



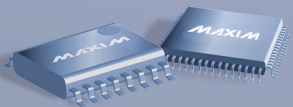
Comments on 07-339r2

SAS-2 Phy Electrical Specification

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15 August 2007

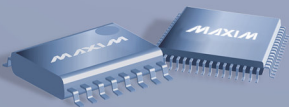
07-336r0





5.3.3 General Electrical Characteristics

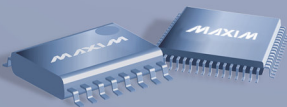
- Paragraph #5
- Current Text: “..shall support a bit error rate (BER) that is less than 10^{-15} (...) based on the results using StatEye (see ...) or an equivalent simulation with data...”
- Issue: specifying StatEye which currently provides an suspect result with the reference channel s-parameter file. Specifying the StatEye methodology explicitly, then contradicted later.
- Proposed Change: “..shall support a bit error rate (BER) that is less than 10^{-15} (...) based on digital communication link simulation result, with data... The specific simulator program is beyond the scope of this specification but an example simulator is StatEye (www.stateye.org)”





5.3.5.2 Transmitter Device Eye Mask

- I assume the intent is to specify that we are testing the Tx Compliance through a Ref Channel and Ref Rx.
- **Issues:**
 - 1) Need to define methodology completely.
 - For example are we capturing the Tx waveform w/ a specific data pattern CJTPAT and then processing?
 - If so, do we measure RJ and use in the simulation?
 - 2) Crosstalk “with reverse traffic”
 - In simulation we will need to define:
 - The coupling channels (s-parameters)
 - Number of Aggressors
 - Amplitude of Aggressors / rise time / De-Emphasis
 - Frequency and phase relation-ship of Aggressors and primary Channel.
- **Proposed Change:**
 - Full define what is collected and how it is processed.





5.3.5.4 Receiver Device Jitter Tolerance Eye Mask 5.3.7.5 Receiver Device Jitter Tolerance.

- **Issue: Jitter Tolerance needs to be a real test with a stressing link. This section (5.3.5.4) is describing a simulated eye mask.**
- **Proposed Change: Need to specify a jitter tolerance test like section 5.3.7.3.4**
 - Real Tx, Real channel, real jitter, stress the Equalizer and CDR
 - Could use 10m MiniSAS or Equivalent
- **Ref T10/ 06-496r3 or 06-053r0**

SAS-2 Receiver Compliance Test Hardware
See 06-053r0 VITESSE

Receiver Compliance w/ Jitter, Crosstalk and Interference (same as OIF-CEI, & 10GBase-KR)

Standardize Test Setup based on 10GBase-LRM ISI Generator

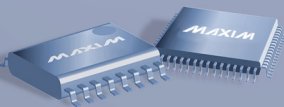
- Generate ISI coefficients for channels of Interest
- Calibrate and Test Through Mated Connector
- Emulate Tx DE, C_{rx} & C

10GbE MMF Example

Needs Mod for SSC

Match Channel ISI Output By adjusting AI

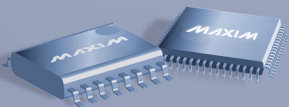
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5.3.6.1 Transmitter device characteristics overview

- **Issue: “Transmitter devices may or may not incorporate de-emphasis ... zero-length and TCTF..”**
- **This is really a SAS1.1 description. We are recommending default Tx setting including De-Emphasis**
- **Proposed Change: Change title to “ 5.3.6.1 1.5 & 3Gbps Transmitter device characteristics overview”**





Channel Compliance

- We need a section stating what is a compliant SAS-2 channel.
 - See T10/ 06-496r3

SAS-2 Channels

VITESSE

-  A Compliant Channel
 - Any Channel Which Will Operated at 1e-12 With the Given Reference Transmitter and Receiver Device.
 - Operation is Defined as Passing Link Analysis at the TBD Worst Case Corner.
 - Simulation Methodology is up to the User, but is Expected to be Based on Estimated/Measured S-Parameters and Digital Communication Analysis Techniques.
-  SAS-2 S-Parameter Models Posted to the T10 Serve as Guidance

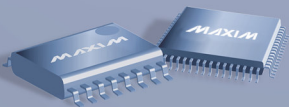
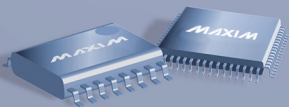




Table 69 Receiver Device

- **Differential Eye Opening**
- **Issue: This table is for real Receiver Devices. This is a Reference Rx specification. Should it be in this table?**
- **Issue: Note c. Receiver devices are not compliant by simulation.**
- **Proposed Change:**
 - 1. Add Rx compliant test . Specify BER on representative worst case link.
 - 2. Move this spec in the Reference Rx section (5.3.7.3.3). Add / move a spec for horizontal open in the same section.





5.3.7.3.4 Receiver Device Physical Testing

- **Issue #1: Informative? Should be normative. If not is will be re-written differently in all the procurement specs.**
- **Proposed Change: Make it Normative.**
- **Issue #2: Tx Settings**
- **Proposed Change: Specify the interoperability settings. For the Tx.**

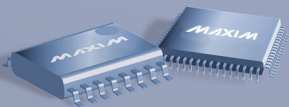
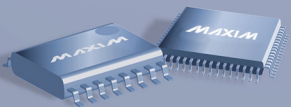




Table 74 Receiver Device Jitter ...

- **Issue: DJ at channel output of 0.35UI at 6G IR and CR**
- **The real SAS-2 DJ can be almost a UI (closed eye) with SAS-2 Channels.**
- **Proposed Change: Rx Jitter tolerance test (already proposed) Remove 0.35 DJ spec from 6G and use representative channel.**





Summary

- **Issues and proposed changes presented.**

