



USB-IF 2.0 Compliance Test Report for Peripheral

Company Name: NXP Semiconductors

VID (Dec): 8137 The VID for the company who apply the USB-IF logo.

Model Name: LPC55S16

Product Type: MSC

Report Date: 06/23/2020

Test Result: **PASS**

Tester: Sofiya Mayevskiy

Authorized Signature: Kayla Seliner

Company Information:

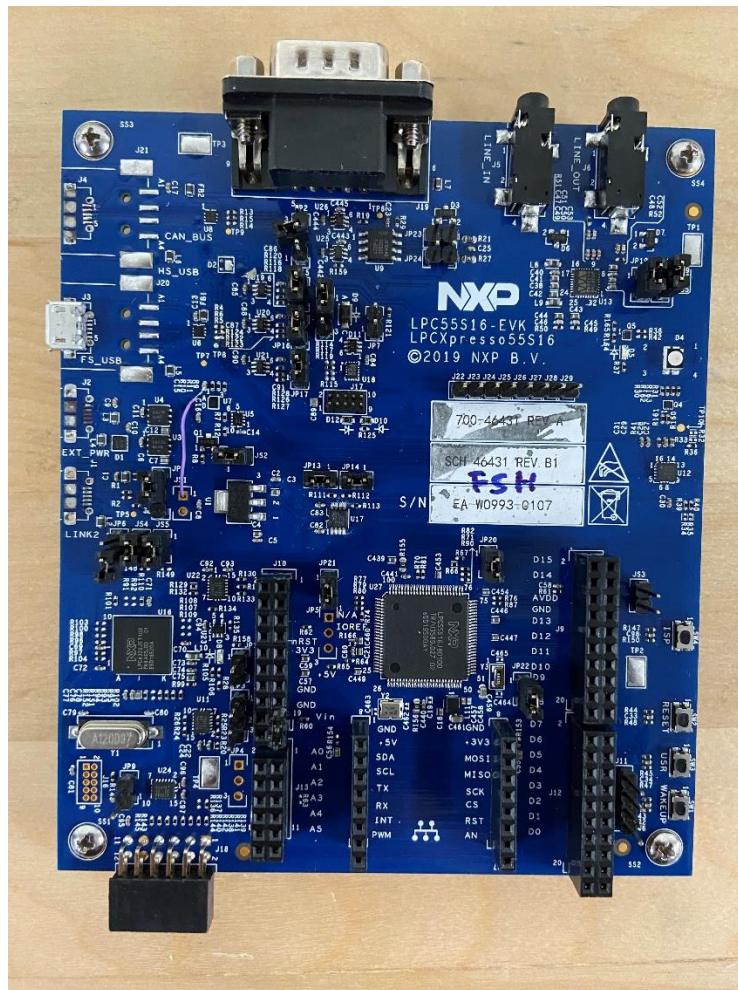
Company

Company Name: NXP Semiconductors
Company Address: 411 E Plumeria Dr. San Jose, CA 95134

Technical Contact

Name: Dezheng Tang (Tom)
Phone Number: N/A
E-Mail: dezheng.tang@nxp.com
FAX Number: N/A

Product Picture:



Overall Test Result Summary

| Test Category | Result |
|-------------------------------|--------|
| PHY | |
| Full Speed | Pass |
| BC 1.2 | |
| Upstream Port | N/A |
| CV | |
| USB20CV | Pass |
| USB3xCV | Pass |
| IOP | |
| Average Power Current Draw | Pass |
| Interoperability Interim Tree | Pass |

Full Speed Compliance Tests

Full Speed Signal Quality Test Result

☒ Pass

☐ Fail

Connector Type: Untethered (Tethered means no standard B or special B connector)

Full Speed Upstream Signal Quality:

☒ Pass

☐ Fail

Inrush Current Test:

☒ Pass

☐ Fail

Back Voltage Test Results

☒ Pass

☐ Fail

Before Enumeration / After Enumeration

| Pin | Voltage (mV) | |
|------------------|--------------|------|
| D+ | 0.7 | 1.1 |
| D- | -0.2 | -0.1 |
| V _{Bus} | 0.2 | 0.4 |

(All values <= 400mV)

Miscellaneous:

☐ Pass

☐ Fail

☒ N/A

BC 1.2 Implemented Check:

☐ Supported

☒ Not Supported

If the upstream port has BC 1.2 capability, all items of BC 1.2 Portable Device category should be tested under this port for USB-IF certification.

Battery Charging 1.2 Compliance Test

| | | | |
|---|-------------------------------|-------------------------------|---|
| <u>Portable Device (PD)</u> | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| B-UUT Initial Power-up Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| Data Contact Detect Test – With Current Source | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| Data Contact Detect Test – No Current Source | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| DCP Detection Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| CDP Detection Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| SDP Detection Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| ACA-Dock Detection Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| ACA-A Detection Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| ACA-B Detection Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| ACA-C Detection Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| ACA-GND Detection Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| Common Mode Test - Full Speed | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| Common Mode Test - High Speed | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| Dead Battery Provision Test | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |

Framework Test Results (USB 2 CV) ☒ Pass ☐ Fail

This test primarily covers USB-IF testing of devices and hubs for compliance with the standard commands in Chapters 9 and 11 of the USB 2.0 specification. This specification does not describe the full set of USB-IF tests and assertions for these devices.

StarTech PEX400USB2 (add-in card)

Full-Speed:

VID: 0x1FC9 PID: 0x0092

Chapter 9 Tests: ☒ Pass ☐ Fail

Interface: 1 Max Power: 100 mA Remote Wakeup: N/A

MSC Class Tests: ☒ Pass ☐ Fail ☐ N/A

UVC Class Tests: ☐ Pass ☐ Fail ☒ N/A

HID Class Tests: ☐ Pass ☐ Fail ☒ N/A

Framework Test Results (USB 3 Gen X CV) ☒ Pass ☐ Fail

All USB peripherals are required to enumerate on a SuperSpeed host controller and pass all applicable tests within USB 3 Gen X CV. Failure framework test in USB 3 Gen X CV will prevent certification.

DELL XPS8920 Platform

Full-Speed:

VID: 0x1FC9 PID: 0x0092

Chapter 9 Tests: ☒ Pass ☐ Fail

Connector Type Tests: ☒ Pass ☐ Fail

Interface: 1 Max Power: 100 mA Remote Wakeup: N/A

MSC Class Tests: ☒ Pass ☐ Fail ☐ N/A

UVC Class Tests: ☐ Pass ☐ Fail ☒ N/A

HID Class Tests: ☐ Pass ☐ Fail ☒ N/A

Average Power Current Test Results ☒ Pass ☐ Fail

Full-Speed: Low Powered Device ☒ Pass ☐ Fail

Unconfigured Power: 0.19 mA
($\leq 100\text{mA}$)

Configured Power: 0.19 mA
($\leq \text{Max Power} \leq 100\text{mA}$ for Low Power)
($\leq \text{Max Power} \leq 500\text{mA}$ for High Power)

Suspend Mode Power: 172.7 μA
($\leq 2500\mu\text{A}$ for Self Power Hub or Non Compound Device)
($\leq 12500\mu\text{A}$ for Bus Power Hub or Compound Device)

Powered State Suspend Mode Power: 172.8 μA
($\leq 2500\mu\text{A}$ for not Supporting USB Battery Charging)
($\leq 100\text{mA}$ for Supporting USB Battery Charging)

Operating Power: 0.18 mA
($\leq \text{Max Power} \leq 100\text{mA}$ for Low Power)
($\leq \text{Max Power} \leq 100\text{mA}$ for Self Power)
($\leq \text{Max Power} \leq 500\text{mA}$ for High Power)

Interoperability Test Overall Results

☒ Pass ☐ Fail

DELL XPS8700 Platform

Operating System: Win10

XHCI Host Controller:

Root Port

Enumeration and Driver installation
Check operation of device
Interoperability – Operate all devices
Hot plug test – A Plug
Hot plug test – B Plug
S3 Active Standby Test
Remote Wake-up Test
S3 Active Standby Resume Test
S4 Active Hibernate Test
S4 Active Hibernate Resume Test
Warm Boot Test
Hybrid Boot Test
Cold Boot Test

☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail ☐ N/A
☒ Pass ☐ Fail
☐ Pass ☐ Fail ☒ N/A
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail

Topology Change 1 (SS Tree)

Enumeration
Check operation of device
Interoperability – Operate all devices
Hot plug test – A Plug
Hot plug test – B Plug
S3 Active Standby Test
Remote Wake-up Test
S3 Active Standby Resume Test
S4 Active Hibernate Test
S4 Active Hibernate Resume Test
Warm Boot Test
Hybrid Boot Test
Cold Boot Test

☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail ☐ N/A
☒ Pass ☐ Fail
☐ Pass ☐ Fail ☒ N/A
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail
☒ Pass ☐ Fail

Topology Change 2 (HS Tree)

Enumeration

☒ Pass ☐ Fail

Check operation of device

☒ Pass ☐ Fail

Interoperability – Operate all devices

☒ Pass ☐ Fail

Hot plug test – A Plug

☒ Pass ☐ Fail

Hot plug test – B Plug

☒ Pass ☐ Fail ☐ N/A

S3 Active Standby Test

☒ Pass ☐ Fail

Remote Wake-up Test

☐ Pass ☐ Fail ☒ N/A

S3 Active Standby Resume Test

☒ Pass ☐ Fail

S4 Active Hibernate Test

☒ Pass ☐ Fail

S4 Active Hibernate Resume Test

☒ Pass ☐ Fail

Warm Boot Test

☒ Pass ☐ Fail

Hybrid Boot Test

☒ Pass ☐ Fail

Cold Boot Test

☒ Pass ☐ Fail

Topology Change 3 (FS Tree)

Enumeration

☒ Pass ☐ Fail

Check operation of device

☒ Pass ☐ Fail

Interoperability – Operate all devices

☒ Pass ☐ Fail

Hot plug test – A Plug

☒ Pass ☐ Fail

Hot plug test – B Plug

☒ Pass ☐ Fail ☐ N/A

S3 Active Standby Test

☒ Pass ☐ Fail

Remote Wake-up Test

☐ Pass ☐ Fail ☒ N/A

S3 Active Standby Resume Test

☒ Pass ☐ Fail

S4 Active Hibernate Test

☒ Pass ☐ Fail

S4 Active Hibernate Resume Test

☒ Pass ☐ Fail

Warm Boot Test

☒ Pass ☐ Fail

Hybrid Boot Test

☒ Pass ☐ Fail

Cold Boot Test

☒ Pass ☐ Fail

Interoperability without Driver Verifier:

Run Only if Saw Poor Video or Audio Quality

☐ Pass ☐ Fail ☒ N/A

More Detailed Test Results:

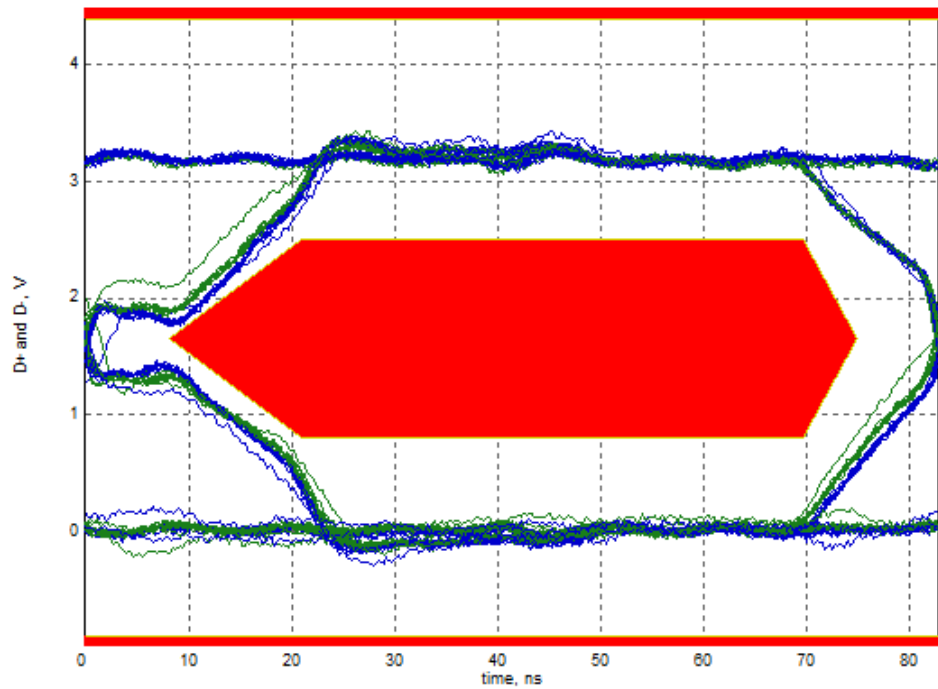
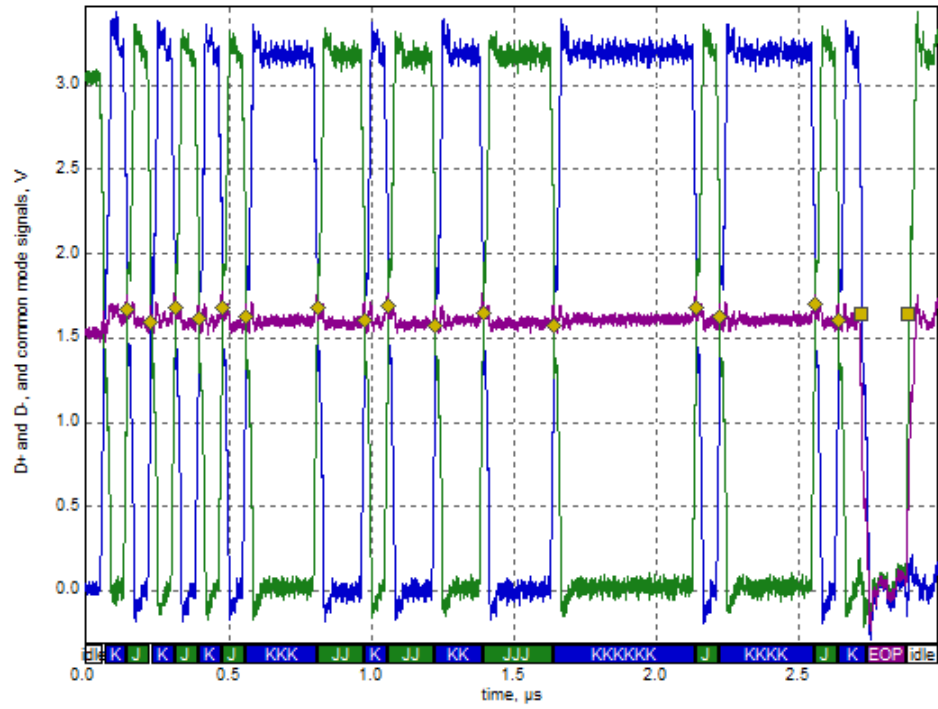
1. Full Speed Upstream Signal Quality: Pass

- Overall result: pass!
- Sync result:
sync passes
- Signal eye:
eye passes
- EOP width: 165.47 ns
EOP width passes
- Measured signaling rate: 12.0017 MHz
signal rate passes
- Edge Monotonicity: 214 mV
Monotonic Edge passes
- Crossover voltage range: 1.57 V to 1.70 V, mean crossover 1.64 V
(first crossover at 1.67 V, 15 other differential crossovers checked)
crossover voltages pass
- Consecutive jitter range: -497.455 ps to 439.623 ps, RMS jitter 244.721 ps
- Paired JK jitter range: -540.026 ps to 284.956 ps, RMS jitter 267.154 ps
- Paired KJ jitter range: -309.524 ps to 308.620 ps, RMS jitter 245.147 ps
jitter passes

Additional Information

- Rising Edge Rate: 74.30 V/us (Equivalent risetime = 35.53 ns)
- Falling Edge Rate: 73.72 V/us (Equivalent falltime = 35.81 ns)
- Edge Rate Match: 0.79% (limit +/-10%)
- Margin Above eye: 0.3537 V
- Margin Below eye: 0.3074 V
- Maximum Voltage: 3.4371 V
- Margin Below Top: 0.9629 V
- Minimum Voltage: -0.2898 V
- Margin Above Bottom: 0.6102 V

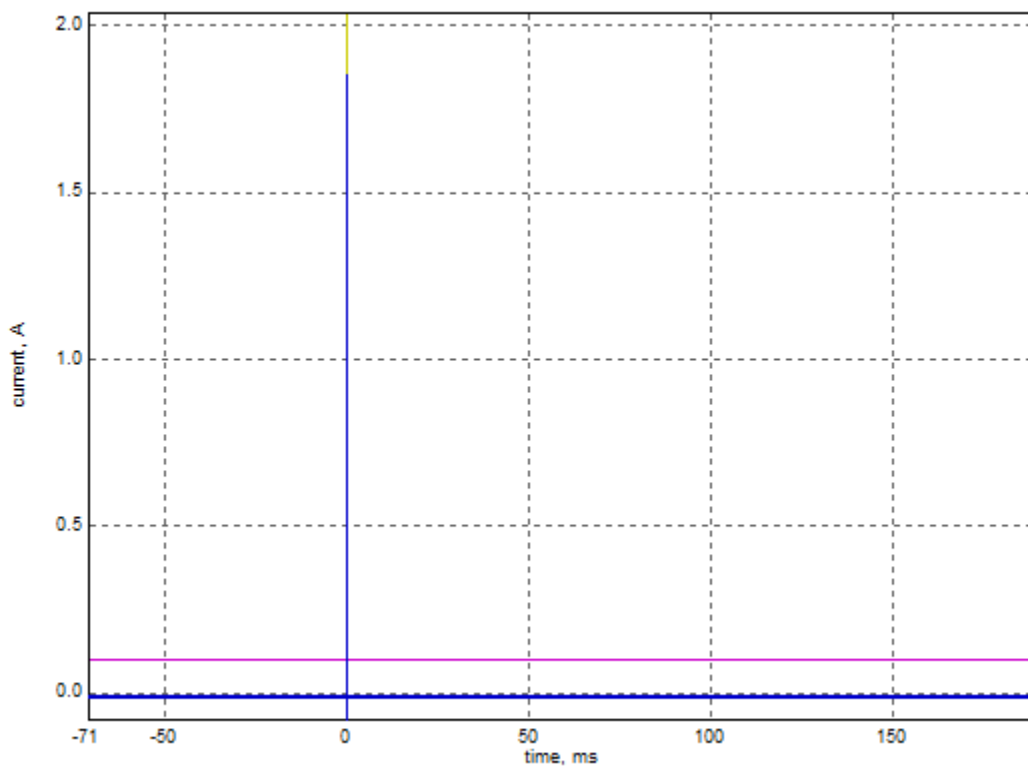
Signal Data and Eye



2. Inrush Current: Pass

- Overall result: pass!
- Inrush at 5.241 V: 6.5100 μC
Inrush passes
- Region 1 Start: -0.00015 ms - End: 0.107 ms = 6.51 μC

Hot Plug (Attach) Current Draw



Testing Procedure Documents:

1. Universal Serial Bus Implementers Forum Full and Low Speed Electrical and Interoperability Compliance Test Procedure, Version: 1.3
2. xHCI Interoperability Test Procedures For Peripherals, Hubs and Hosts (Legacy, USB Type-C and Power Delivery), Version 0.95
3. USB Battery Charging 1.2 Compliance Plan, Revision: 1.1

Notice: The test results are only valid for the original tested device model.