

USB 3.0 ENGINEERING CHANGE NOTICE

ECN# 009

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Title: USB3.0 Standard-B Connector Near End Crosstalk Applied to: USB3.0 (11132008)-final and ECN# 002

Brief description of the functional changes:

The near end crosstalk between SuperSpeed pairs became stricter from -27 dB to -32 dB from Rev 1.0 to ECN# 002, since it can give more solution space for USB3 channels. It was found recently that most connector vendors had a lot of difficulties to meet the -32 dB requirement, just at a few frequencies. Thus it is decided to add a near end crosstalk requirement in time domain to characterize the real impact of the out-of-spec frequency domain contents. The change only applies to the Standard-B and Powered-B connector.

Benefits as a result of the changes:

Allow most connector vendors to pass the Standard-B and Powered-B connector near end crosstalk spec without severely sacrificing the electrical performance of the channel in time domain.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:

No USB3 system exists yet and the USB3 connector is still in prototype stage.

An analysis of the hardware implications:

Connector vendors need to improve the Standard-B and Powered-B connector design to meet the crosstalk requirement in time domain, if they are failed to meet -32 dB in frequency domain.

An analysis of the software implications:

None.

An analysis of the compliance testing implications:

The USB3.0 Connector Compliance Spec is still under development and this change is comprehended by the compliance specification.

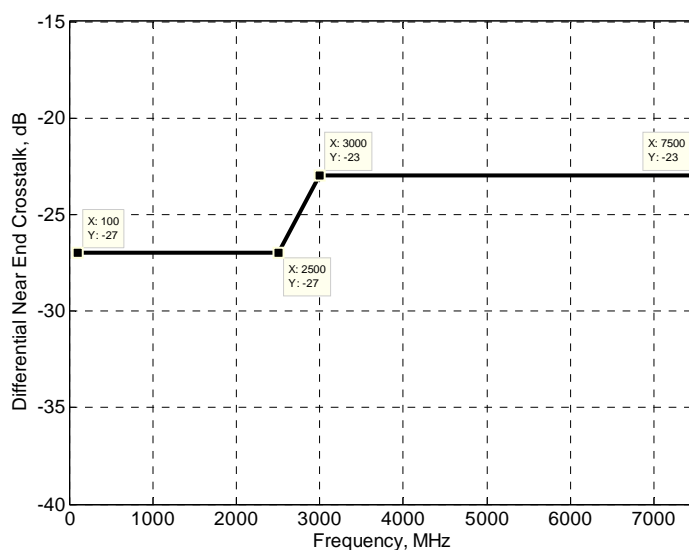
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Actual Change

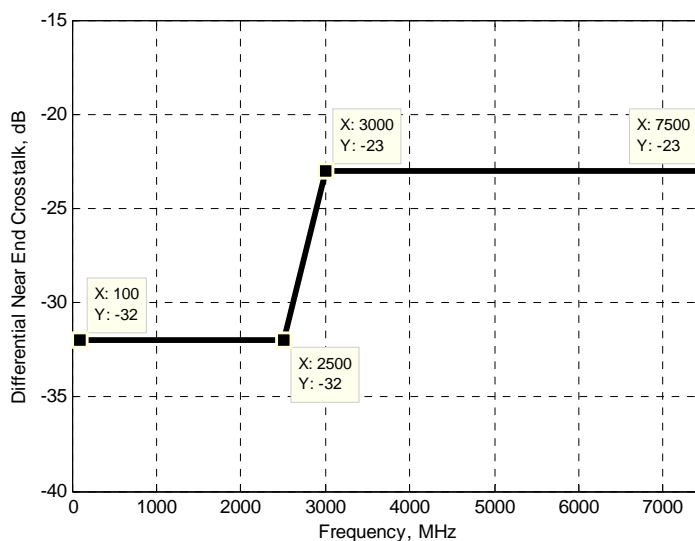
(a). From Text (and location): Section 5.6.1.3.2, Page 5-50

The differential crosstalk measures the unwanted coupling between differential pairs. Since the Tx pair is right next to the Rx pair for SuperSpeed, only the differential near-end crosstalk (DDNEXT) is specified, as shown in Figure 5-24. The mated cable assembly meets the DDNEXT requirement if its DDENXT does not exceed the limit shown in Figure 5-24; the vertices that define the DDNEXT limit are:

- For USB 3.0 Micro connector family: (100 MHz, -27 dB), (2.5 GHz, -27 dB), (3 GHz, -23 dB) and (7.5GHz, -23 dB)
- For all other USB 3.0 connectors: (100 MHz, -32 dB), (2.5 GHz, -32 dB), (3 GHz, -23 dB) and (7.5GHz, -23 dB)



(a) For USB 3.0 Micro-B Family



(b) For all other USB 3.0 Connectors

Figure 5-24. Differential Near-End Crosstalk Requirement between SuperSpeed Pairs

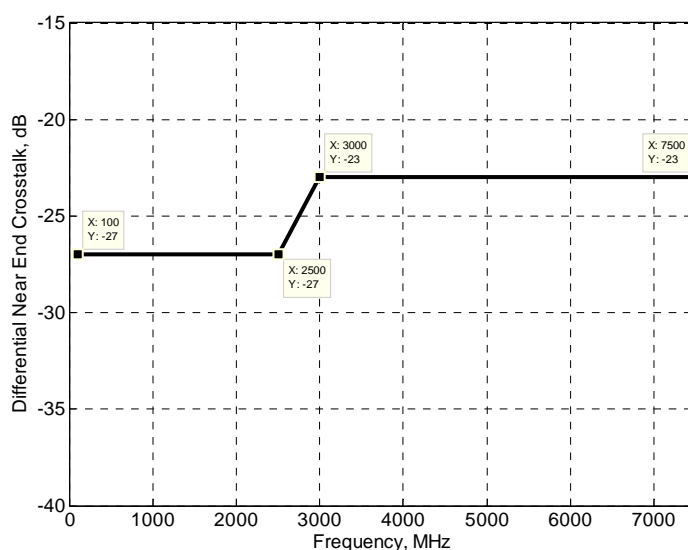
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To Text (and location): Section 5.6.1.3.2, Page 5-50

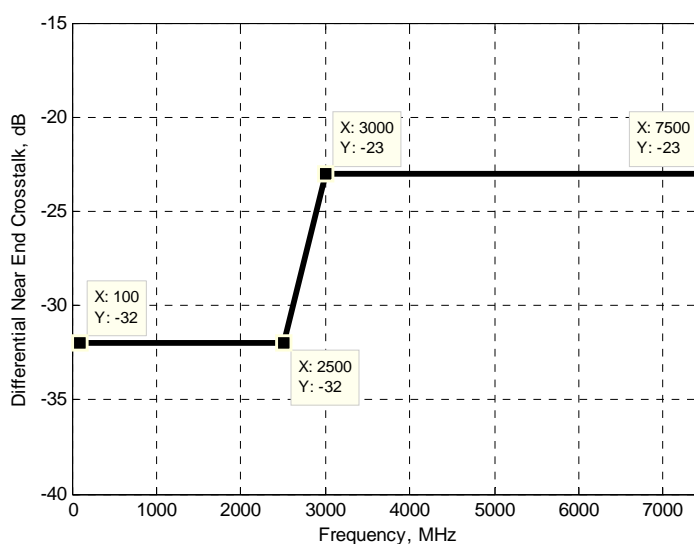
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- For USB 3.0 Micro connector family: (100 MHz, -27 dB), (2.5 GHz, -27 dB), (3 GHz,-23 dB) and (7.5GHz, -23 dB)
- For all other USB 3.0 connectors: (100 MHz, -32 dB), (2.5 GHz, -32 dB), (3 GHz,-23 dB) and (7.5GHz, -23 dB)

For the USB3.0 Standard-B and Powered-B connectors: If a Standard-B or Powered-B connector fails to meet the -32 dB requirement in frequency domain shown in Figure 5-24 (b), but is able to meet the -27dB requirement shown in Figure 5-24(a), the measurement of DDNEXT in time domain will be required. The peak-to-peak value of DDNEXT in time domain shall not exceeds 1.5% of the input voltage swing (as shown in Figure 5-24 (c)), as seen from a 50 ps (20%-80%) rise time of a differential Time Domain Transmission (TDT) at TP1 or TP2 (as shown in Figure 5-22). Note that removing fixture effect is not required for the time domain measurements. If a Standard-B or Powered-B connector fails to meet the -27 dB requirement shown in Figure 5-24(a), it shall be considered non-compliance.

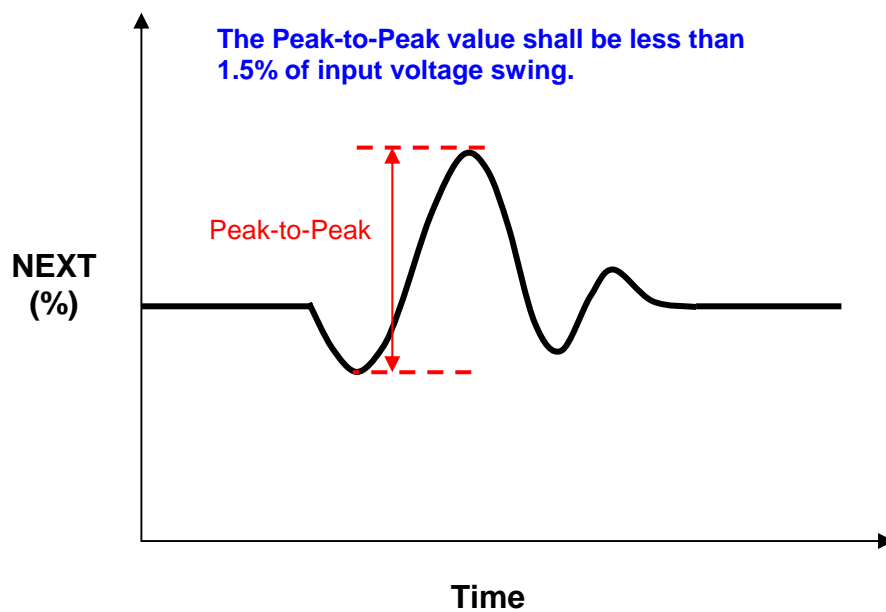


(a) For USB 3.0 Micro-B Family



(b) For all other USB 3.0 Connectors

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(c) For USB3.0 Standard-B and Powered-B Connector in Time Domain

Figure 5-24. Differential Near-End Crosstalk Requirement between SuperSpeed Pairs