



## PCI-SIG ENGINEERING CHANGE NOTICE

<b>TITLE:</b>	OCuLink Server Change
<b>DATE:</b>	December 09, 2016
<b>AFFECTED DOCUMENT:</b>	OCuLink 1.0
<b>SPONSOR:</b>	Intel

### **Part I**

#### **1. Summary of the Functional Changes**

[Table 6-12 and Table 6-13 in Section 6.9 are modified to reflect connector requirements for server/datacenter segment. In addition, this proposal also reflects a clarification in the Introduction text, Section 1 to include the server/datacenter market segment.](#)

#### **2. Benefits as a Result of the Changes**

[This proposal aligns to the connector/cable assembly topologies mentioned in the Section 7.1.1 of the OCuLink specification. This change enables the OCuLink internal and external cable connector form factor to address a range of market segments from mobile to server/datacenter.](#)

#### **3. Assessment of the Impact**

[Existing connector environmental and mechanical requirements are tightened to reflect the server/datacenter requirements.](#)

#### **4. Analysis of the Hardware Implications**

[For the potential implementations targeting the server/datacenter segments, the connector requirements should adhere to the requirements for these segments.](#)

#### **5. Analysis of the Software Implications**

[None.](#)

## **Part II**

*Changes are reflected in Section 1, Section 2.1, and 6.9.1 as follows:*

### **1. Introduction to PCI Express OCuLink**

This document is a companion Specification to the *PCI Express Base Specification* and other *PCI Express*® documents listed in *Section 1.1*. The primary focus of the *PCI Express OCuLink Specification* is the implementation of internal and external small form factor *PCI Express*® connectors and cables, optimized for the client and mobile market segments. This form factor supports multiple market segments, from client, mobile, server, datacenter, and storage. This Specification discusses cabling and connector requirements to meet the 8.0 GT/s signaling needs in the *PCI Express Base Specification*.

No assumptions are made regarding the implementation of PCI Express compliant components on either side of the Link; such components are addressed in other PCI Express Specifications.

### **2.1. Mechanical Overview**

The mechanical Specification includes what is required to provide interoperable, properly operating, small form factor connectors and cable assemblies. All other aspects will be left to the industry to determine. The mechanical attributes include:

- Small form factor connector targeting small form factor enclosures or enclosures with limited faceplate area.
- Minimal connector size.
- At least four (4) connectors to fit within an area equivalent to the defined edge of a single-slot, full height add-in card faceplate.
- At least two (2) connectors to fit within an area equivalent to the defined edge of a single-slot, low profile add-in card faceplate.
- Minimal number of signal pins for the PCIe Link.
- Minimal number of sideband/auxiliary signal pins.
- Single connector form factor specification for both external and internal enclosures /applications.
- Mechanical retention, optionally passive or active, at both ends of the cable.
- Insertion/removal cycles equivalent to similar industry standard connectors:
  - External connectors must support a minimum durability of 10,000 insertions and removals;
  - Internal connectors must support a minimum durability of ~~50~~ 250 insertions and removals.
- Symmetrical connector Specification (i.e., the same connector is used for both ends of a given cable).
- Single mechanical connector that enables any one of x1, x2, or x4 PCIe Lanes. An implementation is permitted to support any one of single x1, x2, or x4 PCIe Links.
- External cable Link Hot- plug enabled.
- Forward looking for future signaling levels – connector capable of supporting extrapolated PCI Express 4.0 signaling rates (currently targeting 16 GT/s) with reasonably sufficient margin.

**Table 6-12. Connector Environmental Requirements**

Description	<a href="#">Enterprise Requirement</a>	Client/Mobile Requirement
Field Life	<a href="#">5 years</a>	3 years
Field Operating Temperature - External	<a href="#">-25 °C to +65 °C</a>	-25 °C ~ +55 °C
Field Operating Temperature - Internal	<a href="#">-25 °C to +65 °C</a>	-25 °C ~ +60 °C
Test Group 4 Option	<a href="#">Option 2</a>	<del>±B</del> <a href="#">Option 2</a>
Storage Temperature	<a href="#">-40 °C to +85 °C</a>	-40 °C to +85 °C
Storage Humidity	<a href="#">80 % Relative Humidity</a>	80 % Relative Humidity

[Note: Currently the same Field Operating Temperature requirement for Enterprise applies for both internal and external, and both passive and active cables. These ranges may be updated in future when active cables for Enterprise come into the market.](#)

**Table 6-13. Connector Mechanical Requirements**

Description	Requirement	Procedure
Contact Interface Plating Type	Noble	
Surface Treatment (Lubricated or non- Lubricated)	Specified by Manufacturer	
Rated Durability Cycles – External	10,000	
Rated Durability Cycles – Internal	<del>50</del> <a href="#">250</a>	
Vibration	No Damage.  No discontinuity longer than 1 microsecond allowed.  30 mΩ maximum change from initial (baseline) contact resistance.	<i>EIA 364-28</i> Condition III
Mechanical Shock	No Damage.  No discontinuity longer than one microsecond allowed.  30 mΩ maximum change from initial (baseline) contact resistance.	<i>EIA 364-27</i> Condition A