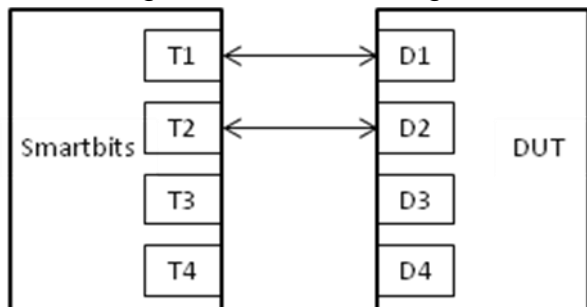
10.2.2. Throughput test (2 port) [CPU: Intel® Celeron® Processor N3350 (2M Cache, up to 2.4 GHz)]

**Test Description:**

7. In DUT System, set routing function enabled.

```
<# echo 1 > /proc/sys/net/ipv4/ip_forward>
```

8. Test Configuration as below Figure.



9. Smartflow\Test Group to add port1<->port2 with Bi-directional,

10. The tester set loading traffic from 1% to 100% and the traffic step is 50%.

11. Interaction Constants Duration Time Set to 60 Sec.

12. Test all LAN ports performance.

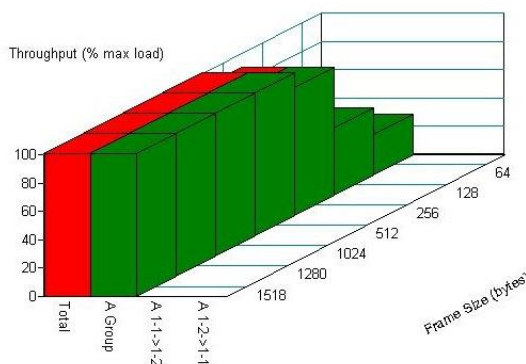
**Test Result:**

Test Group: <LAN1-LAN2 bi-directional>

| Speed:<br>1000_Full | Frame Size(bytes) |            |            |            |            |           |           |
|---------------------|-------------------|------------|------------|------------|------------|-----------|-----------|
| LAN ports           | 64                | 128        | 256        | 512        | 1024       | 1280      | 1518      |
| 1-2                 | 28.0703125        | 46.6328125 | 89.9453125 | 100        | 100        | 100       | 100       |
| 3-4                 | 28.84375          | 47.40625   | 86.078125  | 83.7578125 | 96.1328125 | 100       | 100       |
| 5-6                 | 28.0703125        | 48.953125  | 69.8359375 | 69.0625    | 85.3046875 | 86.078125 | 89.171875 |

Throughput Summary Report

|                             |                               |                                     |                                    |                                    |
|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|
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|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|

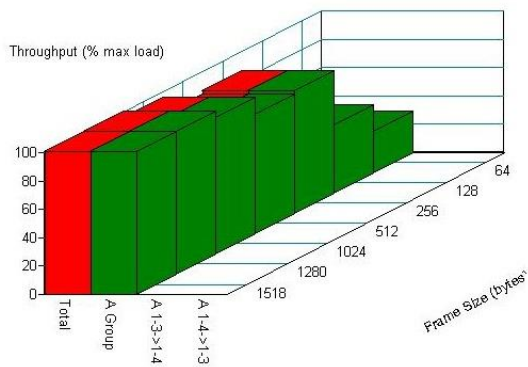


Throughput vs Frame Size

| Name/Frame size | 64         | 128        | 256        | 512 | 1024 | 1280 | 1518 |
|-----------------|------------|------------|------------|-----|------|------|------|
| Total           | 28.0703125 | 46.6328125 | 89.9453125 | 100 | 100  | 100  | 100  |
| A Group         | 28.0703125 | 46.6328125 | 89.9453125 | 100 | 100  | 100  | 100  |
| A 1-1->1-2      | N/A        | N/A        | N/A        | N/A | N/A  | N/A  | N/A  |
| A 1-2->1-1      | N/A        | N/A        | N/A        | N/A | N/A  | N/A  | N/A  |

**Throughput Summary Report**

|                             |                               |                                     |                                    |                                    |
|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|
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|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|

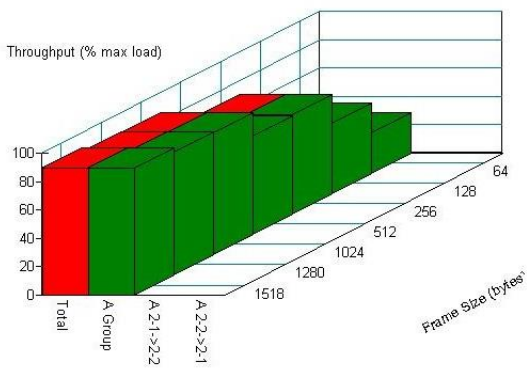


Throughput vs Frame Size

| Name/FrameSize | 64       | 128      | 256       | 512        | 1024       | 1280 | 1518 |
|----------------|----------|----------|-----------|------------|------------|------|------|
| Total          | 28.84375 | 47.40625 | 86.078125 | 83.7578125 | 96.1328125 | 100  | 100  |
| A Group        | 28.84375 | 47.40625 | 86.078125 | 83.7578125 | 96.1328125 | 100  | 100  |
| A 1-3->1-4     | N/A      | N/A      | N/A       | N/A        | N/A        | N/A  | N/A  |
| A 1-4->1-3     | N/A      | N/A      | N/A       | N/A        | N/A        | N/A  | N/A  |

**Throughput Summary Report**

|                             |                               |                                     |                                    |                                    |
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|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|



Throughput vs Frame Size

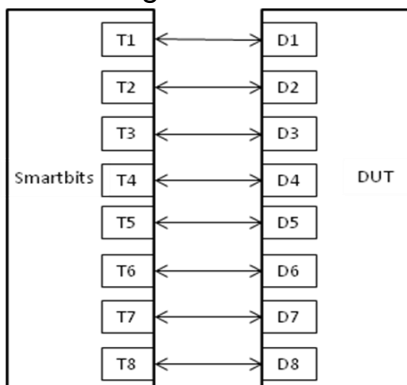
| Name/FrameSize | 64         | 128       | 256        | 512     | 1024       | 1280      | 1518      |
|----------------|------------|-----------|------------|---------|------------|-----------|-----------|
| Total          | 28.0703125 | 48.953125 | 69.8359375 | 69.0625 | 85.3046875 | 86.078125 | 89.171875 |
| A Group        | 28.0703125 | 48.953125 | 69.8359375 | 69.0625 | 85.3046875 | 86.078125 | 89.171875 |
| A 2-1->2-2     | N/A        | N/A       | N/A        | N/A     | N/A        | N/A       | N/A       |
| A 2-2->2-1     | N/A        | N/A       | N/A        | N/A     | N/A        | N/A       | N/A       |

### 10.3 RFC-2544 performance test (6 ports)

#### 10.3.1. Throughput test

##### Test Description:

- In DUT System, set routing function enabled.  
<# echo 1 > /proc/sys/net/ipv4/ip\_forward>
- Test Configuration as below Figure.



- Smartflow\Test Group to add port1<->port2 with Bi-directional, port3<->port4 with Bi-directional, port5<->port6 with Bi-directional, port7<->port8 with Bi-directional.
- The tester set loading traffic from 1% to 100% and the traffic step is 50%.
- Interaction Constants Duration Time Set to 60 Sec.
- Test all LAN ports performance.

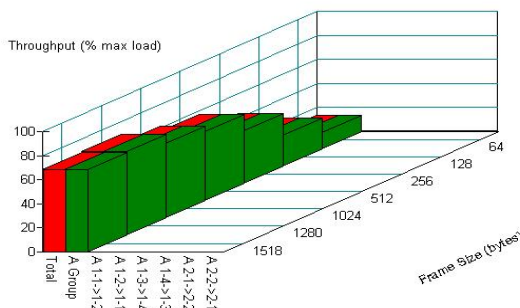
##### Test Result:

Test Group: <LAN1-LAN2 bi-directional> ; <LAN3-LAN4 bi-directional>  
<LAN5-LAN6 bi-directional>

| Speed:<br>1000_Full | Frame Size(bytes) |            |            |         |           |         |            |
|---------------------|-------------------|------------|------------|---------|-----------|---------|------------|
| LAN ports           | 64                | 128        | 256        | 512     | 1024      | 1280    | 1518       |
| 1 ~6                | 13.375            | 24.9765625 | 43.5390625 | 56.6875 | 61.328125 | 69.0625 | 68.2890625 |

Throughput Summary Report

|                             |                               |                                     |                                    |                                    |
|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|
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|-----------------------------|-------------------------------|-------------------------------------|------------------------------------|------------------------------------|



Throughput vs Frame Size

| Name/Framesize | 64     | 128        | 256        | 512     | 1024      | 1280    | 1518       |
|----------------|--------|------------|------------|---------|-----------|---------|------------|
| Total          | 13.375 | 24.9765625 | 43.5390625 | 56.6875 | 61.328125 | 69.0625 | 68.2890625 |
| A Group        | 13.375 | 24.9765625 | 43.5390625 | 56.6875 | 61.328125 | 69.0625 | 68.2890625 |
| A 1-1->1-2     | N/A    | N/A        | N/A        | N/A     | N/A       | N/A     | N/A        |
| A 1-2->1-1     | N/A    | N/A        | N/A        | N/A     | N/A       | N/A     | N/A        |
| A 1-3->1-4     | N/A    | N/A        | N/A        | N/A     | N/A       | N/A     | N/A        |
| A 1-4->1-3     | N/A    | N/A        | N/A        | N/A     | N/A       | N/A     | N/A        |
| A 2-1->2-2     | N/A    | N/A        | N/A        | N/A     | N/A       | N/A     | N/A        |
| A 2-2->2-1     | N/A    | N/A        | N/A        | N/A     | N/A       | N/A     | N/A        |