USB 3.2 ENGINEERING CHANGE NOTICE

Title: Gen 2 SKP OS Insertion in Polling.RxEQ
Applied to: USB 3.2 Revision 1.0

Brief description of the functional changes:
This ECN relaxes the requirement of Gen 2 SKP OS insertion in Polling.RxEQ and to make it optional for Gen 2 SKP OS insertion in Polling.RxEQ.

Benefits as a result of the changes:
1. Ensures no interop issues dealing with existing implementations that may or may not insert SKP OS in Polling.RxEQ in Gen 2 operation.   2. Ensures no implementations insert SKP OS too frequently that degrades the link training.   3. Ensures future implementations do not assume SKP OS is always inserted in Polling.RxEQ.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
1. No impact to USB3.2 ecosystem

An analysis of the hardware implications:
No impact to existing implementations if they insert SKP OS as per specified SKP OS interval, or do not insert SKP OS.   There is an impact to existing implementations if they insert SKP OS in shorter intervals than the interval defined by the spec.

An analysis of the software implications:
None

An analysis of the compliance testing implications:
Compliance test will be added to check the minimum SKP OS interval is compliant to the specification.

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Actual Change

(a)Section 6.8.1. Receiver Equalization Training
From Text:

During Gen 2 operation, the training period is ~8ms. The training pattern is periodic with a period of 16,385 132-bit blocks (16,384 TSEQ blocks plus a SYNC OS block). The much longer pattern greatly increases the richness of the pattern compared to Gen 1. The Gen 2 training pattern spectrum is essentially white. Due to the length of the Gen 2 training interval and the potential desire to examine the data, SKPs are inserted during Polling.RxEQ. A port shall transmit a SKP OS once every 128 TSEQ OS. The longer interval between SKP OS helps preserve the richness of the data while training the receiver.

To Text:

During Gen 2 operation, the training period is ~8ms. The training pattern is periodic with a period of 16,385 132-bit blocks (16,384 TSEQ blocks plus a SYNC OS block). The much longer pattern greatly increases the richness of the pattern compared to Gen 1. The Gen 2 training pattern spectrum is essentially white. A port shall transmit a SKP OS no more frequent than once every 128 TSEQ OS. For example, a port may transmit one SKP OS every 256 TSEQ OS, but is prohibited to transmit one SKP OS every 64 TSEQ OS. The longer interval between SKP OS helps preserve the richness of the data while training the receiver. Note that a port may also choose to not insert SKP OS while transmitting TSEQ OS.