Proposed	Serial ATA

Proposed Draft

Serial ATA International Organization

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Title: Clarification of the Gen3i RX Tolerance Test Signal Amplitude Calibration Methodology.

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Author Information

Author Name	Company	Email address
John Hill	STMicroelectronics, Inc	john.hill@st.com

Workgroup Chair Information

Workgroup (Phy, Digital, etc…)	Chairperson Name	Email address
Phy WG	Chuck Hill	cphill@altaeng.com

Document History

Version	Date	Comments
1.0	28 Feb 2011	Initial release.
2.0	1 Mar 2011	Rewrite all sections
3.0	4 Mar 2011	Update background section sentence after Mar. 2nd PHY WG review.
4.0	9 Mar 2011	Added ECN Number 052

1   Introduction

1.1   Problem Statement

For Gen3i Receiver Tolerance testing, the specification is not clear if added jitter components are present in the test signal, when calibrating to the Minimum Amplitude through the Gen3i CIC.
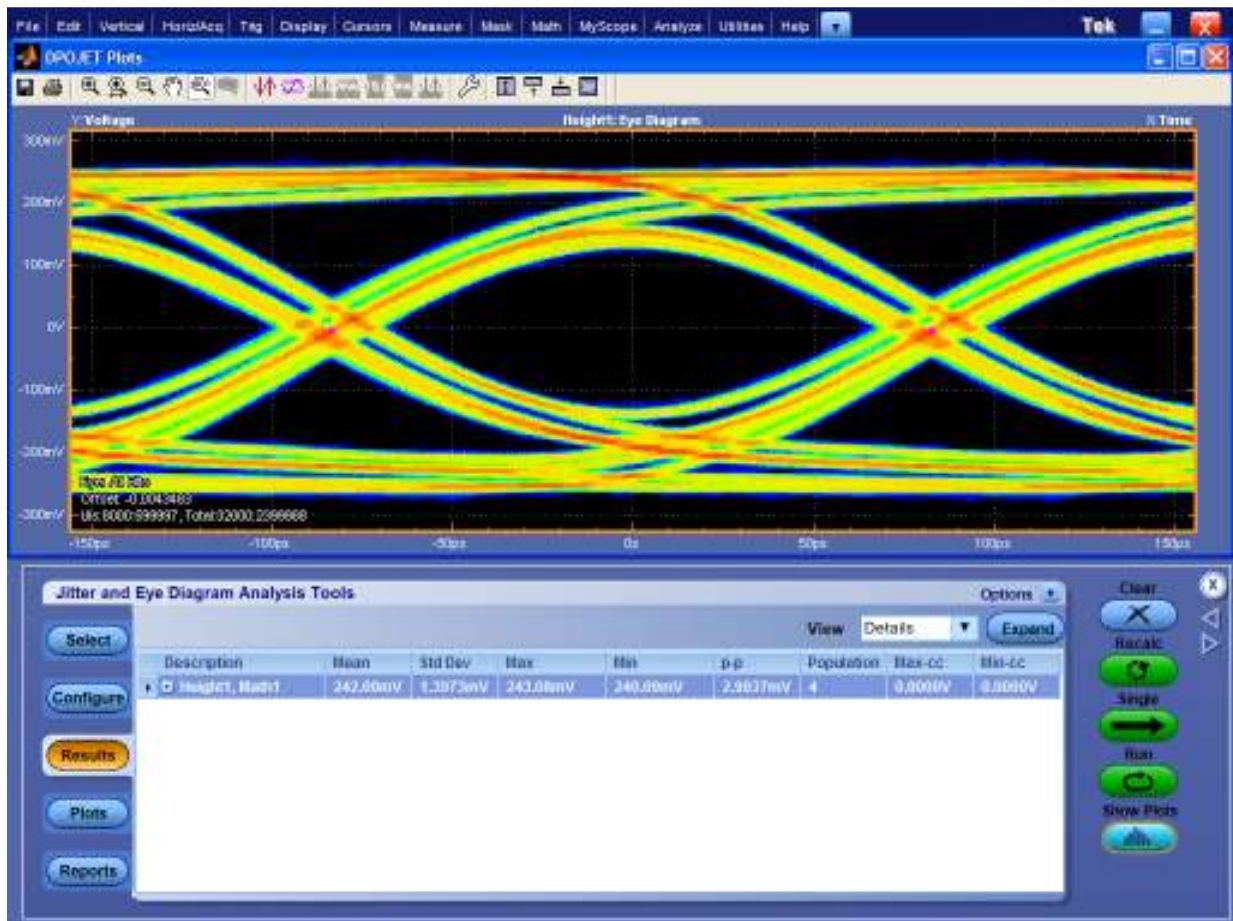
1.2   Solution Summary

The solution is to clarify the specification such that it will not be interpreted by various labs in multiple ways, such that correlation between labs and interoperability is improved.

1.3   Background (optional)

This data is taken using the Minimum Amplitude methodology change incorporated in ECN 50. (4-sigma Eye Height) These are Gen3 LBP Eye Diagrams measured after the Gen3i CIC at the RX Tolerance calibration plane. The amplitude of the pattern generator was first adjusted to get an Eye Ht. close to 240 mV with no jitter added, other than what the CIC adds. The rise time of pattern generator had been previously set to 70 ps 20-80% using a LFTP pattern, as specified for Gen3i rise time measurements.
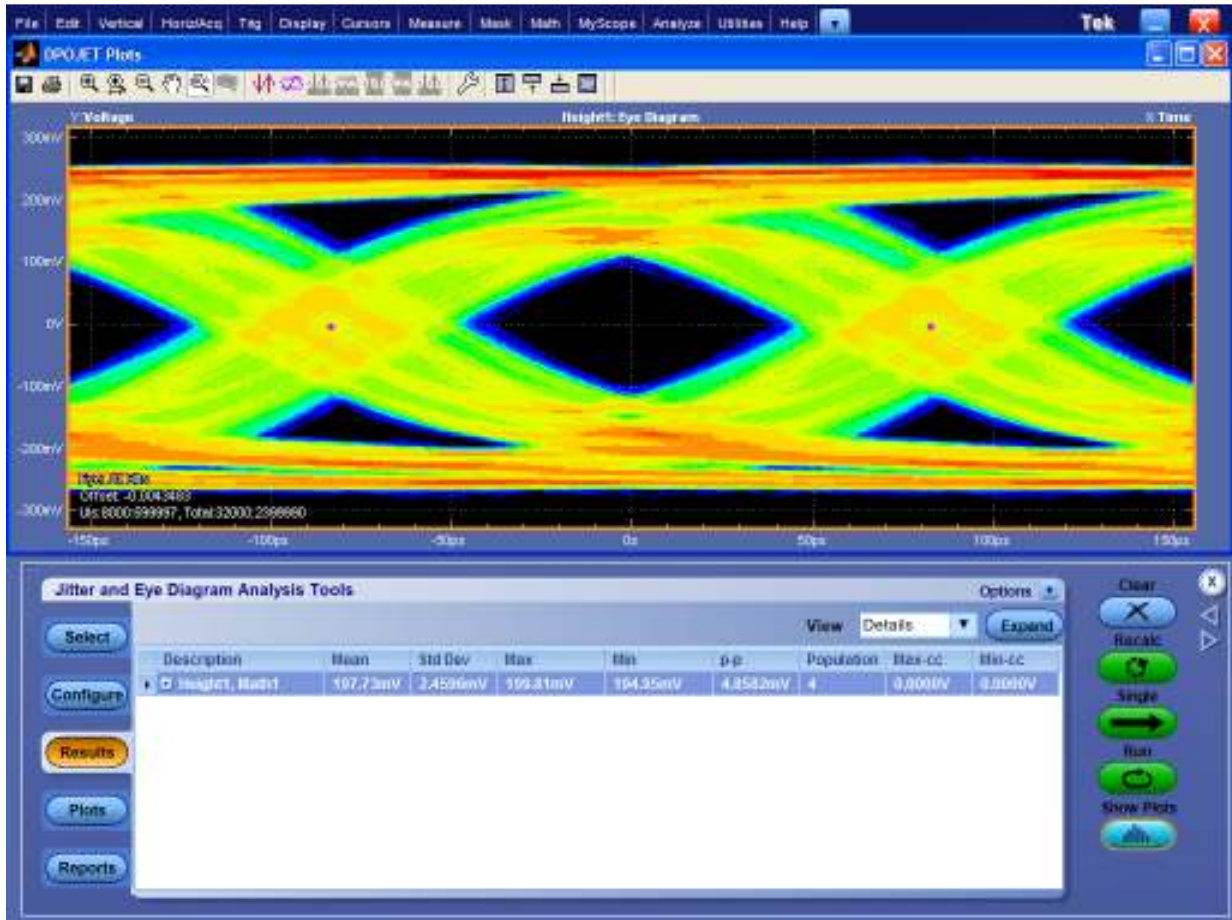
The first Eye Diagram is shown with no Jitter added to the RX Tolerance test signal:

Reported EYE HT = **242 mV**

No signal path or settings are changed. Only pattern generator RJ and PJ (35 MHz in this case) are added to obtain TJ = 0.60 UI pp as the Gen3i RX Tolerance Test specifies.

A second Eye Diagram is now shown with 0.6 UI pp Total Jitter applied, as per the Gen3i Receiver tolerance test signal requirements:

Reported EYE HT = **198 mV**

The reported eye height is reduced by 18.2 % when the jitter is added to the test signal. To compensate for this reduction, the amplitude of the pattern generator would need to increase.

When calibrating the minimum amplitude with this method, the actual amplitude of the test signal will be about 22% higher if it is calibrated with the jitter sources active versus when the jitter is inactive.

This shows that it is important to clearly state in the specification if the test jitter is active or not when the amplitude is calibrated.

The original intent of the released Gen3i specification was to calibrate the amplitude at the calibration plane with all test jitter sources active. This ECN clarifies that condition.

Note that ECN50 also specifies an "Explicit" clock or a "Mean" clock (Constant frequency) for the RX Tolerance test signal calibration. This method does not work if SSC is active on the test signal. (No tracking) The minimum amplitude must be calibrated with SSC off.

2   Technical Specification Changes

[**Editor's Note:** The changes marked in red (and underlined/strikethrough) will be incorporated in section 7.4.12]

[**Editor's Note:** The changes below assume that ECN 50 has been incorporated in the specification as per the integrators markup below in alternate colors. Text exists before and after this paragraph in section 7.4.12, that remains unchanged in this ECN so it is not shown.]

7.4.12 Receiver Tolerance (Gen3i)

The measurement of the minimum and maximum amplitude levels of the test signal at the calibration plane, are performed in the same method used for these parameters for the TX amplitude tests. (see section 7.4.3 for required method) In general the maximum peak-to-peak amplitude of a Gen3 MFTP pattern is the maximum limit, and the minimum eye height (see section 7.4.3.3)opening of a Gen3 LBP at a BER of 10 -12 is the minimum limit. The test signal minimum amplitude calibration shall be performed with SSC off, and all the jitter sources used during the tolerance test active, at their calibrated levels.