VITESSE

Towards a 6Gbps SAS-2 Physical Specification

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YOUR PARTNER FOR SUCCESS

Towards a SAS-2 Physical Specification

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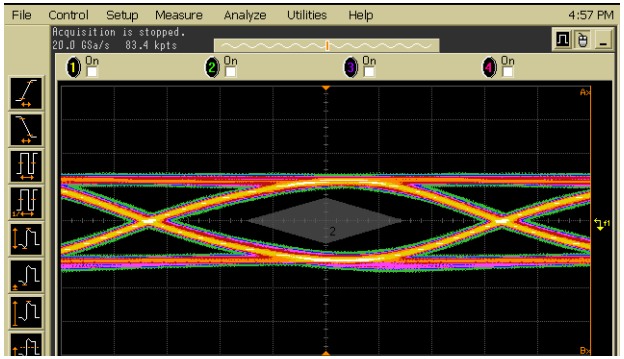
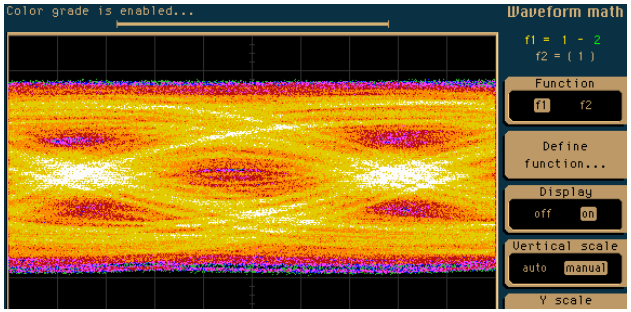
- Equalization will be needed for SAS-2
  - See previous presentation for details
- Example Eyes w/ TCTF test channel

SAS-1 3G 9m InfiniBand 24AWG
De-Emphasis Enabled



6G 9m InfiniBand 24AWG
De-Emphasis Enabled



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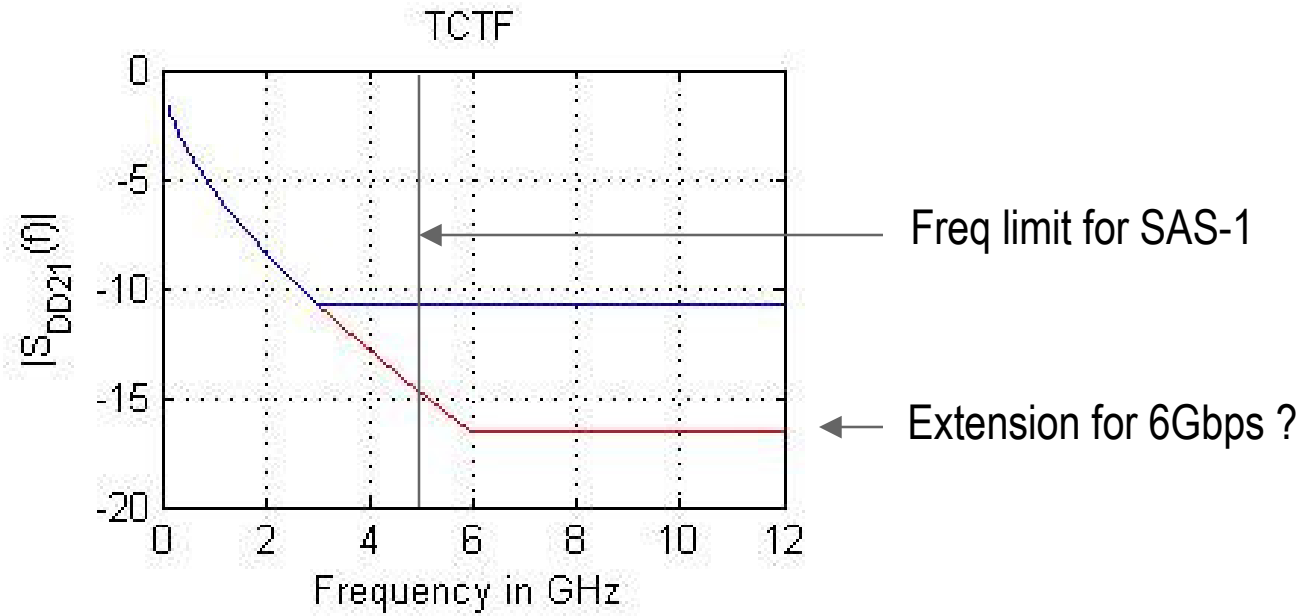
- Need to define the SAS-2 channel
  - Is TCTF sufficient as a channel model?
  - Attenuation at 6Ghz higher than 10.6 dB for FR4.
  - Should it be extended to higher frequencies – What is the history of the corner frequency?



- Need to prove technical feasibility of Equalizer's to proposed SAS-2 channel
  - Initial simulation results look promising
  - Equalization of up to 25" FR4 and 9m 24AWG Infiniband (both exceed SAS-1 TCTF)

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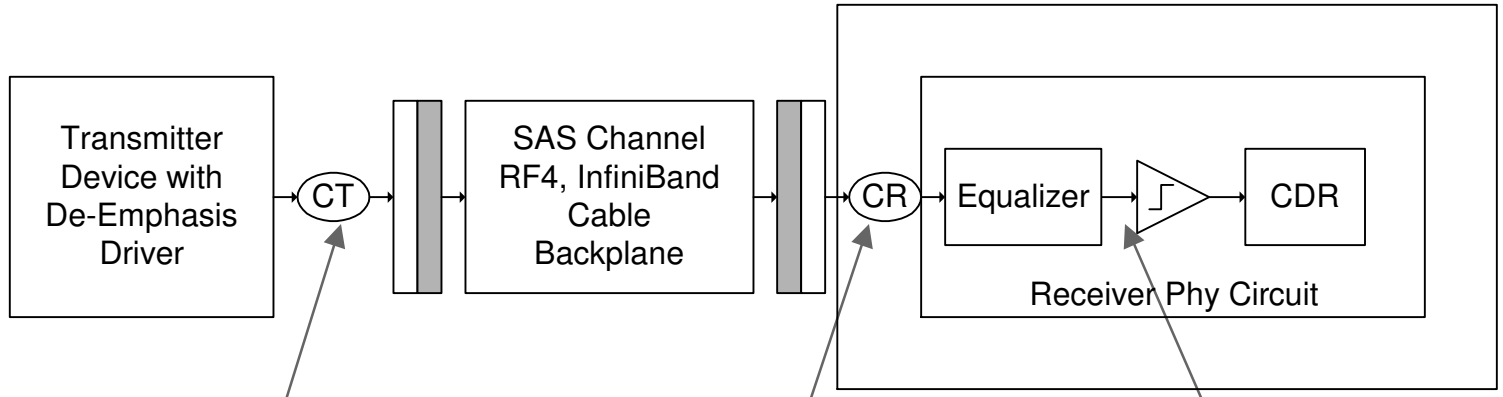
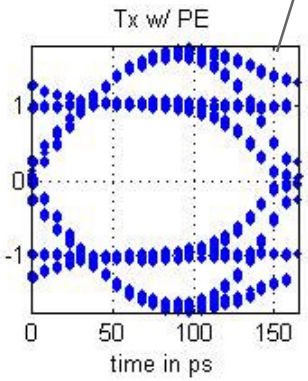
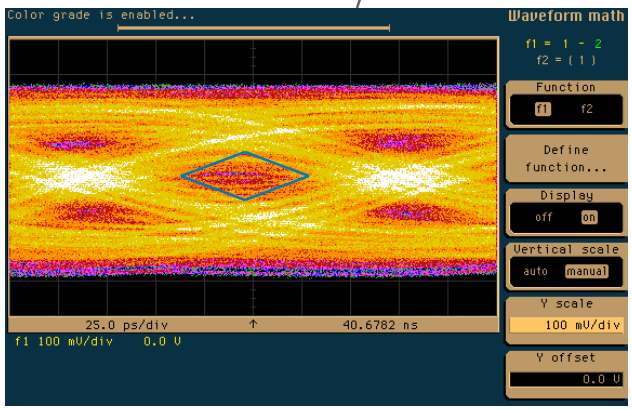
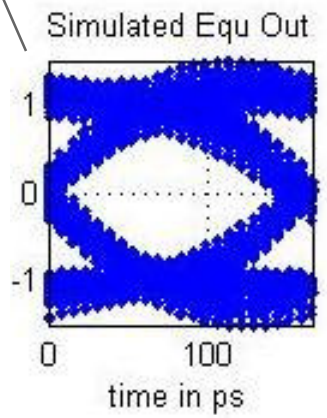
Rx Compliance Issues with Mask Test

- BER of the link is dictated at the Decision Point (Equalizer Output)
- In general the equalizer output is not accessible.
- Eye mask at compliance point CR is not applicable to a closed eye
- Need to use a compliance test designed for Equalized channels









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- Transmit Modifications
  - Need appropriate rise/fall times for 6Gbps
  - Need to modify Jitter tolerance methodology (Deterministic Jitter can be >1UI)
- Need to Determine compliance test and Inoperability
  - Tx Compliance: If De-Emphasis is specified how do we insure interoperability across multiple vendors
  - Rx Compliance: Eye mask at CT does not make sense for an equalized channel
- Equalization Implementation & Specification
  - Target solution should be low power
    - Comparable to 3G Phy in die area and power
    - Support high port counts applications, ie 24 and 36 ports
  - Should not specify the detail of the Equalization implementation
    - Keep Equalizers Vendor specific – do not impose architecture, # taps …
    - Open to advances in equalization techniques

Towards a SAS-2 Physical Specification

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- Propose that the SAS Phy working group drive the 6 Gpbs standard
  - Weekly conference calls to form consensus and resolve issues
- Incomplete list of topics for discussion
  - Channel Model
  - Transmit Specifications
    - Eye mask at launch
    - Rise/Fall times
  - Tx and Rx Compliance testing
  - Interoperability
  - Speed Negotiation
- Desired Outcome
  - Proposal on electrical specification for 6G operation