# VIA Labs, Inc.

# VL812 USB 3.0 Hub for Low Power

# Test Report

Revision 1.2

Sept. 3, 2012

# VIA Labs, Inc.

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## Disclaimer Notice:

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# REVISION HISTORY

| Revision | Date | Note | Initial |
|----------|------|------|---------|
| 1.0 | May 18, 2012 | FW83E1_LowPower Test Report | PW |
| 1.1 | Aug. 3, 2012 | Add Hub with Bus Power Test Result for FW83E1_LowPower | PW |
| 1.2 | Sept. 3, 2012 | FW8561_LowPower Test Report | PW |

# VL812 USB 3.0 Hub for Low Power Test Report

## Table of Contents

# 1. Functionality Test

## 1.1 Test Condition

1. Chip: VL812
2. Firmware Version: v8561_LowePower
3. Circuit State: DP4_Power Switch, DP1~DP3_Poly Fuse
4. Test Platform:

| Motherboard | Intel DB75EN | BIOS Version | Intel Corp EN7510H.86A 0026.2012.0329.1439 |
|---|---|---|---|
| Chipset | Intel B75 | Memory | Samsung DDR3-1333 2GB *2 |
| CPU | Intel Pentium G840 @ 2.80GHz | VGA | Onboard |
| Motherboard | ASUS P8H77-V | BIOS Version | AMI 0906 |
| Chipset | Intel H77 | Memory | Kingston DDR3-1333 2GB *2 |
| CPU | Intel Pentium G840 @ 2.80GHz | VGA | Onboard |
| Motherboard | AMD Annapurna | BIOS Version | AMI RAP0080E |
| Chipset | AMD ID1410+A75 | Memory | Micron MT16JTF25664AZ-1G6G1 2GB |
| CPU | AMD Eng Sample | VGA | Onboard |
| Motherboard | ASUS P7H55D-M EVO | BIOS Version | AMI 1604 |
| Chipset | Intel H55 | Memory | Transcend DDR3-1333 2GB |
| CPU | Intel Core i3 530 @ 2.93GHz | VGA | Onboard |

5. OS: Windows 7 SP1 32bit [Win7 64bit on Intel B75]
6. Host: Intel, AMD, Renesas, Fresco

| Host Controller | Chip | FW / HW | Driver | Type |
|---|---|---|---|---|
| Intel | B75 | Integrated | 1.0.5.235 | Onboard |
| Intel | H77 | Integrated | 1.0.5.235 | Onboard |
| AMD | A75 | Integrated | 1.0.0.72 | Onboard |
| Renesas | uPD720200F1 | FW 3034 | 2.1.36.0 | Onboard |
| Renesas | uPD720202 | FW 2017 | 3.0.20.0 | Add-on Card |
| Fresco | FL1100 | HW Rev. 1.0 | 3.5.46.0 | Add-on Card |

7. PCI Express: Gen1, Gen2
8. Power Supply Status: Bus-Power
9. USB3.0 Cable: ELKA_3M

## 10. DUT List

| 4SS Devices List | | |
|---|---|---|
| **Host** | **No.** | **Device** |
| Intel H77 / B75 | S01 | VL701 _FW2.0.0.6_burst write disable_Bus Power + Transcend TS64GSSD25S-M 2.5" SSD 64GB |
| | S02 | I-O DATA HDJ-UT1.0 External 3.5" HDD 1TB [VID_04BB/PID_0131/REV_0100] |
| | S03 | Seagate FreeAgent GoFlex _Bus Power [VID_0BC2/PID_5030/REV_0100] + Transcend TS64GSSD25S-M 2.5" SSD 64GB |
| | S04 | BUFFALO HD-HXU3 External 3.5" HDD 1TB [VID_0411/PID_0180/REV_0001] |
| AMD A75 | S02 | I-O DATA HDJ-UT1.0 External 3.5" HDD 1TB [VID_04BB/PID_0131/REV_0100] |
| | S04 | BUFFALO HD-HXU3 External 3.5" HDD 1TB [VID_0411/PID_0180/REV_0001] |
| | S05 | Seagate FreeAgent GoFlex _Bus Power [VID_0BC2/PID_5030/REV_0100] + Seagate ST9500325AS 2.5" HDD 500GB |
| | S06 | VL701_FW2.0.0.6_Bus Power + LITEON LCT-256M3S 2.5" SSD 256GB |
| Renesas D720200F1 / D720202 | S02 | I-O DATA HDJ-UT1.0 External 3.5" HDD 1TB [VID_04BB/PID_0131/REV_0100] |
| | S04 | BUFFALO HD-HXU3 External 3.5" HDD 1TB [VID_0411/PID_0180/REV_0001] |
| | S05 | Seagate FreeAgent GoFlex _Bus Power [VID_0BC2/PID_5030/REV_0100] + Seagate ST9500325AS 2.5" HDD 500GB |
| | S07 | VL701_FW2.0.0.6_Bus Power + OCZ Right Memo 2.5" SATA3 SSD 60GB |
| Fresco FL1100 | S03 | Seagate FreeAgent GoFlex _Bus Power [VID_0BC2/PID_5030/REV_0100] + Transcend TS64GSSD25S-M 2.5" SSD 64GB |
| | S02 | I-O DATA HDJ-UT1.0 External 3.5" HDD 1TB [VID_04BB/PID_0131/REV_0100] |
| | S01 | VL701 _FW2.0.0.6_burst write disable_Bus Power + Transcend TS64GSSD25S-M 2.5" SSD 64GB |
| | S04 | BUFFALO HD-HXU3 External 3.5" HDD 1TB [VID_0411/PID_0180/REV_0001] |

| 1SS + 1HS + 1FS + 1LS Devices List | | | |
|---|---|---|---|
| **Host** | **No.** | **Speed** | **Device** |
| Intel H77 / B75 | S04 | SS | BUFFALO HD-HXU3 External 3.5" HDD 1TB [VID_0411/PID_0180/REV_0001] |
| | H01 | HS | Patriot XPORT XT Boost Flash Disk 4GB [VID_13FE/PID_3100/REV_0100] |
| | F01 | FS | Logitech ClearChat Pro USB Headset [VID_046D/PID_0A0B/REV_1013] |
| | L01 | LS | Microsoft Comfort Curev Keyboard 2000 [VID_045E/PID_00DD/REV_0173] |
| AMD A75 | S06 | SS | VL701_FW2.0.0.6_Bus Power+ LITEON LCT-256M3S 2.5" SSD 256GB |
| | H01 | HS | Patriot XPORT XT Boost Flash Disk 4GB [VID_13FE/PID_3100/REV_0100] |
| | F02 | FS | Targus Keyboard [VID_05A4/PID_9862/REV_0110] |
| | L02 | LS | GIGABYTE GK-KM6150-M Mouse [VID_093A/PID_2510/REV_0100] |
| Renesas D720200F1 / D720202 | S07 | SS | VL701_FW2.0.0.6_Bus Power + OCZ Right Memo 2.5" SATA3 SSD 60GB |
| | H02 | HS | OCZ DIESE Flash Disk 4GB [VID_058F/PID_6387/REV_0104] |
| | F02 | FS | Targus Keyboard [VID_05A4/PID_9862/REV_0110] |
| | L02 | LS | GIGABYTE GK-KM6150-M Mouse [VID_093A/PID_2510/REV_0100] |
| Fresco FL1100 | S02 | SS | I-O DATA HDJ-UT1.0 External 3.5" HDD 1TB [VID_04BB/PID_0131/REV_0100] |
| | H03 | HS | Sony 16GB Flash Disk [VID_054C/PID_05BA/REV_0100] |
| | F03 | FS | JWIN Headset [VID_05E1/PID_2010/REV_0100] |
| | L03 | LS | Logitech M-BT83 Mouse [VID_046D/PID_C03E/REV_2000] |

## 1.2 Test Item Description
**1. Hot Plug test**
    1) Upstream Port

        ① Inactive Attach / Detach USB Cable to Upstream Port 50 Times with 4 Downstream Port Devices

        ② Active Attach / Detach USB Cable to Upstream Port 50 Times with 4 Downstream Port Devices

    2) Downstream Port Manual Droop (Active Detach/Re-attach)

        ① Attach 4 Devices to Downstream Port

        ② DP2~DP4 Run Burn-in AP

        ③ Hot plug DP1 20 Times

        ④ Repeat Step 2~3 for Other DP (The rest may be deduced by analogy)


***Item 2 – Item 5: Active Boot & ACPI Mode Test [\*Burn-in Tool: HD Speed]***

    1) Attach 4 Devices to Downstream Port

    2) Run Burn-in Tool on ACPI Mode

    3) Operate Each Mode 5 Times

    4) Check Status of Hub & Downstream Port Devices

**2. Active Cold boot**

Pass if all four DP devices operate after reboot; Fail - otherwise

**3. Active Warm boot**

Pass if all four DP devices operate after reboot; Fail - otherwise

**4. Active S3 / Hybrid Sleep**

Pass if HD Speed continues to run on all four DP devices; Fail - otherwise

**5. Active S4**

Pass if HD Speed continues to run on all four DP devices; Fail – otherwise

## 1.3 Test Result

| Intel B75/H77 Host Controller | | | | |
|---|---|---|---|---|
| **Downstream Port Device Condition** | **Test Item** | | **Test Result** | |
| | | | **B75** | **H77** |
| **4 Super Speed Devices** | **Hot Plug** | Inactive UP | PASS | PASS |
| | | Active UP | PASS | PASS |
| | | DP Manual Droop — DP1 | PASS | PASS |
| | | DP Manual Droop — DP2 | PASS | PASS |
| | | DP Manual Droop — DP3 | PASS | PASS |
| | | DP Manual Droop — DP4 | PASS | PASS |
| | Active Cold Boot | | PASS | PASS |
| | Active Warm Boot | | PASS | PASS |
| | **ACPI** | S3 | PASS | PASS |
| | | S4 | PASS | PASS |
| | | Hybrid Sleep | PASS | PASS |
| **1SS + 1HS + 1FS + 1LS Devices** | **Hot Plug** | Inactive UP | PASS | PASS |
| | | Active UP | PASS | PASS |
| | | DP Manual Droop — DP1 | PASS | PASS |
| | | DP Manual Droop — DP2 | PASS | PASS |
| | | DP Manual Droop — DP3 | PASS | PASS |
| | | DP Manual Droop — DP4 | PASS | PASS |
| | Active Cold Boot | | PASS | PASS |
| | Active Warm Boot | | PASS | PASS |
| | **ACPI** | S3 | PASS | PASS |
| | | S4 | PASS | PASS |
| | | Hybrid Sleep | PASS | PASS |

| AMD A75 Host Controller | | | |
|---|---|---|---|
| **Downstream Port Device Condition** | **Test Item** | | **Test Result** |
| **4 Super Speed Devices** | **Hot Plug** | Inactive UP | PASS |
| | | Active UP | PASS |
| | | DP Manual Droop — DP1 | PASS |
| | | DP Manual Droop — DP2 | PASS |
| | | DP Manual Droop — DP3 | PASS |
| | | DP Manual Droop — DP4 | PASS |
| | Active Cold Boot | | PASS |
| | Active Warm Boot | | PASS |
| | **ACPI** | S3 | PASS |
| | | S4 | PASS |
| | | Hybrid Sleep | PASS |
| **1SS + 1HS + 1FS + 1LS Devices** | **Hot Plug** | Inactive UP | PASS |
| | | Active UP | PASS |
| | | DP Manual Droop — DP1 | PASS |
| | | DP Manual Droop — DP2 | PASS |
| | | DP Manual Droop — DP3 | PASS |
| | | DP Manual Droop — DP4 | PASS |
| | Active Cold Boot | | PASS |
| | Active Warm Boot | | PASS |
| | **ACPI** | S3 | PASS |
| | | S4 | PASS |
| | | Hybrid Sleep | PASS |

## Renesas uPD720200F1/uPD720202 Host Controller

| Downstream Port Device Condition | Test Item | | | Test Result | |
|---|---|---|---|---|---|
| | | | | uPD720200F1 | uPD720202 |
| 4 Super Speed Devices | Hot Plug | Inactive UP | | PASS | PASS |
| | | Active UP | | PASS | PASS |
| | | DP Manual Droop | DP1 | PASS | PASS |
| | | | DP2 | PASS | PASS |
| | | | DP3 | PASS | PASS |
| | | | DP4 | PASS | PASS |
| | Active Cold Boot | | | PASS | PASS |
| | Active Warm Boot | | | PASS | PASS |
| | ACPI | S3 | | PASS | PASS |
| | | S4 | | PASS | PASS |
| | | Hybrid Sleep | | PASS | PASS |
| 1SS + 1HS + 1FS + 1LS Devices | Hot Plug | Inactive UP | | PASS | PASS |
| | | Active UP | | PASS | PASS |
| | | DP Manual Droop | DP1 | PASS | PASS |
| | | | DP2 | PASS | PASS |
| | | | DP3 | PASS | PASS |
| | | | DP4 | PASS | PASS |
| | Active Cold Boot | | | PASS | PASS |
| | Active Warm Boot | | | PASS | PASS |
| | ACPI | S3 | | PASS | PASS |
| | | S4 | | PASS | PASS |
| | | Hybrid Sleep | | PASS | PASS |

## Fresco FL1100 Host Controller

| Downstream Port Device Condition | Test Item | | | Test Result |
|---|---|---|---|---|
| 4 Super Speed Devices | Hot Plug | Inactive UP | | PASS |
| | | Active UP | | PASS |
| | | DP Manual Droop | DP1 | PASS |
| | | | DP2 | PASS |
| | | | DP3 | PASS |
| | | | DP4 | PASS |
| | Active Cold Boot | | | PASS |
| | Active Warm Boot | | | PASS |
| | ACPI | S3 | | PASS |
| | | S4 | | PASS |
| | | Hybrid Sleep | | PASS |
| 1SS + 1HS + 1FS + 1LS Devices | Hot Plug | Inactive UP | | PASS |
| | | Active UP | | PASS |
| | | DP Manual Droop | DP1 | PASS |
| | | | DP2 | PASS |
| | | | DP3 | PASS |
| | | | DP4 | PASS |
| | Active Cold Boot | | | PASS |
| | Active Warm Boot | | | PASS |
| | ACPI | S3 | | PASS |
| | | S4 | | PASS |
| | | Hybrid Sleep | | PASS |

# 2. Gold Tree Test

## Test Platform

| Motherboard | Intel DH55TC | BIOS Version | TCIBX10H.86A.0048.2011.1206.1342 |
|---|---|---|---|
| Chipset | Intel H55 | Memory | OCZ DDR3-1333 2GB *2 |
| CPU | Intel Core i3 540 | VGA | Onboard |

## 2.1 xHCI Interoperability Test_1 Procedures for Peripherals, Hubs, Hosts

Please refer to USB3.0 tests procedure from USB-IF website as "xHCI_Interoperability_Testing_v1_3_10.27.2011.pdf"

Test Preparation modified by Microsoft Hub Workshop SuperSpeed Interoperability



Hub Vendor Tree Topology
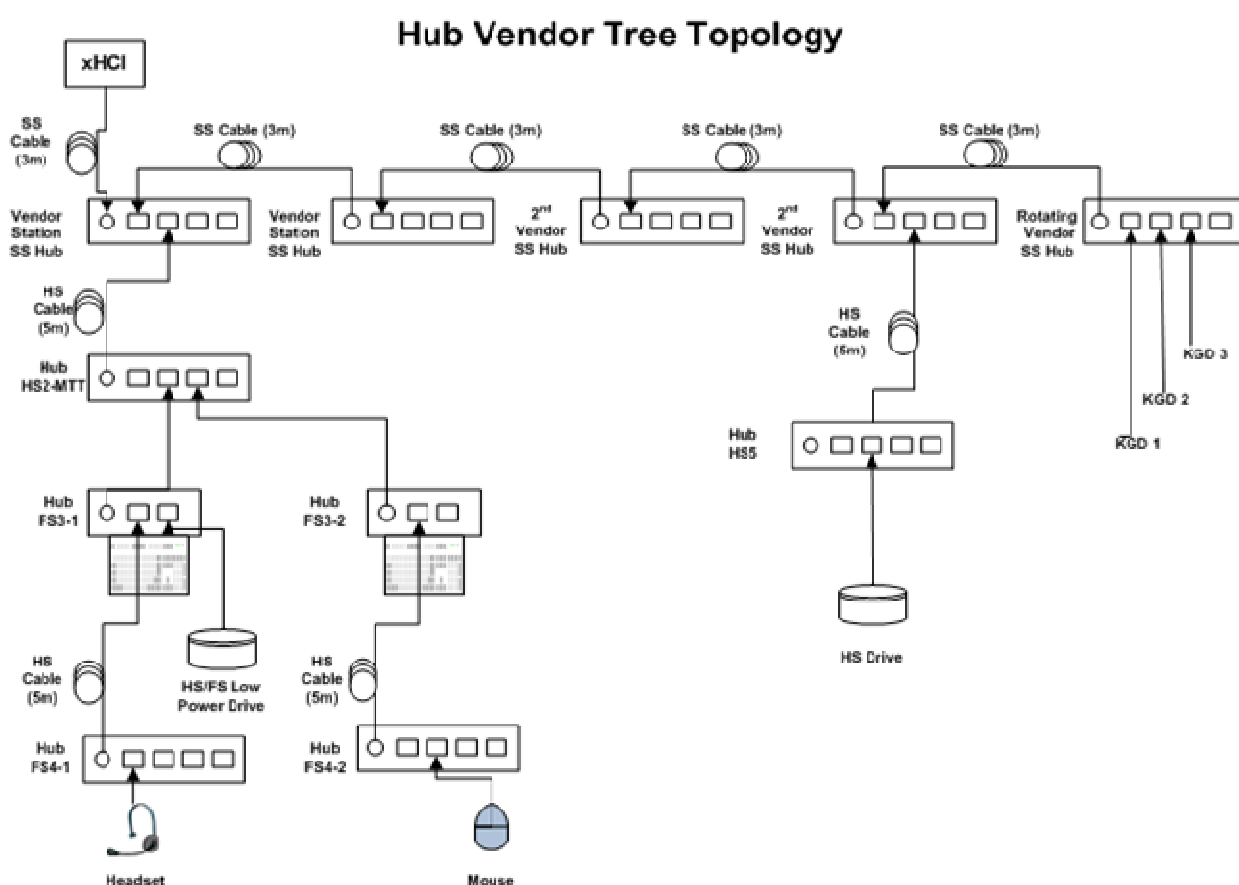
KGD1: TUSB9261

KGD2: ASM1051

KGD3: MB86C31

| Renesas PDK | | |
|---|---|---|
| **Test Item** | | **Test Result** |
| **1** | **Basic Interoperability** | **PASS** |
| 1-1 | Peripheral Driver Installation and Enumeration | **PASS** |
| 1-2 | Stress | **PASS** |
| 1-3 | Inactive Detach | **PASS** |
| 1-4 | Active Detach | **PASS** |
| 1-5 | Active Hybrid Sleep/Remote Wake | **PASS** |
| 1-6 | Active S4 Hibernate/Resume | **PASS** |
| 1-7 | Warm boot | **PASS** |
| 1-8 | Hybrid boot | **PASS** |
| 1-9 | Cold boot | **PASS** |
| **2** | **Additional Tests** | **PASS** |
| 2-1 | U1/U2 | **PASS** |
| 2-2 | Deferred Bit | **PASS** |
| 2-3 | SS Hub1 Bus Power Check | **PASS** |
| 2-4 | SSHub1 Power Cycle | **PASS** |
| 2-5 | SSHub3 Active Detach | **PASS** |
| 2-6 | HS2-MTT Active Detach | **PASS** |
| 2-7 | SSHub3 Power Cycle | **PASS** |
| 2-8 | Topology change ASMedia KGD to HS5 and check Enumeration | **PASS** |
| **Remark** | | |
| **U1/U2: Enable; Driver Verifier: Enable** | | |

| Fresco PDK | | |
|---|---|---|
| **Test Item** | | **Test Result** |
| **1** | **Basic Interoperability** | **PASS** |
| 1-1 | Peripheral Driver Installation and Enumeration | **PASS** |
| 1-2 | Stress | **PASS** |
| 1-3 | Inactive Detach | **PASS** |
| 1-4 | Active Detach | **PASS** |
| 1-5 | Active Hybrid Sleep/Remote Wake | **PASS** |
| 1-6 | Active S4 Hibernate/Resume | **PASS** |
| 1-7 | Warm boot | **PASS** |
| 1-8 | Hybrid boot | **PASS** |
| 1-9 | Cold boot | **PASS** |
| **2** | **Additional Tests** | **PASS** |
| 2-1 | U1/U2 | **PASS** |
| 2-2 | Deferred Bit | **PASS** |
| 2-3 | SS Hub1 Bus Power Check | **PASS** |
| 2-4 | SSHub1 Power Cycle | **PASS** |
| 2-5 | SSHub3 Active Detach | **PASS** |
| 2-6 | HS2-MTT Active Detach | **PASS** |
| 2-7 | SSHub3 Power Cycle | **PASS** |
| 2-8 | Topology change ASMedia KGD to HS5 and check Enumeration | **PASS** |
| **Remark** | | |
| **U1/U2: Enable; Driver Verifier: Enable** | | |

## 2.2 xHCI Interoperability Test_2 Procedures for Peripherals, Hubs, Hosts

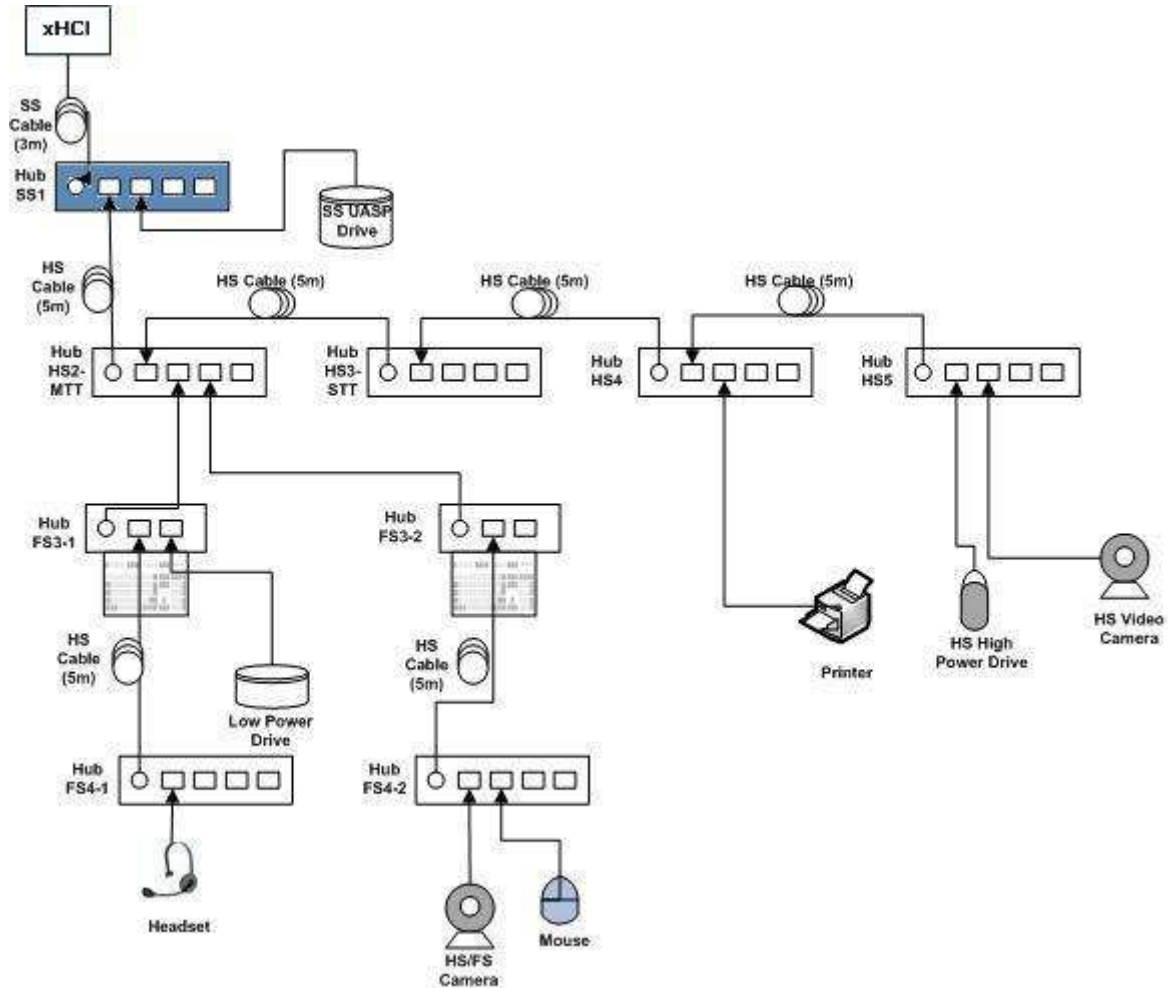**Please refer to USB3.0 tests procedure from USB-IF website as** "**xHCI_Interoperability_Testing_v1_3_10.27.2011.pdf**"

| Renesas PDK | | | | |
|---|---|---|---|---|
| **Test Item** | **DUT[KGD]** | | | |
| | **VL701** | **TUSB9261** | **ASM1051** | **MB86C31** |
| **Self-Powered Hub Overall** | **PASS** | **PASS** | **PASS** | **PASS** |
| 1   **xHCI Controller Driver Installation** | **PASS** | **PASS** | **PASS** | **PASS** |
| 2   **Peripheral Enumeration and Driver Installation** | **PASS** | **PASS** | **PASS** | **PASS** |
| 3   **Interoperability** | **PASS** | **PASS** | **PASS** | **PASS** |
| 4   **All Device Tests** | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-1   Inactive Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-2   Active Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-3   Active Sleep/Remote Wake | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-4   Active S4 Hibernation/Resume | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-5   Warm boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-6   Cold boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 5   **Topology Change 1 [SS Hub→HS Hub]** | **PASS** | **PASS** | **PASS** | **PASS** |
| 6   **All Device Tests** | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-1   Inactive Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-2   Active Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-3   Active Sleep/Remote Wake | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-4   Active S4 Hibernation/Resume | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-5   Warm boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-6   Cold boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 7   **Topology Change 2 [HS Hub→FS Hub]** | **PASS** | **PASS** | **PASS** | **PASS** |
| 8   **All Device Tests** | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-1   Inactive Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-2   Active Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-3   Active Sleep/Remote Wake | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-4   Active S4 Hibernation/Resume | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-5   Warm boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-6   Cold boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 9   **Interoperability without Driver Verifier** | **PASS** | **PASS** | **PASS** | **PASS** |
| 10   **Function Wake** | **PASS** | **PASS** | **PASS** | **PASS** |

**Remark**
**U1/U2: Enable**
**Driver Verifier: Enable**

| Fresco PDK | | | | |
|---|---|---|---|---|
| **Test Item** | **DUT[KGD]** | | | |
| | **VL701** | **TUSB9261** | **ASM1051** | **MB86C31** |
| **Self-Powered Hub Overall** | **PASS** | **PASS** | **PASS** | **PASS** |
| **1**   **xHCI Controller Driver Installation** | **PASS** | **PASS** | **PASS** | **PASS** |
| **2**   **Peripheral Enumeration and Driver Installation** | **PASS** | **PASS** | **PASS** | **PASS** |
| **3**   **Interoperability** | **PASS** | **PASS** | **PASS** | **PASS** |
| **4**   **All Device Tests** | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-1   Inactive Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-2   Active Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-3   Active Sleep/Remote Wake | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-4   Active S4 Hibernation/Resume | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-5   Warm boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-6   Cold boot | **PASS** | **PASS** | **PASS** | **PASS** |
| **5**   **Topology Change 1 [SS Hub→HS Hub]** | **PASS** | **PASS** | **PASS** | **PASS** |
| **6**   **All Device Tests** | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-1   Inactive Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-2   Active Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-3   Active Sleep/Remote Wake | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-4   Active S4 Hibernation/Resume | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-5   Warm boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 6-6   Cold boot | **PASS** | **PASS** | **PASS** | **PASS** |
| **7**   **Topology Change 2 [HS Hub→FS Hub]** | **PASS** | **PASS** | **PASS** | **PASS** |
| **8**   **All Device Tests** | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-1   Inactive Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-2   Active Detach & Reattach | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-3   Active Sleep/Remote Wake | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-4   Active S4 Hibernation/Resume | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-5   Warm boot | **PASS** | **PASS** | **PASS** | **PASS** |
| 8-6   Cold boot | **PASS** | **PASS** | **PASS** | **PASS** |
| **9**   **Interoperability without Driver Verifier** | **PASS** | **PASS** | **PASS** | **PASS** |
| **10**   **Function Wake** | **PASS** | **PASS** | **PASS** | **PASS** |

**Remark**
**U1/U2: Enable**
**Driver Verifier: Enable**

## 2.3 xHCI Backwards Compatibility for Hosts, Hubs

Please refer to USB3.0 tests procedure from USB-IF website as "**xHCI_Backwards_Compatibility_Testing_10.27.2011.pdf**"

| Renesas PDK | | | | |
|---|---|---|---|---|
| **Test Item** | **DUT[KGD]** | | | |
| | **VL701** | **TUSB9261** | **ASM1051** | **MB86C31** |
| **Overall Backwards Compatibility Result** | **PASS** | **PASS** | **PASS** | **PASS** |
| **1**   **xHCI Controller Driver Installation** | **PASS** | **PASS** | **PASS** | **PASS** |
| **2**   **Peripheral Enumeration and Driver Installation** | **PASS** | **PASS** | **PASS** | **PASS** |
| **3**   **Backwards Compatibility** | **PASS** | **PASS** | **PASS** | **PASS** |
| **4**   **All Device Tests** | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-1   Inactive Detach & Reattach | PASS | PASS | PASS | PASS |
| 4-2   Active Detach & Reattach | PASS | PASS | PASS | PASS |
| 4-3   Active Sleep/Remote Wake | PASS | PASS | PASS | PASS |
| 4-4   Active S4 Hibernation/Resume | PASS | PASS | PASS | PASS |
| 4-5   Warm boot | PASS | PASS | PASS | PASS |
| 4-6   Cold boot | PASS | PASS | PASS | PASS |
| **5**   **Topology Change 1 [SS Hub→HS Hub]** | **PASS** | **PASS** | **PASS** | **PASS** |
| **7**   **Topology Change 2 [HS Hub→FS Hub]** | **PASS** | **PASS** | **PASS** | **PASS** |
| **8**   **Backwards Compatibility without Driver Verifier** | **PASS** | **PASS** | **PASS** | **PASS** |

**Remark**
U1/U2: Enable
Driver Verifier: Enable

| Fresco PDK | | | | |
|---|---|---|---|---|
| **Test Item** | **DUT[KGD]** | | | |
| | **VL701** | **TUSB9261** | **ASM1051** | **MB86C31** |
| **Overall Backwards Compatibility Result** | **PASS** | **PASS** | **PASS** | **PASS** |
| **1**   **xHCI Controller Driver Installation** | **PASS** | **PASS** | **PASS** | **PASS** |
| **2**   **Peripheral Enumeration and Driver Installation** | **PASS** | **PASS** | **PASS** | **PASS** |
| **3**   **Backwards Compatibility** | **PASS** | **PASS** | **PASS** | **PASS** |
| **4**   **All Device Tests** | **PASS** | **PASS** | **PASS** | **PASS** |
| 4-1   Inactive Detach & Reattach | PASS | PASS | PASS | PASS |
| 4-2   Active Detach & Reattach | PASS | PASS | PASS | PASS |
| 4-3   Active Sleep/Remote Wake | PASS | PASS | PASS | PASS |
| 4-4   Active S4 Hibernation/Resume | PASS | PASS | PASS | PASS |
| 4-5   Warm boot | PASS | PASS | PASS | PASS |
| 4-6   Cold boot | PASS | PASS | PASS | PASS |
| **5**   **Topology Change 1 [SS Hub→HS Hub]** | **PASS** | **PASS** | **PASS** | **PASS** |
| **7**   **Topology Change 2 [HS Hub→FS Hub]** | **PASS** | **PASS** | **PASS** | **PASS** |
| **8**   **Backwards Compatibility without Driver Verifier** | **PASS** | **PASS** | **PASS** | **PASS** |

**Remark**
U1/U2: Enable
Driver Verifier: Enable

# 3. CV Test

| Host | Hub | KGD | CH9-3.0 | MSC | CH9-2.0 | Hub Tests-2.0 |
|------|-----|-----|---------|-----|---------|---------------|
| Renesas | VL812 | N/A | **PASS** | N/A | **PASS** | **PASS** |
| Renesas | VL812 | VL701 | **PASS** | **PASS** | N/A | N/A |
| Renesas | VL812 | MB86C31 | **PASS** | **PASS** | N/A | N/A |
| Renesas | VL812 | TUSB9261 | **PASS** | **PASS** | N/A | N/A |
| Renesas | VL812 | ASM1051 | **PASS** | **PASS** | N/A | N/A |
| Renesas | (VL812)+HS Cable | VL701 | N/A | **PASS** | **PASS** | N/A |
| Renesas | (VL812)+HS Cable | MB86C31 | N/A | **PASS** | **PASS** | N/A |
| Renesas | (VL812)+HS Cable | TUSB9261 | N/A | **PASS** | **PASS** | N/A |
| Renesas | (VL812)+HS Cable | ASM1051 | N/A | **PASS** | **PASS** | N/A |
| Fresco | VL812 | N/A | **PASS** | N/A | **PASS** | **PASS** |
| Fresco | VL812 | VL701 | **PASS** | **PASS** | N/A | N/A |
| Fresco | VL812 | MB86C31 | **PASS** | **PASS** | N/A | N/A |
| Fresco | VL812 | TUSB9261 | **PASS** | **PASS** | N/A | N/A |
| Fresco | VL812 | ASM1051 | **PASS** | **PASS** | N/A | N/A |
| Fresco | (VL812)+HS Cable | VL701 | N/A | **PASS** | **PASS** | N/A |
| Fresco | (VL812)+HS Cable | MB86C31 | N/A | **PASS** | **PASS** | N/A |
| Fresco | (VL812)+HS Cable | TUSB9261 | N/A | **PASS** | **PASS** | N/A |
| Fresco | (VL812)+HS Cable | ASM1051 | N/A | **PASS** | **PASS** | N/A |
| **Remark**<br>**U1/U2: Enable** | | | | | | |

# 4. Interop 3.0 Test

| Host | Hub | KGD | Active detach/attach | Active hybrid sleep | Active hibernate | Warm boot | Cold boot |
|------|-----|-----|------|------|------|------|------|
| Renesas | VL812 | VL701 | **PASS** | **PASS** | **PASS** | **PASS** | **PASS** |
| Renesas | VL812 | MB86C31 | **PASS** | **PASS** | **PASS** | **PASS** | **PASS** |
| Renesas | VL812 | TUSB9261 | **PASS** | **PASS** | **PASS** | **PASS** | **PASS** |
| Renesas | VL812 | ASM1051 | **PASS** | **PASS** | **PASS** | **PASS** | **PASS** |
| Fresco | VL812 | VL701 | **PASS** | **PASS** | **PASS** | **PASS** | **PASS** |
| Fresco | VL812 | MB86C31 | **PASS** | **PASS** | **PASS** | **PASS** | **PASS** |
| Fresco | VL812 | TUSB9261 | **PASS** | **PASS** | **PASS** | **PASS** | **PASS** |
| Fresco | VL812 | ASM1051 | **PASS** | **PASS** | **PASS** | **PASS** | **PASS** |

**Remark**
**U1/U2: Enable**

# 5. Power Consumption

| Renesas Onboard Host Controller | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Motherboard | MSI 880GSA-E45 | | | | | Chip | VL812 | | | | | |
| RAM | DDR3-1333 2G*2 | | | | | Host Driver | 2.1.28.0 | | | | | |
| OS | Win7_SP1_32bit | | | | | Unit | mA | | | | | |

| Mode Voltage | No Device | | | 1*Low Speed Device (Keyboard) | | | 2*USB2.0 + 2*USB3.0 | | | Full Loading 4*USB2.0 + 4*USB3.0 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Normal | Read | S3 | Normal | Read | S3 | Normal | Read | S3 | Normal | Read | S3 |
| 5V | 8.27 | N/A | 8.25 | 24.32 | 24.33 | 8.22 | 130.80 | 143.20 | 8.35 | 202.90 | 220.10 | 8.30 |
| 3.3V | 6.10 | N/A | 6.10 | 22.00 | 22.00 | 6.20 | 79.90 | 91.80 | 6.20 | 111.70 | 128.00 | 6.20 |
| 1.15V | 10.30 | N/A | 10.20 | 22.40 | 22.40 | 10.21 | 231.20 | 237.60 | 10.40 | 341.10 | 345.50 | 10.30 |
| Power(mW) | 31.98 | N/A | 31.86 | 98.36 | 98.36 | 32.20 | 529.55 | 576.18 | 34.42 | 760.88 | 819.73 | 32.31 |

| Mode Voltage | 1 * USB2.0 Device | | | 2 * USB2.0 Device | | | 3 * USB2.0 Device | | | 4 * USB2.0 Device | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Normal | Read | S3 | Normal | Read | S3 | Normal | Read | S3 | Normal | Read | S3 |
| 5V | 29.21 | 34.81 | 8.21 | 36.22 | 44.60 | 8.23 | 42.98 | 54.50 | 8.25 | 50.33 | 62.70 | 8.30 |
| 3.3V | 27.90 | 34.80 | 6.20 | 36.70 | 47.20 | 6.20 | 45.00 | 60.50 | 6.20 | 54.70 | 71.20 | 6.20 |
| 1.15V | 23.80 | 24.70 | 10.10 | 25.10 | 26.40 | 10.10 | 26.40 | 28.00 | 10.20 | 27.70 | 29.10 | 10.30 |
| Power(mW) | 119.44 | 143.25 | 32.08 | 149.98 | 186.12 | 32.08 | 178.86 | 231.85 | 32.19 | 212.37 | 268.43 | 32.31 |

| Mode Voltage | 1 * USB3.0 Device | | | 2 * USB3.0 Device | | | 3 * USB3.0 Device | | | 4 * USB3.0 Device | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Normal | Read | S3 | Normal | Read | S3 | Normal | Read | S3 | Normal | Read | S3 |
| 5V | 73.07 | 74.00 | 8.30 | 100.60 | 102.60 | 8.27 | 129.50 | 132.60 | 8.32 | 162.40 | 166.30 | 8.36 |
| 3.3V | 36.10 | 36.00 | 6.30 | 48.70 | 48.80 | 6.20 | 61.40 | 61.50 | 6.20 | 75.10 | 75.20 | 6.30 |
| 1.15V | 161.30 | 164.50 | 10.30 | 215.60 | 221.50 | 10.20 | 269.90 | 278.10 | 10.40 | 324.10 | 333.80 | 10.50 |
| Power(mW) | 304.63 | 307.98 | 32.64 | 408.65 | 415.77 | 32.19 | 513.01 | 522.77 | 32.42 | 620.55 | 632.03 | 32.87 |

| Fresco Onboard Host Controller | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Motherboard** | | | MSI 880GSA-E45 | | | **Chip** | | | VL812 | | |
| **RAM** | | | DDR3-1333 2G*2 | | | **Host Driver** | | | 2.1.28.0 | | |
| **OS** | | | Win7_SP1_32bit | | | **Unit** | | | mA | | |
| Mode / Voltage | **No Device** | | | **1*Low Speed Device (Keyboard)** | | | **2*USB2.0 + 2*USB3.0** | | | **Full Loading 4*USB2.0 + 4*USB3.0** | | |
| | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** |
| 5V | 52.76 | N/A | 8.30 | 55.46 | 55.40 | 8.21 | 131.40 | 136.50 | 8.32 | 205.60 | 208.00 | 8.30 |
| 3.3V | 37.20 | N/A | 6.20 | 40.80 | 40.70 | 6.20 | 79.80 | 85.00 | 6.20 | 111.70 | 113.00 | 6.20 |
| 1.15V | 8.67 | N/A | 10.30 | 86.60 | 86.60 | 10.00 | 230.90 | 233.00 | 10.30 | 341.20 | 343.50 | 10.20 |
| Power(mW) | 132.73 | N/A | 32.31 | 234.23 | 233.90 | 31.96 | 517.33 | 536.80 | 31.79 | 743.93 | 750.75 | 31.68 |
| Mode / Voltage | **1 * USB2.0 Device** | | | **2 * USB2.0 Device** | | | **3 * USB2.0 Device** | | | **4 * USB2.0 Device** | | |
| | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** |
| 5V | 59.73 | 67.00 | 8.25 | 66.75 | 76.50 | 8.28 | 73.45 | 85.00 | 8.28 | 81.10 | 91.00 | 8.30 |
| 3.3V | 45.70 | 55.00 | 6.20 | 54.50 | 67.00 | 6.30 | 62.90 | 78.00 | 6.20 | 72.50 | 85.60 | 6.20 |
| 1.15V | 88.00 | 89.20 | 10.10 | 89.40 | 90.90 | 10.20 | 90.80 | 92.30 | 10.20 | 92.00 | 93.40 | 10.30 |
| Power(mW) | 252.01 | 284.08 | 32.08 | 282.66 | 325.64 | 32.52 | 311.99 | 363.55 | 32.19 | 345.05 | 389.89 | 32.31 |
| Mode / Voltage | **1 * USB3.0 Device** | | | **2 * USB3.0 Device** | | | **3 * USB3.0 Device** | | | **4 * USB3.0 Device** | | |
| | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** | **Normal** | **Read** | **S3** |
| 5V | 87.70 | 87.70 | 8.30 | 116.00 | 117.20 | 8.35 | 146.70 | 147.80 | 8.30 | 180.60 | 181.20 | 8.30 |
| 3.3V | 49.00 | 49.00 | 6.20 | 61.80 | 61.80 | 6.20 | 74.60 | 74.60 | 6.20 | 88.10 | 88.20 | 6.20 |
| 1.15V | 173.40 | 176.30 | 10.20 | 228.00 | 232.00 | 10.40 | 282.10 | 282.10 | 10.20 | 336.20 | 338.10 | 10.20 |
| Power(mW) | 361.11 | 364.45 | 32.19 | 466.14 | 470.74 | 32.42 | 570.60 | 570.60 | 32.19 | 677.36 | 679.88 | 32.08 |

# 6. Signal Quality

<u>TX Test Data</u>

1. **Upstream Port**

| Pass | # Failed | # Trials | Test Name | Actual Value | Margin | Spec Range |
|------|----------|----------|-----------|--------------|--------|------------|
| ✓ | 0 | 1 | LFPS Peak-Peak Differential Output Voltage | 1.0411V | 39.7 % | 800.0mV <= VALUE <= 1.2000V |
| ✓ | 0 | 1 | LFPS Period (tPeriod) | 39.9584ns | 24.9 % | 20.0000ns <= VALUE <= 100.0000ns |
| ✓ | 0 | 1 | LFPS Burst Width (tBurst) | 1.0240µs | 47.0 % | 600.0ns <= VALUE <= 1.4000µs |
| ✓ | 0 | 1 | LFPS Repeat Time Interval (tRepeat) | 10.1903µs | 47.6 % | 6.0000µs <= VALUE <= 14.0000µs |
| ✓ | 0 | 1 | LFPS Rise Time | 115.5ps | 97.1 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Fall Time | 116.7ps | 97.1 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Duty cycle | 50.7799% | 46.1 % | 40.0000% <= VALUE <= 60.0000% |
| ✓ | 0 | 1 | LFPS AC Common Mode Voltage | 34.1mV | 65.9 % | VALUE <= 100.0mV |
| ✓ | 0 | 1 | Unit Interval (with SSC) | 199.995ps | 4.9 % | 199.940ps <= VALUE <= 201.060ps |
| ✓ | 0 | 1 | SSC Deviation | 5.015000kppm | 17.8 % | 3.700000kppm <= VALUE <= 5.300000kppm |
| ✓ | 0 | 1 | SSC Modulation Rate | 31.173110kHz | 39.1 % | 30.000000kHz <= VALUE <= 33.000000kHz |
| ✓ | 0 | 1 | SSC Slew Rate | 5.742ms | 42.6 % | VALUE <= 10.000ms |
| ✓ | 0 | 1 | Far End Random Jitter (CTLE ON) | 166mUI | 27.8 % | VALUE <= 230mUI |
| ✓ | 0 | 1 | Far End Maximum Deterministic Jitter (CTLE ON) | 133mUI | 69.1 % | VALUE <= 430mUI |
| ✓ | 0 | 1 | Far End Total Jitter at BER-12 (CTLE ON) | 299mUI | 54.7 % | VALUE <= 660mUI |
| ✓ | 0 | 1 | Far End Template Test (CTLE ON) | 0.000 | 100.0 % | VALUE = 0.000 |
| ✓ | 0 | 1 | Far End Peak-Peak Differential Output Voltage (CTLE ON) | 470.0mV | 33.6 % | 100.0mV <= VALUE <= 1.2000V |

2. **Downstream Port 1**

| Pass | # Failed | # Trials | Test Name | Actual Value | Margin | Spec Range |
|------|----------|----------|-----------|--------------|--------|------------|
| ✓ | 0 | 1 | LFPS Peak-Peak Differential Output Voltage | 1.0411V | 39.7 % | 800.0mV <= VALUE <= 1.2000V |
| ✓ | 0 | 1 | LFPS Period (tPeriod) | 39.9838ns | 25.0 % | 20.0000ns <= VALUE <= 100.0000ns |
| ✓ | 0 | 1 | LFPS Burst Width (tBurst) | 1.0160µs | 48.0 % | 600.0ns <= VALUE <= 1.4000µs |
| ✓ | 0 | 1 | LFPS Repeat Time Interval (tRepeat) | 10.2098µs | 47.4 % | 6.0000µs <= VALUE <= 14.0000µs |
| ✓ | 0 | 1 | LFPS Rise Time | 115.1ps | 97.1 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Fall Time | 116.8ps | 97.1 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Duty cycle | 50.5790% | 47.1 % | 40.0000% <= VALUE <= 60.0000% |
| ✓ | 0 | 1 | LFPS AC Common Mode Voltage | 39.1mV | 60.9 % | VALUE <= 100.0mV |
| ✓ | 0 | 1 | Unit Interval (with SSC) | 201.008ps | 4.6 % | 199.940ps <= VALUE <= 201.060ps |
| ✓ | 0 | 1 | SSC Deviation | 5.040000kppm | 16.3 % | 3.700000kppm <= VALUE <= 5.300000kppm |
| ✓ | 0 | 1 | SSC Modulation Rate | 31.647740kHz | 45.1 % | 30.000000kHz <= VALUE <= 33.000000kHz |
| ✓ | 0 | 1 | SSC Slew Rate | 5.693ms | 43.1 % | VALUE <= 10.000ms |
| ✓ | 0 | 1 | Far End Random Jitter (CTLE ON) | 169mUI | 26.5 % | VALUE <= 230mUI |
| ✓ | 0 | 1 | Far End Maximum Deterministic Jitter (CTLE ON) | 166mUI | 61.4 % | VALUE <= 430mUI |
| ✓ | 0 | 1 | Far End Total Jitter at BER-12 (CTLE ON) | 336mUI | 49.1 % | VALUE <= 660mUI |
| ✓ | 0 | 1 | Far End Template Test (CTLE ON) | 0.000 | 100.0 % | VALUE = 0.000 |
| ✓ | 0 | 1 | Far End Peak-Peak Differential Output Voltage (CTLE ON) | 655.5mV | 49.5 % | 100.0mV <= VALUE <= 1.2000V |

## 3. Downstream Port 2

| Pass | # Failed | # Trials | Test Name | Actual Value | Margin | Spec Range |
|------|----------|----------|-----------|--------------|--------|------------|
| ✓ | 0 | 1 | LFPS Peak-Peak Differential Output Voltage | 1.0511V | 37.2 % | 800.0mV <= VALUE <= 1.2000V |
| ✓ | 0 | 1 | LFPS Period (tPeriod) | 39.9943ns | 25.0 % | 20.0000ns <= VALUE <= 100.0000ns |
| ✓ | 0 | 1 | LFPS Burst Width (tBurst) | 1.0160µs | 48.0 % | 600.0ns <= VALUE <= 1.4000µs |
| ✓ | 0 | 1 | LFPS Repeat Time Interval (tRepeat) | 10.2098µs | 47.4 % | 6.0000µs <= VALUE <= 14.0000µs |
| ✓ | 0 | 1 | LFPS Rise Time | 102.4ps | 97.4 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Fall Time | 100.3ps | 97.5 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Duty cycle | 50.6804% | 46.6 % | 40.0000% <= VALUE <= 60.0000% |
| ✓ | 0 | 1 | LFPS AC Common Mode Voltage | 44.7mV | 55.3 % | VALUE <= 100.0mV |
| ✓ | 0 | 1 | Unit Interval (with SSC) | 199.997ps | 5.1 % | 199.940ps <= VALUE <= 201.060ps |
| ✓ | 0 | 1 | SSC Deviation | 5.010000kppm | 18.1 % | 3.700000kppm <= VALUE <= 5.300000kppm |
| ✓ | 0 | 1 | SSC Modulation Rate | 30.921360kHz | 30.7 % | 30.000000kHz <= VALUE <= 33.000000kHz |
| ✓ | 0 | 1 | SSC Slew Rate | 5.926ms | 40.7 % | VALUE <= 10.000ms |
| ✓ | 0 | 1 | Far End Random Jitter (CTLE ON) | 169mUI | 26.5 % | VALUE <= 230mUI |
| ✓ | 0 | 1 | Far End Maximum Deterministic Jitter (CTLE ON) | 220mUI | 48.8 % | VALUE <= 430mUI |
| ✓ | 0 | 1 | Far End Total Jitter at BER-12 (CTLE ON) | 389mUI | 41.1 % | VALUE <= 660mUI |
| ✓ | 0 | 1 | Far End Template Test (CTLE ON) | 0.000 | 100.0 % | VALUE = 0.000 |
| ✓ | 0 | 1 | Far End Peak-Peak Differential Output Voltage (CTLE ON) | 709.2mV | 44.6 % | 100.0mV <= VALUE <= 1.2000V |

## 4. Downstream Port 3

| Pass | # Failed | # Trials | Test Name | Actual Value | Margin | Spec Range |
|------|----------|----------|-----------|--------------|--------|------------|
| ✓ | 0 | 1 | LFPS Peak-Peak Differential Output Voltage | 1.0382V | 40.5 % | 800.0mV <= VALUE <= 1.2000V |
| ✓ | 0 | 1 | LFPS Period (tPeriod) | 39.9811ns | 25.0 % | 20.0000ns <= VALUE <= 100.0000ns |
| ✓ | 0 | 1 | LFPS Burst Width (tBurst) | 1.0240µs | 47.0 % | 600.0ns <= VALUE <= 1.4000µs |
| ✓ | 0 | 1 | LFPS Repeat Time Interval (tRepeat) | 10.2098µs | 47.4 % | 6.0000µs <= VALUE <= 14.0000µs |
| ✓ | 0 | 1 | LFPS Rise Time | 99.1ps | 97.5 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Fall Time | 98.9ps | 97.5 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Duty cycle | 50.7121% | 46.4 % | 40.0000% <= VALUE <= 60.0000% |
| ✓ | 0 | 1 | LFPS AC Common Mode Voltage | 40.6mV | 59.4 % | VALUE <= 100.0mV |
| ✓ | 0 | 1 | Unit Interval (with SSC) | 201.006ps | 4.8 % | 199.940ps <= VALUE <= 201.060ps |
| ✓ | 0 | 1 | SSC Deviation | 5.030000kppm | 16.9 % | 3.700000kppm <= VALUE <= 5.300000kppm |
| ✓ | 0 | 1 | SSC Modulation Rate | 31.333130kHz | 44.4 % | 30.000000kHz <= VALUE <= 33.000000kHz |
| ✓ | 0 | 1 | SSC Slew Rate | 5.824ms | 41.8 % | VALUE <= 10.000ms |
| ✓ | 0 | 1 | Far End Random Jitter (CTLE ON) | 166mUI | 27.8 % | VALUE <= 230mUI |
| ✓ | 0 | 1 | Far End Maximum Deterministic Jitter (CTLE ON) | 226mUI | 47.4 % | VALUE <= 430mUI |
| ✓ | 0 | 1 | Far End Total Jitter at BER-12 (CTLE ON) | 392mUI | 40.6 % | VALUE <= 660mUI |
| ✓ | 0 | 1 | Far End Template Test (CTLE ON) | 0.000 | 100.0 % | VALUE = 0.000 |
| ✓ | 0 | 1 | Far End Peak-Peak Differential Output Voltage (CTLE ON) | 699.5mV | 45.5 % | 100.0mV <= VALUE <= 1.2000V |

## 5. Downstream Port 4

| Pass | # Failed | # Trials | Test Name | Actual Value | Margin | Spec Range |
|---|---|---|---|---|---|---|
| ✓ | 0 | 1 | LFPS Peak-Peak Differential Output Voltage | 1.0373V | 40.7 % | 800.0mV <= VALUE <= 1.2000V |
| ✓ | 0 | 1 | LFPS Period (tPeriod) | 39.9797ns | 25.0 % | 20.0000ns <= VALUE <= 100.0000ns |
| ✓ | 0 | 1 | LFPS Burst Width (tBurst) | 1.0160µs | 48.0 % | 600.0ns <= VALUE <= 1.4000µs |
| ✓ | 0 | 1 | LFPS Repeat Time Interval (tRepeat) | 10.2195µs | 47.3 % | 6.0000µs <= VALUE <= 14.0000µs |
| ✓ | 0 | 1 | LFPS Rise Time | 103.0ps | 97.4 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Fall Time | 100.4ps | 97.5 % | VALUE <= 4.0000ns |
| ✓ | 0 | 1 | LFPS Duty cycle | 50.6542% | 46.7 % | 40.0000% <= VALUE <= 60.0000% |
| ✓ | 0 | 1 | LFPS AC Common Mode Voltage | 39.1mV | 60.9 % | VALUE <= 100.0mV |
| ✓ | 0 | 1 | Unit Interval (with SSC) | 200.996ps | 5.7 % | 199.940ps <= VALUE <= 201.060ps |
| ✓ | 0 | 1 | SSC Deviation | 4.980000kppm | 20.0 % | 3.700000kppm <= VALUE <= 5.300000kppm |
| ✓ | 0 | 1 | SSC Modulation Rate | 31.511700kHz | 49.6 % | 30.000000kHz <= VALUE <= 33.000000kHz |
| ✓ | 0 | 1 | SSC Slew Rate | 5.591ms | 44.1 % | VALUE <= 10.000ms |
| ✓ | 0 | 1 | Far End Random Jitter (CTLE ON) | 170mUI | 26.1 % | VALUE <= 230mUI |
| ✓ | 0 | 1 | Far End Maximum Deterministic Jitter (CTLE ON) | 168mUI | 60.9 % | VALUE <= 430mUI |
| ✓ | 0 | 1 | Far End Total Jitter at BER-12 (CTLE ON) | 339mUI | 48.6 % | VALUE <= 660mUI |
| ✓ | 0 | 1 | Far End Template Test (CTLE ON) | 0.000 | 100.0 % | VALUE = 0.000 |
| ✓ | 0 | 1 | Far End Peak-Peak Differential Output Voltage (CTLE ON) | 674.0mV | 47.8 % | 100.0mV <= VALUE <= 1.2000V |

## TX Eye Diagram

### 1. Upstream Port

Eye Diagram
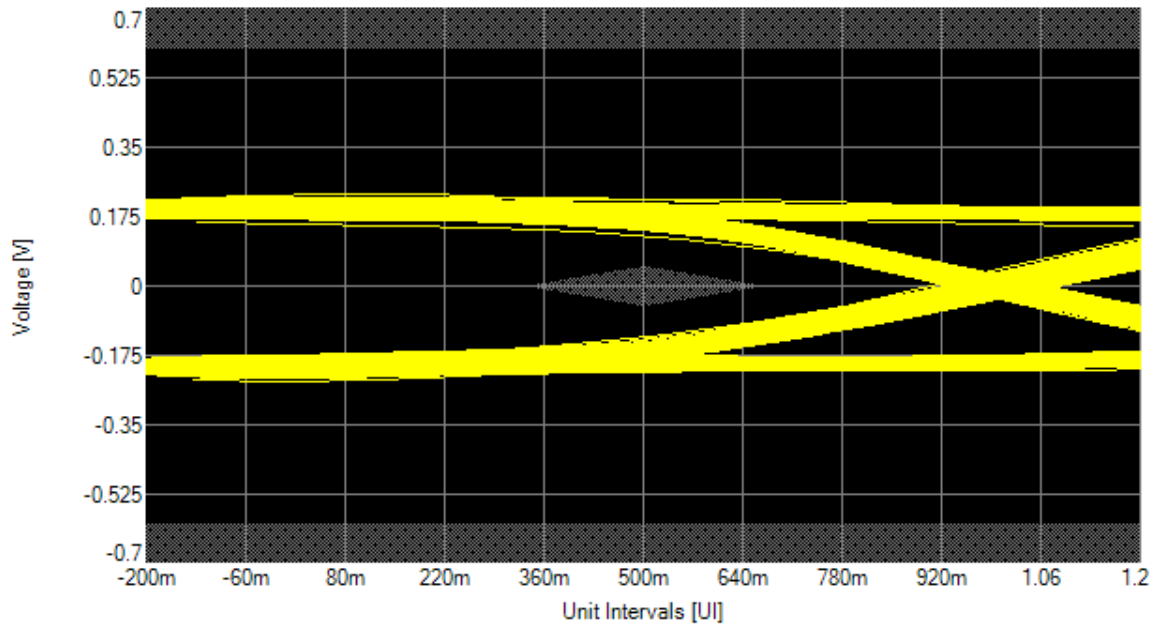


Legend:
Waveform
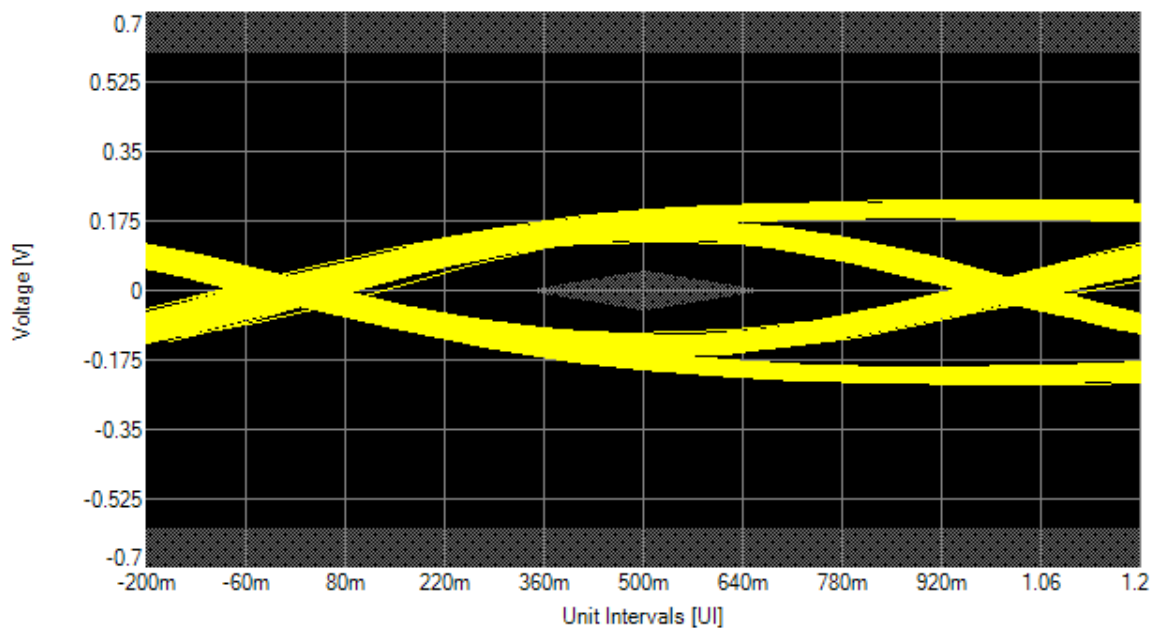
Eye Diagram
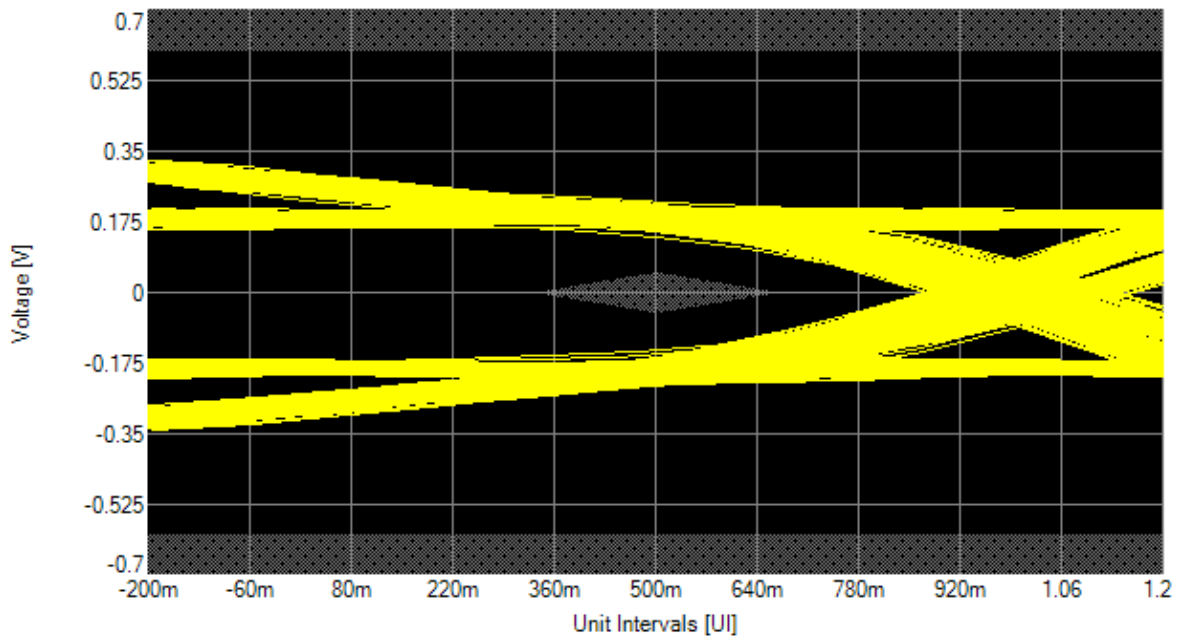


Legend:
Waveform

## 2. Downstream Port 1

Eye Diagram



Legend:
  Waveform
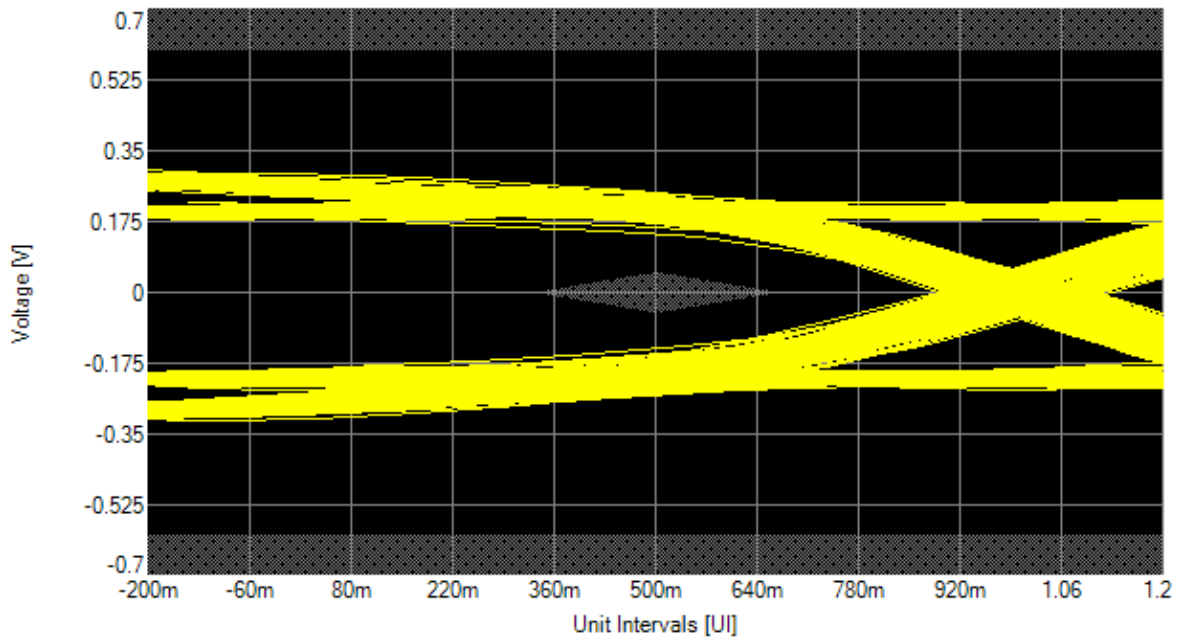
Eye Diagram
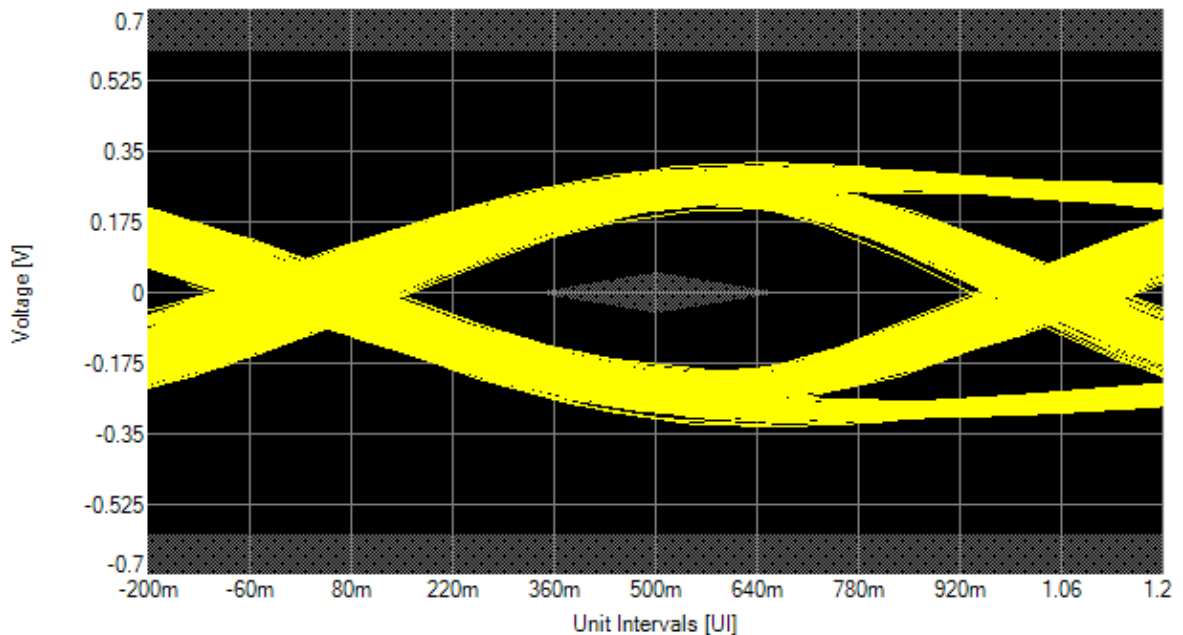


Legend:
  Waveform

## 3. Downstream Port 2

Eye Diagram



Legend:
■ Waveform
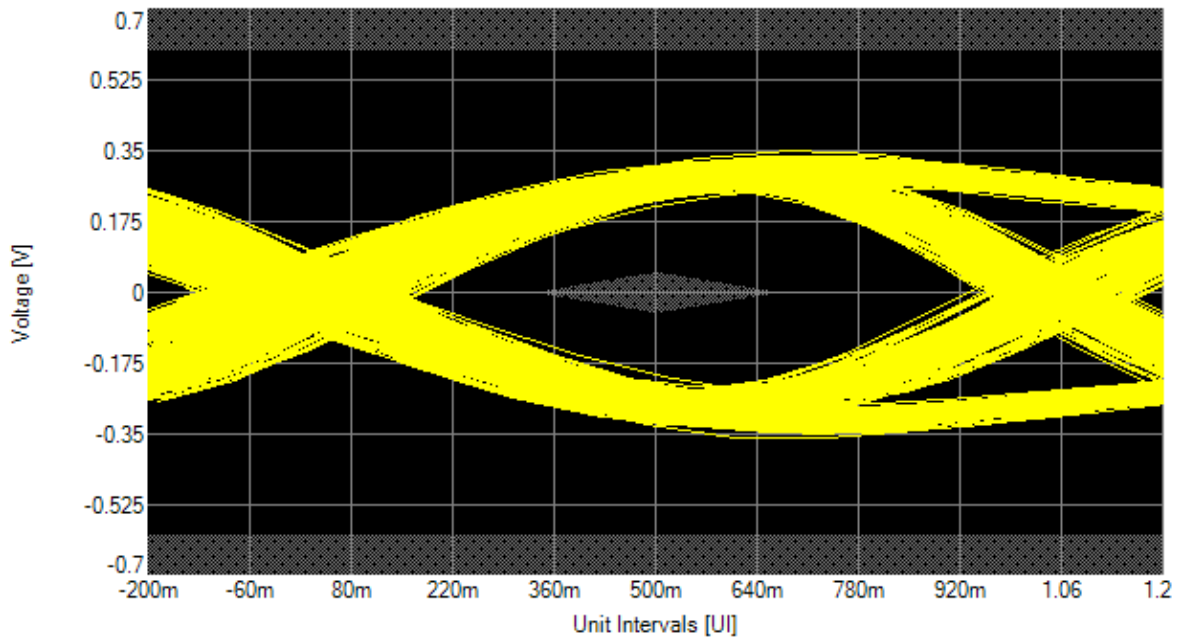
Eye Diagram



Legend:
■ Waveform

## 4. Downstream Port 3

Eye Diagram



Legend:

Waveform

Eye Diagram



Legend:
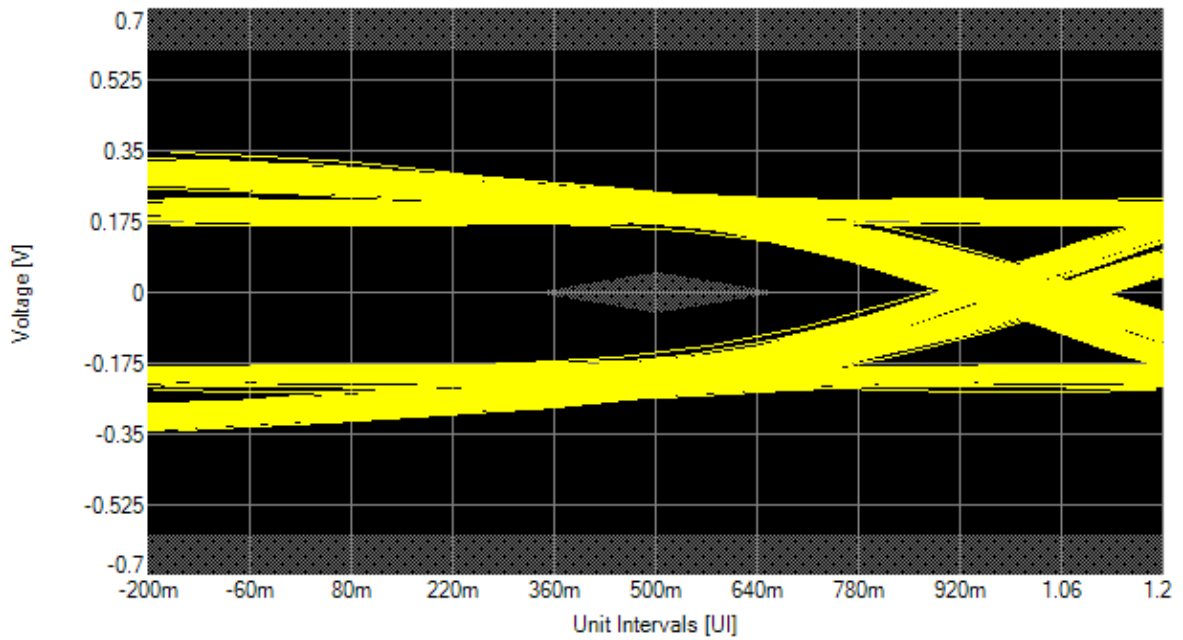
Waveform
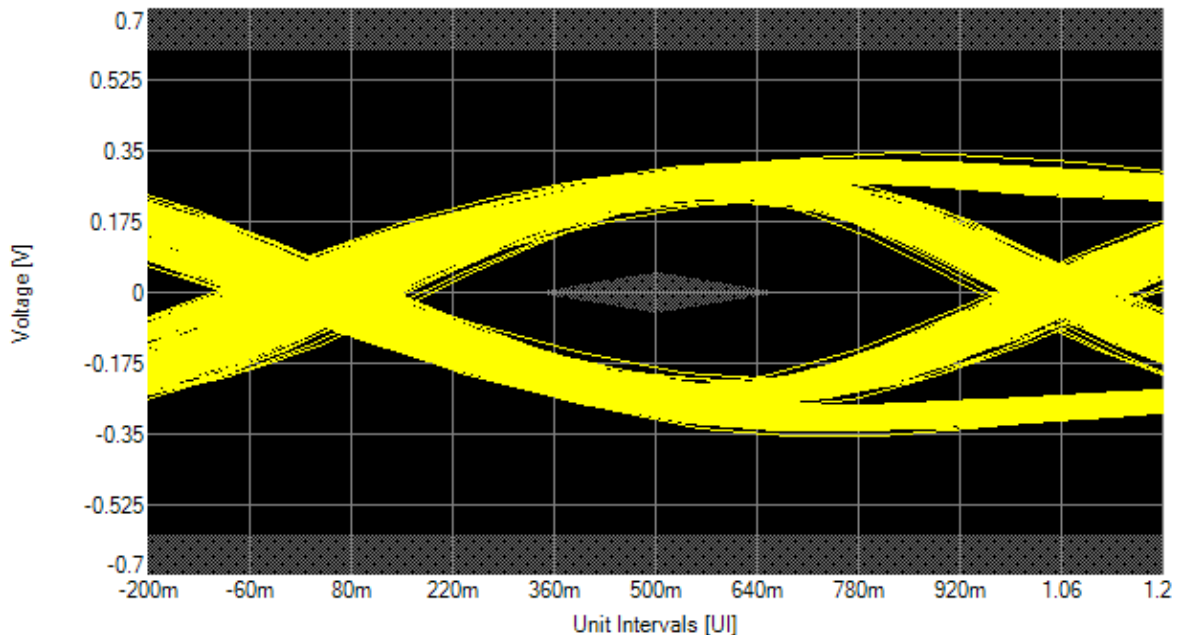
## 5. Downstream Port 4

Eye Diagram



Legend:
■ Waveform

Eye Diagram



Legend:
■ Waveform

**RX Jitter Tolerance**
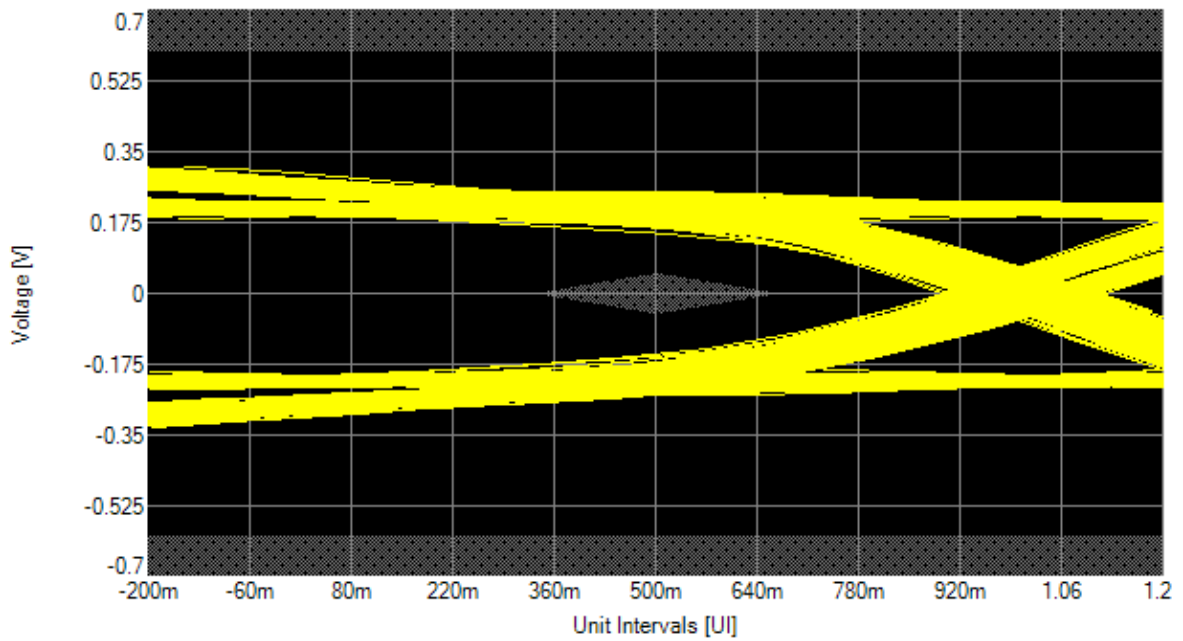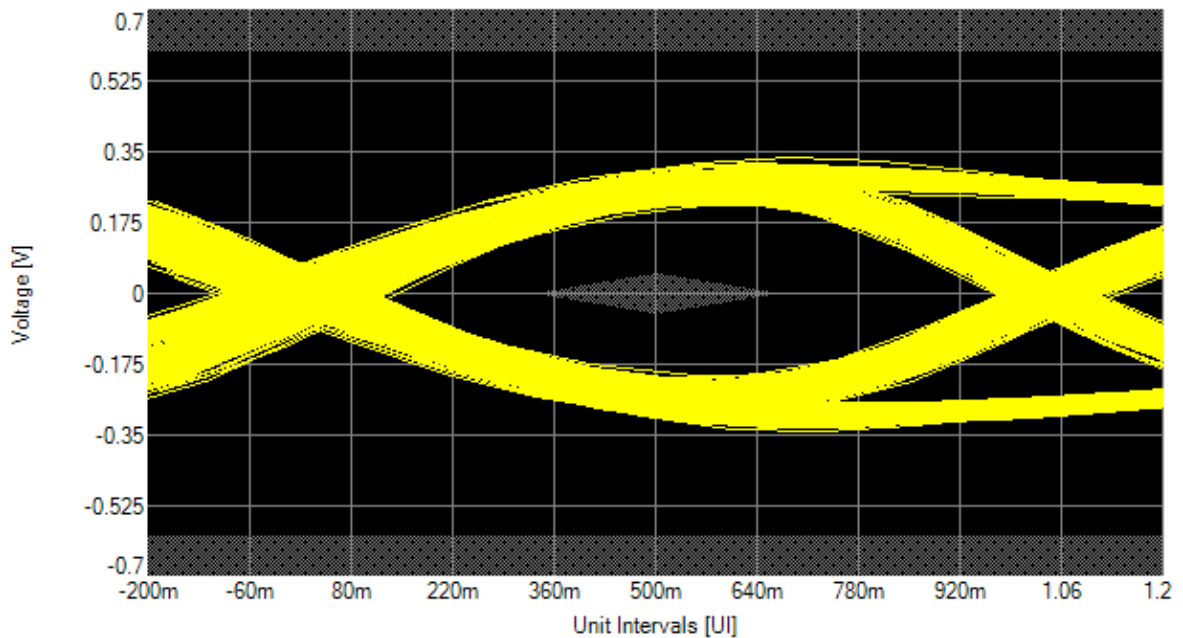
## Jitter Tolerance
### USB SuperSpeedDevice
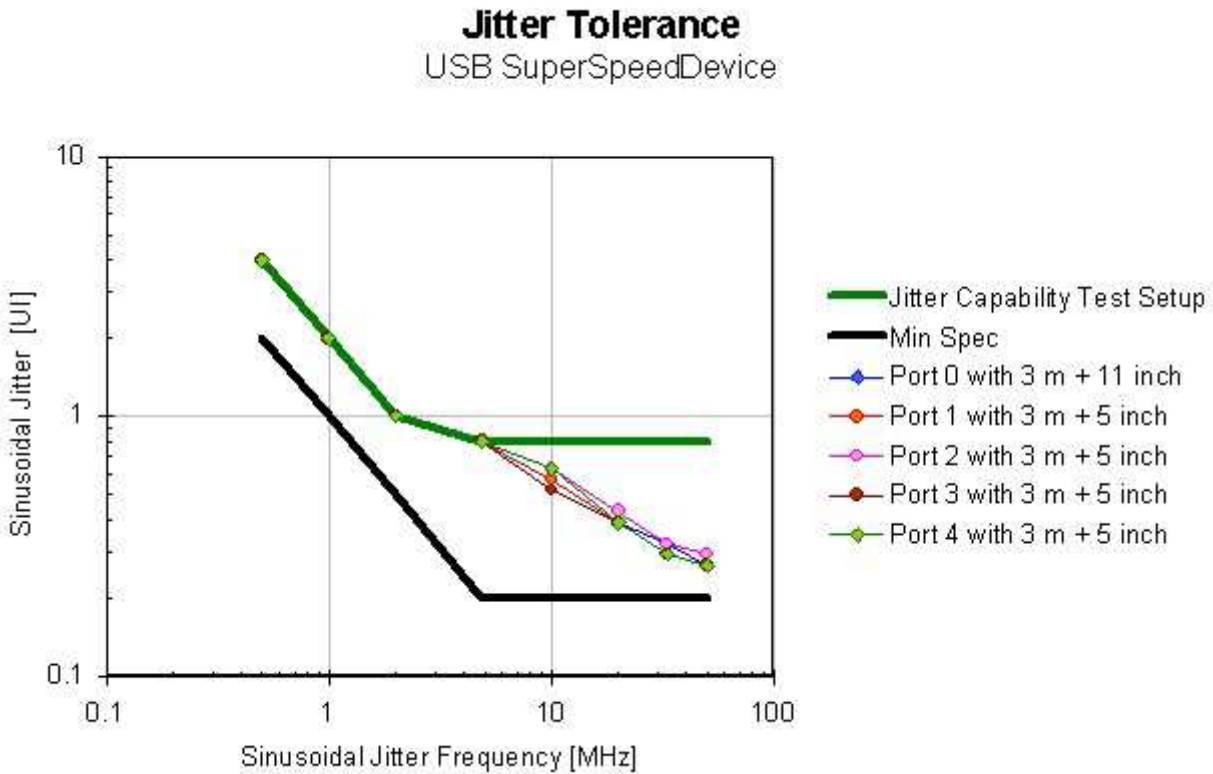
# 7. Compatibility Test

**Descriptions**

```
┌─────────────┐      ┌─────────────┐      ┌─────────────┐
│ Host [xHCI] │ ==>  │    VL812    │ ==>  │     DUT     │
└─────────────┘      └─────────────┘      └─────────────┘
```
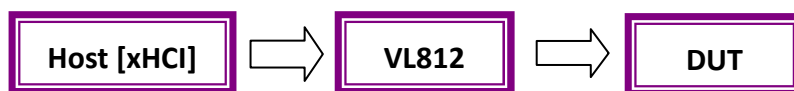
A. DUT is super speed device.

B. Attach / Detach DUT 5 Times under VL812 Downstream Port. Check the DUT have no error on Device Manager.

C. Check device of operation. Copy/Compare is required with storage device.

## 7.1 Platform Compatibility List

| Notebook | |
|---|---|
| **Dell LATITUDE E6530 [Intel integrated Host]** | |
| **Lenovo T430 [Intel integrated Host]** | |
| **Lenovo X1 [Renesas]** | |
| **Lenovo W510 [NEC]** | |
| **Toshiba Satellite L840D/L800D/L845D [AMD integrated Host]** | |
| **ASUS Zenbook [Renesas]** | |
| **Desktop Platform** | |
| **Intel Chipset** | |
| **ASUS P8H77-V** | **ASUS P8H67-M EVO** |
| **ASUS P7H55D-M EVO** | **ASUS P6T-DELUXE** |
| **ASUS P7P55D-E** | **ASUS P6X58D-E** |
| **ASUS P7P55D-EV** | **Gigabyte GA-P55-USB3** |
| **Gigabyte GA-P55-USB3** | **Gigabyte GA-P55A-UD3** |
| **Gigabyte GA-H57M-USB3** | **Gigabyte GA-EP45-UD3L** |
| **Gigabyte X58A-UD3R** | **Gigabyte GA-P67A-UD3-B3** |
| **Gigabyte GA-P67A-UD5** | **Gigabyte GA-H61N-USB3** |
| **Gigabyte LosLunas CRB** | **Intel DB75EN** |
| **Intel DH55HC** | **Intel DH55TC** |
| **AMD Chipset** | |
| **ASUS M4A89TD PRO** | **ASUS M4A89GTD PRO/USB3** |
| **ASUS M4A87TD/USB3** | **ASUS M4A88TD-VEVO** |
| **Gigabyte GA-880GA-UD3H** | **Gigabyte GA-MA770T-USB3** |
| **Gigabyte GA-790XTA-UD4** | **Gigabyte GA-MA785GMT-UD2H0** |
| **Gigabyte GA-870A-UD3** | **Gigabyte GA-770T-USB3** |
| **Gigabyte GA-880GM-USB3** | **ASRock A75 Pro4** |
| **ASRock 770 Extreme3** | **MSI 890GXM-G65** |
| **Apple Platform** | |
| **Power Mac G4 10.2** | **Power Mac G5 10.4.8** |
| **Power Mac G5 10.4.10** | **Mac Mini 10.5.8** |
| **iMac 21.5-inch 10.6.8** | **MacBook Air** |

## 7.2  Upstream Port Host Compatibility List

| Host Controller | Chip | Host Controller | Chip |
|---|---|---|---|
| Intel | Z77 | Fresco | FL1100 |
| Intel | H77 | Fresco | FL1009 |
| Intel | B75 | Fresco | FL1000G |
| AMD | A75 | VLI | VL800 |
| AMD | A85 | VLI | VL805 |
| Renesas | uPD720200F1 | ASMedia | ASM1042 |
| Renesas | uPD720202 | Etron | EJ168A |
| Renesas | uPD720201 | TI | TUSB7340 |

## 7.3  Downstream Port Device Compatibility List

**USB3.0 Devices**

| External Enclosure | | | |
|---|---|---|---|
| **No.** | **Device** | **No.** | **Device** |
| 01 | ADATA NH01 2.5" Portable HDD | 14 | Good Way NU6110 USB 3.0 to SATA Enclosure |
| 02 | ADATA NH02 2.5" Portable Drive 500GB | 15 | Good Way NU6120 USB 3.0 to SATA Enclosure |
| 03 | ADATA NH03 3.5" External Hard Drive | 16 | Good Way NU6220 USB 3.0 to SATA Enclosure |
| 04 | ASMedia ASM1051 | 17 | JMicron JMS539 USB 3.0 to SATA |
| 05 | Buffalo BUF-HD-HXU3 Drive Station | 18 | PROLIFIC PL2771 |
| 06 | Buffalo BR-X1216U3 USB 3.0 Blue-Ray Burner | 19 | Symwave SW6317 |
| 07 | Fujitsu MB86C30B | 20 | VLI VL700 |
| 08 | Fujitsu MB86C301B | 21 | VLI VL701 |
| 09 | Fujitsu MB86C31 | 22 | WD My Book 3.0 |
| 10 | Genesys GL3310 | 23 | Skymedia SK7301 |
| 11 | Good Way AS3200V1 3.5"+2.5" Cable Adaptor | 24 | Innostor IS888BL048 |
| 12 | Good Way NU6010 USB 3.0 to SATA Enclosure | 25 | TI TUSB9261 |
| 13 | Good Way NU6020 USB 3.0 to SATA Enclosure | | |

| Pen Drive / Card Reader / Display / Hub | | | |
|---|---|---|---|
| **No.** | **Device** | **No.** | **Device** |
| 01 | Action Star USB 3.0 4-port Hub | 09 | VLI VL750 USB 3.0 Flash Disk |
| 02 | Goodway HU3141V1 USB3.0 4-Port Hub | 10 | VLI VL751 USB 3.0 Flash Disk |
| 03 | GL GLB11029A 4-port Hub | 11 | ADATA NH05 Pen Drive |
| 04 | Buffalo USB3.0 4-Port Hub | 12 | Innostor IS902 32GB |
| 05 | Evolution ET12U310-LQFP80-DEMO_EVB 4-port Hub | 13 | Grain Media(Evolution) GM12U321A USB3.0 to HDMI |
| 06 | TI TUSB8040 4-port Hub | 14 | GL3220 USB3.0 Card Reader |
| 07 | Dragon Joy USB 3.0 Flash Disk | 15 | Super Talent ST3U32SRK 32GB RAID Drive |
| 08 | PQI U368 USB3.0 Flash Disk | 16 | Blackmagic Design USB 3.0 影音轉接器 |

## USB2.0/1.1 Devices

| Keyboard | | | |
|---|---|---|---|
| No. | Device | No. | Device |
| 01 | A4 TEC KL-5UP | 39 | A4 TECH RFSWOP-80 |
| 02 | A4 TECH X-708 | 40 | A4 TECH RK-6 |
| 03 | ACER KU-0355 | 41 | ACER M-UVACR1 |
| 04 | Amice AKB-7100-UBK | 42 | ASUS M106 |
| 05 | ASUS M-UR55A | 43 | ATake 0804-00074 |
| 06 | ATEX AM3313U | 44 | BENQ N205-L |
| 07 | DELL MOC5UO | 45 | DELL SK-8115 |
| 08 | ELECOM M-FGULBK1 | 46 | ELECOM M-M1UP2RBU |
| 09 | ELECOM M-M1UP2RWH | 47 | ELECOM M-PGULBK2 |
| 10 | Genius GK-050010/C | 48 | Genius GM-060019 |
| 11 | Genius NetScroll+Eye U+P | 49 | HP KU-0316 |
| 12 | HP KU-0841 | 50 | HP MODGUO |
| 13 | HP GM322AA Black Wireless Standard Multimedia Keyboard & Mouse | 51 | i-Acon KB-2068 |
| 14 | i-Driver MSO-01 | 52 | i-Rocks IR-7511 |
| 15 | i-Rocks KR-6150 | 53 | IBM MO09KZ |
| 16 | INTOPIC KBD USB-10-B | 54 | INTOPIC KBD USB-15 |
| 17 | Japan Keyboard K292 | 55 | KINYO KBX67 |
| 18 | LEMEL MINI 801 USB | 56 | Lenovo MO28UOL |
| 19 | Lenovo SK-8825 (L) | 57 | Logitech M/N：M-BZ96C |
| 20 | Logitech M-U48a | 58 | Logitech MX Revolution M-RBQ124 |
| 21 | Logitech V220 | 59 | Logitech V450 |
| 22 | Logitech VX Revolution | 60 | Logitech Y-BL49 |
| 23 | Logitech Y-UR83 | 61 | Logitech G19 Gaming Keyboard |
| 24 | Logitech Illuminated Keyboard | 62 | Logitech G15 Keyboard - 920-000379 |
| 25 | Logitech Cordless Desktop MX 5500 Revolution Keyboard and Mouse | 63 | Logitech Cordless Desktop LX710 Laser |
| 26 | Logitech Wireless Desktop MK300 Keyboard and Mouse | 64 | MAC Keyboard M7803 |
| 27 | MAC Keyboard M2452 | 65 | MAC Keyboard A1048 |
| 28 | Microsoft #62052 | 66 | Microsoft KUF0406 |
| 29 | Microsoft P/N：X800945-109 item：1004 | 67 | Microsoft P/N：X08-71118 |
| 30 | Microsoft P/N：X08-70366 | 68 | Microsoft P/N：X06-25120 |
| 31 | Microsoft P/N：X812824-011 item：1113 | 69 | Microsoft P/N：X08-70380 |
| 32 | Microsoft P/N：X10-58273　item:1008 | 70 | Microsoft SideWinder X5 |
| 33 | Microsoft Wired Keyboard 600 Model:1366 | 71 | Microsoft Natural Ergonomic Keyboard 4000 |
| 34 | Microsoft Natural Ergonomic Desktop 7000 | 72 | Protector Optical mouse 800DP1 |
| 35 | SONY Optical mouse | 73 | SANYO SYMS-403 |
| 36 | T.C.STAR TCK620 | 74 | Wintek WSS63 |
| 37 | Xeper CI-M-20 | 75 | Saitek PK02 2-Tone USB Standard Eclipse II Keyboard |
| 38 | Razer Lycosa - RZ03-00180900-R3T1 | | |
| **Floppy Drive** | | | |
| No. | Device | No. | Device |
| 01 | MITUSMI D353FUE | 03 | MITUSMI D353GUE |
| 02 | MITUSMI FD-05PUB | | |

## Mouse

| No. | Device | No. | Device |
|---|---|---|---|
| 01 | A4 TECH X6-55D | 19 | Logitech M-BT85 |
| 02 | A4 TECH X6-60MD | 20 | Logitech M-UAU94 |
| 03 | A4 TECH X6-60D | 21 | Logitech M-UV94 |
| 04 | A4 TECH BT-630 | 22 | Logitech V450 Laser Cordless Mouse for Notebooks |
| 05 | A4 TECH G7-540 | 23 | Logitech USB Optical Mouse |
| 06 | A4 TECH G7-630 | 24 | Logitech Trackman Marble Trackball |
| 07 | A4 TECH R7-70MD | 25 | Logitech MX518 Optical Gaming Mouse |
| 08 | BENQ M800-C2T | 26 | Logitech G5 Laser Mouse |
| 09 | Gigabyte GK-KM6150 | 27 | Logitech G9 Laser Mouse |
| 10 | Gigabyte GM-M5100 | 28 | Microsoft N71-00007S 3 Buttons 1 x Wheel USB Wired Optical Wheel Mouse |
| 11 | HP Mini Optical Mouse | 29 | Magic MS-P007 |
| 12 | HP M-UAE96 | 30 | Microsoft P/N:X10-35703 |
| 13 | HP Wireless 3-Button Optical Mouse | 31 | Microsoft P/N:XB20471-003 |
| 14 | IBM Wireless Mini Optical Mouse | 32 | Microsoft SideWinder HKA-00001 Black 9 Buttons 1 x Wheel USB Wired Mouse |
| 15 | Intel Optical Mouse | 33 | Razer Salmosa 3G Optical Gaming Mouse w/1800dp |
| 16 | Logitech M-BE58 | 34 | RAZER Lachesis Banshee Blue High Precision 3G Laser Gaming Mouse |
| 17 | Logitech M-BJ58 | 35 | Razer DeathAdder Gaming Mouse |
| 18 | Logitech M-BT83 | 36 | Salmosa RZ01-0024 1800dpi |

## Hub

| No. | Device | No. | Device |
|---|---|---|---|
| 01 | Action Star UH-CBA2-A USB Hub | 12 | SMSC USB2504 USB2.0 4-Port Hub |
| 02 | Action Star UH-CBA9-A USB Hub | 13 | Terminus FE1.1 USB2.0 4-Port Hub |
| 03 | Action Star UH-CBC6-A USB Hub | 14 | Belkin Hi-Speed USB2.0 4-Port Ultra-Mini Hub |
| 04 | Action Star U2H-1436-A USB Hub | 15 | Rosewill USB2.0 7-Port Hub |
| 05 | AlcorMicor AU6254 USB2.0 4-Port Hub | 16 | Rosewill 7-Port Hub |
| 06 | Cypress EZ-USB HX2LP USB2.0 4-Port Hub | 17 | IOGEAR 4-Port USB 2.0Hub |
| 07 | Good Way HU2SA0 USB 2.0 10-Port Hub | 18 | Professional Cable USB 2.0 4 Port Hub |
| 08 | Good Way HE2440 USB 2.0 4-Port Hub with Ethernet Adapter | 19 | Logitech Premium 4-Port USB Hub for Notebooks |
| 09 | Good Way HU2F71 USB 2.0 7-Port Hub | 20 | AD 4 Port Hub AD-401 |
| 10 | GL850 USB2.0 4 Port Hub | 21 | Aluratek 7-Port USB2.0 Hub |
| 11 | GL650 USB1.1 4 Port Hub | | |

## MP3 Devices / Game Controllers

| No. | Device | No. | Device |
|---|---|---|---|
| 1 | SanDisk Sansa Fuze 4GB Flash Portable Media Player | 9 | Mircosoft xbox 360 Wireless Controller for Windows |
| 2 | SanDisk 2GB Sansa® Clip+ MP3 Player | 10 | Saitek PZ31A Pro Gamer Command Unit |
| 3 | Microsoft Zune 8GB Digital Media Player | 11 | Logitech ChillStream Controller |
| 4 | Microsoft Zune HD Wireless media Player 32GB | 12 | Logitech Cordless RumblePad 2 |
| 5 | Centon 8GB Craze MP3 Player, Pink [ 8GBCRAZE.03] | 13 | Logitech MOMO Racing Force Feedback Wheel |
| 6 | Visual Land The V-Core MP5 Protable Media Player | 14 | Guillemot Thrustmaster T-Flight Hotas X Joystick |
| 7 | Apple iPod touch 8GB Flash Portable Media Player | 15 | Saitek P990 Dual Analog Pad |
| 8 | Belkin SpeedPad N52TE Tournament Edition | | |

**Pen Drive**

| No. | Device | No. | Device |
|-----|--------|-----|--------|
| 01 | A-DATA C702 8GB | 34 | SanDisk Cruzer 2GB |
| 02 | A-DATA C903 4GB | 35 | SanDisk Ultra Backup 8GB |
| 03 | A-DATA C905 8GB | 36 | SanDisk 4GB Cruzer Titanium Plus |
| 04 | ALLION USB Device 18MB | 37 | SanDisk 16GB Cruzer Micro USB 2.0 Flash Drive |
| 05 | Apacer AH321 8GB | 38 | SONY MICRO VAULT 8GB |
| 06 | Asiadigit FIREFLY 256MB | 39 | SONY Storage Media USB Device 8GB |
| 07 | Axxen AXN-T110 USB DATA CABLE | 40 | Super Talent Pico-C 4GB |
| 08 | Biwin UDF178 8GB | 41 | Super Talent Duo-A 4GB |
| 09 | Biwin M05 8GB | 42 | Super Talent Pico_C 8GB Flash Drive |
| 10 | Biwin M07 8GB | 43 | SilionPower Helios 101 2GB |
| 11 | CBM2092 256MB | 44 | SiliconPower Touch 210 4GB |
| 12 | HP V115W 4GB | 45 | Transcend JetFlash V20 16GB |
| 13 | HP 4GB USB 2.0 Flash Drive | 46 | Transcend V30 8GB |
| 14 | Huke USB Drive 4GB | 47 | Transcend V30 8GB |
| 15 | ITE UT161 256MB | 48 | Tcell 蒙哥 4GB |
| 16 | ITE UT163 1GB | 49 | Tcell TC001 4GB |
| 17 | ITE UT165 8GB | 50 | Tcell TC003 8GB |
| 18 | Kingston Data Traveler DT160 8GB | 51 | TeamGroup C101 2GB |
| 19 | Kingston Data Traveler DTc10 4GB | 52 | TeamGroup X091 16GB |
| 20 | LEXAR JUMPDRIVE PRO 512MB | 53 | TeamGroup Supreme 8GB |
| 21 | OTi 128MB | 54 | TeamGroup Fusion 1GB |
| 22 | OTi-2208 USB Data Bridge and Flash Disk Controller 4GB | 55 | TeamGroup Fusion II 1GB |
| 23 | OTi-2208 NF USB Data Bridge Controller | 56 | USBest UT168 128MB |
| 24 | OCZ Diesel USB2.0 Flash Drive 8GB | 57 | ZOTEK USB Drive 256MB |
| 25 | PNY Micro Attache 2GB | 58 | ZOTEK USB Drive 1GB |
| 26 | Power Driver 128MB | 59 | LaCie iamaKey 8GB USB Flash Drive |
| 27 | PQI i261 4GB | 60 | Kingston 8GB DataTraveler 112 USB Flash Drive |
| 28 | PQI U360 4GB | 61 | Corsair 16GB Flash Voyager USB2.0 Flash Drive |
| 29 | PQI Intelligent Drive i812 8GB | 62 | OCZ Rally2 4GB USB2.0 Dual Channel Flash Drive |
| 30 | RiDATA Ezdrive 2GB | 63 | OCZ Technology 16GB Diesel USB 2.0 Flash Drive |
| 31 | Rayco Z shape 8GB | 64 | Crucial Gizmo! 2GB Flash Drive |
| 32 | SanDisk Cruzer Micro 8GB | 65 | Patriot Xporter XT Boost 4GB Flash Drive |
| 33 | SanDisk USB Device 512MB | 66 | Centon 4GB DataStick Sport USB 2.0 Flash Drive |

**Video**

| No. | Device | No. | Device |
|-----|--------|-----|--------|
| 01 | Action Star UV-V4A1-B VGA/DVI Adapter | 06 | IOGEAR USB2.0 External DVI Video Card |
| 02 | Action Star UV-D3A1-A VGA/DVI Adapter | 07 | TRITTON SEE2 Xtreme DVI to USB – Hi Memory TRI-UV200 USB 2.0 Interface |
| 03 | Action Star VG-MVA0-A USB to Video Grabber | 08 | StarTech USB2DVIE2 USB DVI External Dual or Multi Monitor Video Adapter |
| 04 | Good Way AN2485 USB Display Adapter | 09 | eVGA UV Plus+16 USB VGA Display Adapter |
| 05 | Good Way AN2420 USB 2.0 Display Adapter | | |

## Audio/Speaker/Headsets/Headphone

| No. | Device | No. | Device |
|---|---|---|---|
| 01 | Action Star HF-111A-B USB to Audio Converter | 14 | Plantronics .Audio 470 USB Headset - .AUDIO 470 USB |
| 02 | Action Star UA-COA0-A USB to Audio Converter | 15 | Cyber Acoustics AC-840 Communication USB Mono Headset |
| 03 | Good Way AA1570 External USB 7.1 Channel Sound Box | 16 | SteelSeries 5H V2 USB Headset Black - 61001SS |
| 04 | Good Way AA1504 USB 5.1 Channel Audio Adapter | 17 | Tritton AXPC True 5.1 Surround Sound Gaming Headset |
| 05 | Good Way AA1500 (UA580) USB 5.1 Channel Audio Adapter | 18 | eDimensional Audio FX Pro 5+1 USB Force Feedback  Gaming Headset |
| 06 | Logitech S-150 Speaker | 19 | PLANTRONICS GAMECOMPRO1 USB Circumaural Gaming Stereo Headset |
| 07 | Logitech S-0194B Speaker | 20 | Logitech ClearChat Pro USB Headset |
| 08 | Logitech A-0374A Headphone | 21 | Turtle Beach Audio Advantage Micro Virtual 5.1 Surround Channels USB Interface Sound Card |
| 09 | Logitech ClearChat PC Wireless Stereo Headset - 981 | 22 | Comodow SJ-588 USB 3D Sound 5.1 |
| 10 | Razer Megalodon 7.1 surround sound gaming headset - RZ04 | 23 | GWC USB 5.1 Channel Audo Adapter |
| 11 | Creative HS-1200 USB Circumaural Wireless Gaming Headset | 24 | AOC USB Audio Controller USB2-251 Adaptateur Audio USB2.0-5.1 |
| 12 | Logitech Gaming Headset G330 | 25 | Creative USB Sound Blaster X-Fi Surround 5.1 |
| 13 | jWIN Electronics PC Headphone w/Microphone/USB - JBM55 | | |

## External Enclosure / External DVD Drives

| No. | Device | No. | Device |
|---|---|---|---|
| 01 | Action Star UM-SSA0-ASR0 | 21 | Sunplus Sunplus225 |
| 02 | Action Star UM-SSA0-VLR0 | 22 | SIIG SC-SA0412-S1 Cool Duo SATA to USB2.0 Docking |
| 03 | Action Star US-SAA1-GLR0 | 23 | SIIG SC-SA0312-S1 Cool SATA to USB2.0/eSATA Docking |
| 04 | BENQ EW200G DVD Burner | 24 | SIIG JU-SA0512-S1 Hi-Speed 2.5" SATA to USB2.0 |
| 05 | Good Way NU2420 USB 2.0 2.5" IDE Enclosure | 25 | Iomega eGo Portable Hard Drive w/ Protection Suite 320GB |
| 06 | Good Way NU2320 USB 2.0 2.5" IDE Enclosure | 26 | Lenovo ThinkPad USB Secure Hard Drive |
| 07 | Good Way ND4110 eSATA/USB to SATA Enclosure | 27 | SimpleTech (Re)Drive |
| 08 | Good Way NU2010 USB to SATA 3.5-inch Enclosure | 28 | Western Digital My Passport Hard Drive |
| 09 | Good Way ND4010 USB/SATA to IDE 3.5-inch Enclosure | 29 | Toshiba USB 2.0 External Hard Drive |
| 10 | Good Way AS2200 USB 2.0 to SATA Adapter | 30 | Western Digital Element 1TB 3.5" Black External Hard Drive |
| 11 | Good Way AS1200 USB 2.0 to SATA/IDE Combo Adapter | 31 | Hitachi SimpleDrive Mini 250GB USB 2.0 Portable Hard Drive - Red Wine |
| 12 | Good Way AD2210 (UD-200A) USB 2.0 to IDE Adapter | 32 | Fantom Drives 1TB Silver GreenDrive External Hard Drive GD1000EU |
| 13 | HardBox FHD-354SP | 33 | Seagate FreeAgent Go 500GB USB 2.0 Portable Hard Drive |
| 14 | Ice Cube External Enclosure | 34 | Data Robotics Drobo External USB 2.0 Robotic Storage Array |
| 15 | Integral USB 2.0 2.5" HDD 120GB | 35 | ASUS USB 2.0 External Slim DVD±R/RW Drive |
| 16 | Lite-On eSAU108 DVD Burner | 36 | LG Protable Super Multi Drive - 8x DVD±RW |
| 17 | NexStar NST-D100 | 37 | Samsung SE-S084B 8x DVD±RW Slim Drive |
| 18 | RATOC RCD-U2PX12 DVD Burner | 38 | LaCie d2 8x Blu-ray Drive - 301856U |
| 19 | Sarotech HardBox FHD-354 | 39 | New SLIM DVD-CD-ROM-RW 2.0 USB For Sony VAIO VPC-W111XX/P - B07-0006 |
| 20 | SONY DRU-820A DVD Burner | | |

## Data Transfer

| No. | Device | No. | Device |
|---|---|---|---|
| 1 | Good Way AN2641 High-Speed USB File Transfer Adapter | 5 | Good Way AR2510 USB 2.0 Active Repeater Cable |
| 2 | Good Way HU2R40 Info TransHub | 6 | Good Way AN2230R2 WIN7 USB Link Adapter |
| 3 | Good Way AN2620 USB Link Adapter | 7 | Good Way AP1325 USB to Parallel Bi-Directional Cable |
| 4 | Good Way HU2P40 Info TransHub | 8 | Good Way AP1202 (UC-451N) USB to PS/2 Adapter |

## Web Cam / Cameras

| No. | Device | No. | Device |
|---|---|---|---|
| 01 | ATEX AP-3101U | 12 | Sonix SN9C236BJG |
| 02 | Logitech 9000 Pro | 13 | T.C.STAR TCB-P676 |
| 03 | Logitech QuickCam Web | 14 | Blue Microphone EYEBALL HD Webcam with Mic |
| 04 | Logitech V-UCR45 | 15 | Creative Live! Cam Optia AF Webcam |
| 05 | Logitech Protable Webcam C905 | 16 | Microsoft LifeCam Cinema Model 1393 |
| 06 | Logitech Webcm Pro 9000 | 17 | Kodak easyshare Z915 Digital Camera |
| 07 | Logitech Webcam c200 Model: V-U0011 | 18 | Sony Cyber-shot DSC-W220 |
| 08 | Microsoft LifeCam HD-5000 | 19 | Casio Exilim EX-S5 |
| 09 | Microsoft LifeCam VX-3000 USB 2.0 WebCam | 20 | Canon PowerShot A1100 IS |
| 10 | Microsoft LifeCam VX-6000 Webcam | 21 | Panasonic Lumix DMC-ZR1 |
| 11 | SMI SM371L | | |

## Bluetooth Dongle / WIFI / Ethernet / Wireless

| No. | Device | No. | Device |
|---|---|---|---|
| 01 | Gellink BTA-6030 Bluetooth Dongle | 14 | Good Way AE2302 Gigabit USB 2.0 Ethernet adapter |
| 02 | Good Way UB1100B1 USB Bluetooth v2.0+EDR Dongle | 15 | Good Way AE2220 USB 2.0 Ethernet Adapter |
| 03 | Good Way UB1200B1 USB Bluetooth v2.0+EDR Dongle | 16 | VIA VNT 6656AU WIFI |
| 04 | Good Way UB1100 USB Bluetooth Dongle | 17 | TRENDnet 54Mbps Wireless G USB2.0 Adapter |
| 05 | Good Way UB1200 USB Bluetooth Dongle | 18 | Zonet Wireless 802.11g USB2.0 Wireless Adapter |
| 06 | Aluratek USB to Bluetooth Wireless EDR 2.0 Adapter | 19 | ENCORE 802.11G Wireless    USB2.0 Adapter |
| 07 | Belkin Mini Bluetooth Adapter | 20 | Rosewill IEEE 802.11b/g Wireless USB2.0 Adapter 2dBi Antenna [RNX-G1W] |
| 08 | D-Link DBT-120 Wireless Bluetooth 2.0 USB Adapter | 21 | LINKSYS Wireless-G USB1.1/2.0 Network Adapter |
| 09 | IOGEAR Enhanced Data Rate Wireless USB Adapter | 22 | AZiO AWU254 USB 2.0 802.11g 54Mbps Wireless Pen Adapter |
| 10 | cirago Micro Bluetooth USB2.0 Adapter v2.1 + EDR | 23 | ASUS WL-167G V3 Wireless USB2.0 Adapter |
| 11 | AZiO BTD603-132 USB 2.0 Bluetooth Adapter | 24 | EDIMAX EW-7318USG USB 2.0 Wireless LAN Hi-Gain Adapter |
| 12 | ASUS USB-BT21 USB 2.0 Mini Bluetooth Dongle | 25 | BELKIN G Wireless USB Network Adapter |
| 13 | IOGEAR GBU421 USB 2.0 Bluetooth Micro Adapter | 26 | NETGEAR WG111v3 Wireless USB Adapter |

## Docking Station / Share Switch Station

| No. | Device | No. | Device |
|---|---|---|---|
| 1 | Good Way DH2000 High-Definition A/V Docking Station | 5 | Good Way DU2792 Docking Station with Video |
| 2 | Good Way DU2810 Netbook Docking Station | 6 | Good Way DU2130 USB 2.0 Multi Port Hubs Docking Station |
| 3 | Good Way DU2800 Mini Docking Station | 7 | Good Way SS23A0 USB 2-to-6 Share Switch Station |
| 4 | Good Way DU27A2 Docking Station with Video | | |

## Barcode Scanners / Biometric Scanner

| No. | Device | No. | Device |
|---|---|---|---|
| 1 | unitech MS180-1UG USB Barcide Scanner | 3 | upek Eikon Digital Privacy Manager for Mac & PC |
| 2 | upek Eikon To Go Digital Privacy Manager for Mac & PC | 4 | DigitalPersona U.are.U 4500 Finger Print Reader |

VIA Labs, Inc.

| Card Reader | | | |
|---|---|---|---|
| No. | Device | No. | Device |
| 01 | Action Star CR-ACA1-A Multi Card Reader | 18 | Good Way RU2B41 USB 2.0 Multi-Plus Card Reader/Writer |
| 02 | Action Star CR-ACA1-B Multi Card Reader | 19 | Good Way RU2B51 USB 2.0 Multi-Plus Card Reader/Writer |
| 03 | Action Star CR-ACA2-A Multi Card Reader | 20 | Good Way RU2B61 USB 2.0 Multi-Plus Card Reader/Writer |
| 04 | Action Star CR-ACA2-B Multi Card Reader | 21 | Good Way RU5121 Smart Card Reader |
| 05 | Action Star CR-BCA1-A Multi Card Reader | 22 | Good Way RU3143 USB 2.0 Card Reader/Writer with 3-port Hub |
| 06 | Action Star CR-BCA1-B Multi Card Reader | 23 | Good Way RU3141 USB 2.0 Card Reader/Writer with 3-port Hub |
| 07 | Buffalo BSCRA32UA | 24 | IOGEAR GFR209P |
| 08 | Card Reader All in 1 mini Card Reader | 25 | Mini Card MS All series 4in1 Card Reader |
| 09 | Card Reader CR-DCA0 | 26 | NexXtech Card Reader USB 2.0 |
| 10 | Card Reader CR-ACA2 | 27 | Sony MSAC-UAH1 |
| 11 | Card Reader M2 Card Reader | 28 | Sony 17-in-1 Multi-Card Reader / Writer |
| 12 | Good Way RU2630 Vista ReadyBoost Compatible Card Reader | 29 | Transcend USB Card Reader P5/P6 |
| 13 | Good Way RU2810 Mini Card Reader, for MS series cards | 30 | VIA VIA-P VT6205-DevA |
| 14 | Good Way RU2710 Mini Card Reader, for SD series cards | 31 | Kingston 19-in-1 USB 2.0 Media Reader |
| 15 | Good Way RU2610 Mini Card Reader, for SD & MMC series cards | 32 | SDHC Card Reader |
| 16 | Good Way RU3441 USB 2.0 Multi-Plus Card Reader w/3-Port Hub | 33 | SanDisk ImageMate All-in-One USB2.0 |
| 17 | Good Way RU2C60 USB 2.0 High Speed Card Reader/Writer | 34 | Transcend RDP8 |
| **Printer/Scanner** | | | |
| No. | Device | No. | Device |
| 01 | CANON Pixima MP170 | 11 | HP Deskjet F4280 All-In-One Color Printer |
| 02 | CANON PIXMA iP2600 Inkjet Photo Printer | 12 | HP LaserJet P1006 CB411A Personal Laser Printer |
| 03 | EPSON PM-940C Printer | 13 | Lexmark P4350 |
| 04 | EPSON CX9300F Printer | 14 | Lexmark X8350 |
| 05 | EPSON TX110 Printer | 15 | Lexmark X5470 Multifunction Printer |
| 06 | EPSON GT-9700F Scanner | 16 | SAMSUNG ML-2510 Personal Laser Printer |
| 07 | HP Deskjet D5560 Printer | 17 | Brother HL-2140 Compact, Personal Laser Printer |
| 08 | HP Photosmart 3310 Printer | 18 | EPSON Perfection 4490 B11B176011 USB 2.0 Interface Flatbed Scanner |
| 09 | HP Photosmart 385 Printer | 19 | Canon CanoScan LiDE 100 2923B002 USB 2.0 Hi-Speed Interface Flatbed Scanne |
| 10 | HP J3600 | 20 | brother QL500 50 labels / min. 300 x 300 dpi Label Printer |

Storage Retention: No expiration date