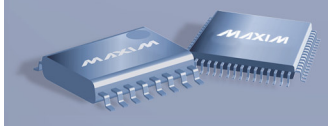
Comments on SAS2r14 Physical Layer

Kevin Witt

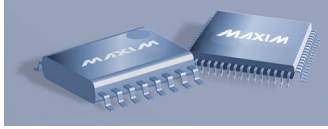
March 11, 2008

08-144r0



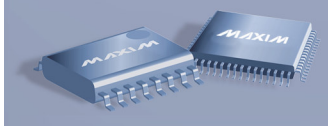
Outline

- **Preview proposed specification changes, for discussion purposes**
- **Review Proposed Rx Stressed Test Calibration Procedure**



Review proposed specification changes

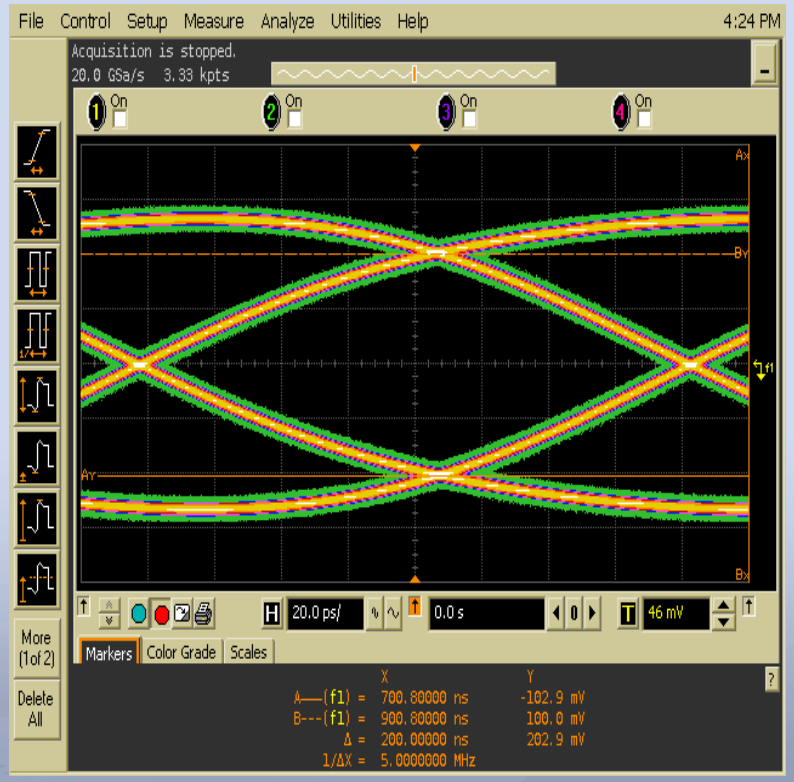
- Page 203: DFE Equation inconsistent with description.
  - Fix index of summation for i=1 to 3
- Page 204: Table 72
  - Remove Z1 Specification, it does not add to the specification.
  - Remove X1 Specification reference to footnote (b), keep spec.
  - Modify X1 range to 90 min 110max and add footnote to specify VMA at crossing.
  - Correct BUJ to be 0.022 UI
- Page 173: Note 21. “not required in previous versions”
  - if this stays if should reference SAS1.1r10
- Page 179:
  - Need pulse response and Insertion loss plot
- Page 196:
  - Change ref Tx to 800mV, remove note b.
- Page 205:
  - Add D24.3 response graphic
- Page 127:
  - I’ll redraw in Vision



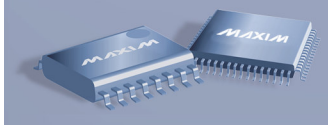
ISI Insertion Loss Calibration

- **Should we change the specification to the mean of the crossing to the mean of the crossing**

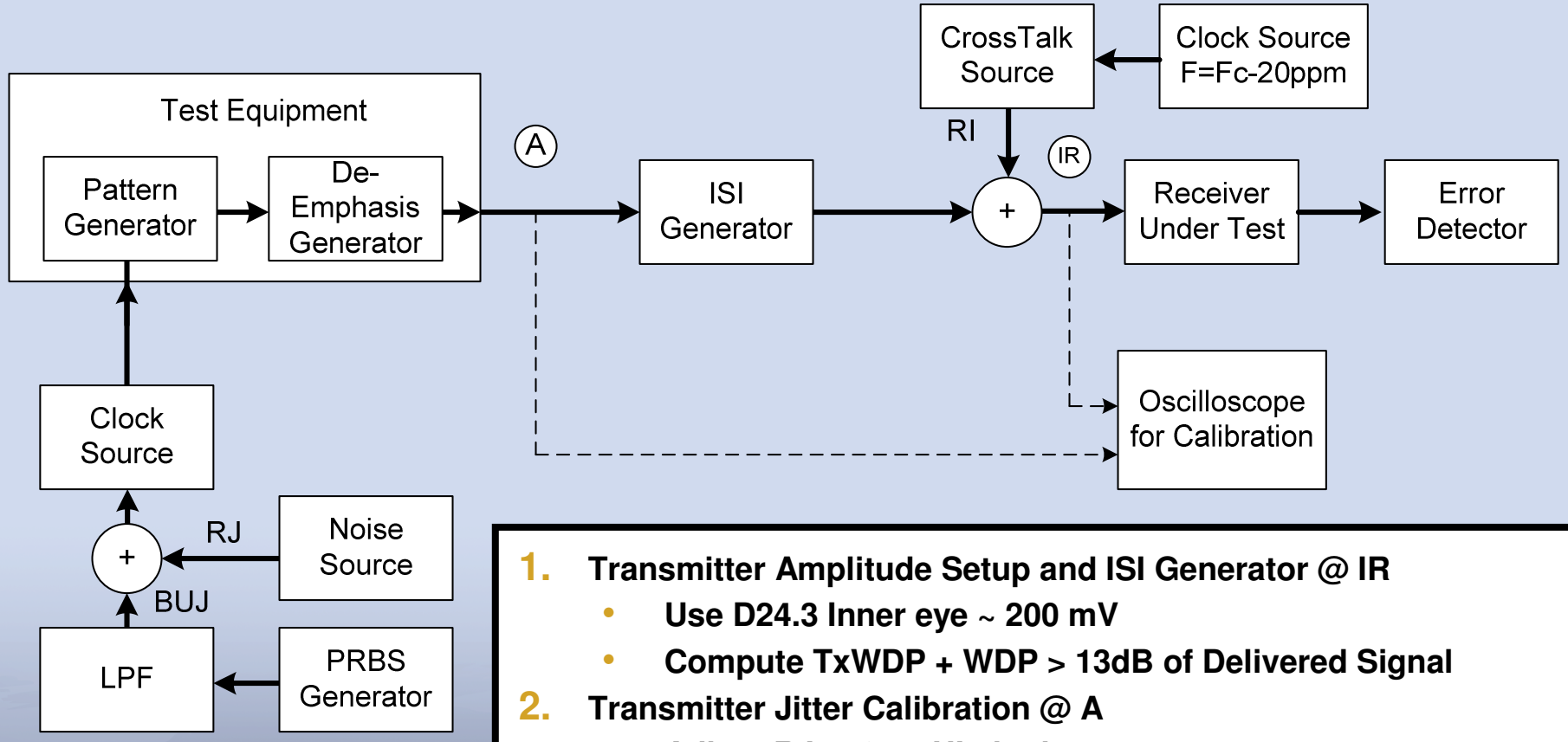
180 → 220mV



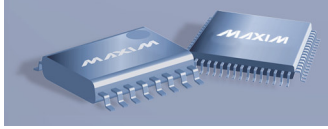
Note: on a limited set of cable we saw a significant variation on insertion loss



Summary of Proposed Calibration

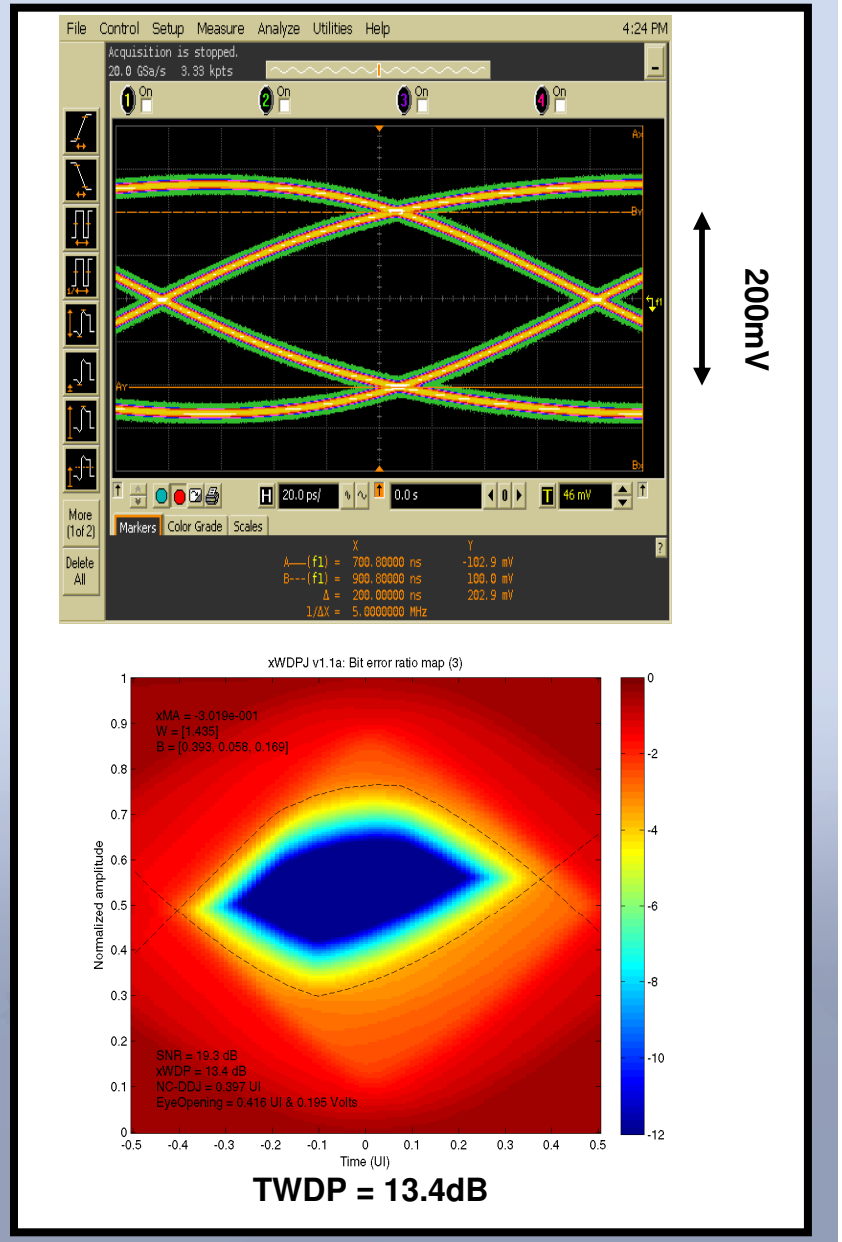


1. **Transmitter Amplitude Setup and ISI Generator @ IR**
   - **Use D24.3 Inner eye ~ 200 mV**
   - **Compute TxWDP + WDP > 13dB of Delivered Signal**
2. **Transmitter Jitter Calibration @ A**
   - **Adjust RJ = 0.15 UI pk-pk**
   - **Adjust BUJ = 0.022 UI pk-pk**
3. **Crosstalk @ IR**
   - **PRBS-7 Crosstalk Source and Adjust Coupled Amplitude > 4mV rms**
4. **Test – Confirm BER < 1e-12**



Calibration Procedure Illustrated

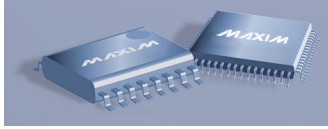
1. **Measure Inner Eye with D24.3**
   - Without jitter or Crosstalk
2. **Compute WDP of Delivered Signal with SAS CJTPAT for the budgeted PALLOC of 15.4.**
   - Make sure > 13.0 dB
3. **Setup Tx Jitter with Standard Test Equipment Options.**
   - RJ = 0.15UI
   - BUJ =0.022UI
4. **Setup Additional Cross talk as needed to meet NEXT limit.**
   - Turn on all channels, add crosstalk for a total of 4mV RMS
5. **Confirm DUT BER < 1e-12 @ 95% confidence**



TWDP = 13.4dB

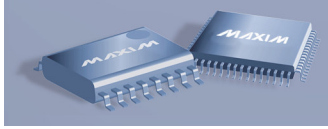
Summary

- **Preview of Proposed Changes Provided**
- **Proposed Method of Calibrating the ISI Generator Appears Feasible and Avoids Golden Hardware.**



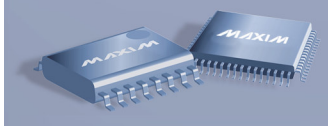
Additional Information

- References
- Updated Link Budget (from 07-380r1)



References

- T10/07-339r? SAS-2 6Gbps PHY Electrical Specification
- T10/07-380r1 Comprehensive Stressed Receiver Sensitivity Test (Kevin Witt)
- T10/07-493r0r0 Crosstalk Budget for Receiver Testing
- T10/07-365r0 Enhanced WDP for 6G SAS (Mike Jenkins)
- T10/07-448r0 DFEEYE and SAS-2 Channel Data (Kevin Witt & Mahbubul Bari)
- T10/07-365r0 Enhanced WDP for 6G SAS (Mike Jenkins)
- T10-07-193r1 Transmitter Test Load (Galen Fromm)
- T11/07-399v1 Beta and Epsilon Point Update (Adam Healey & Mark Marlett)
- T11/07-592v0 Migrating Beta and Epsilon Points to DFEEYE (Adam Healey & Mark Marlett)
- T11/07-344v0 Enhancing WDP (Adam Healey & Mark Marlett)
- T11/07-553v1 TWDP/WDP code for 8GFC SA and EA-delta points (Lindsay & Ghiasi)
- T11/07-644v0 Enhanced TWDP and WDP (Adam Healey & Mark Marlett)
- T11/07-706v0 Informative Eye Diagram Display for Enhanced TWDP and WDP (Adam Healey)



Link Budget

- From 07-365r0