

Refinement of SR4/SR10 Specifications

IEEE 802.3ba

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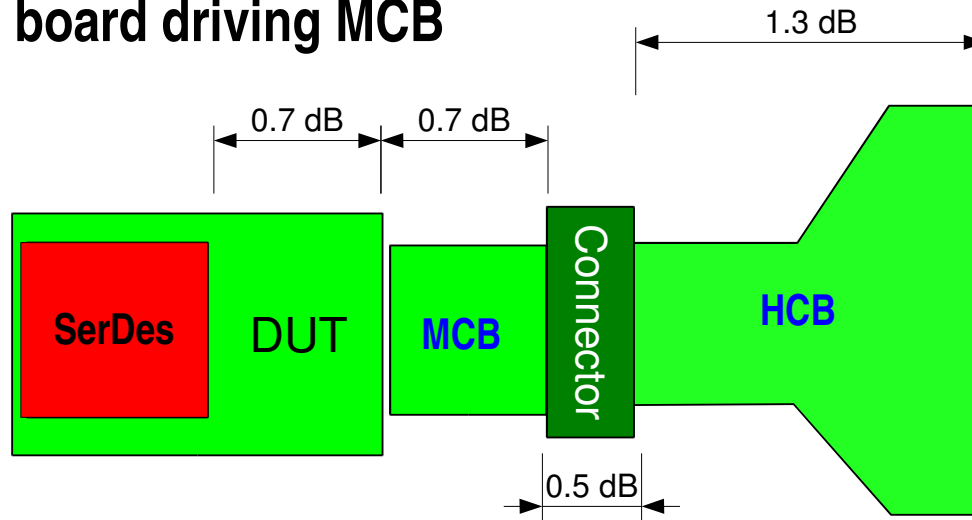
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Key Items Require Further Work

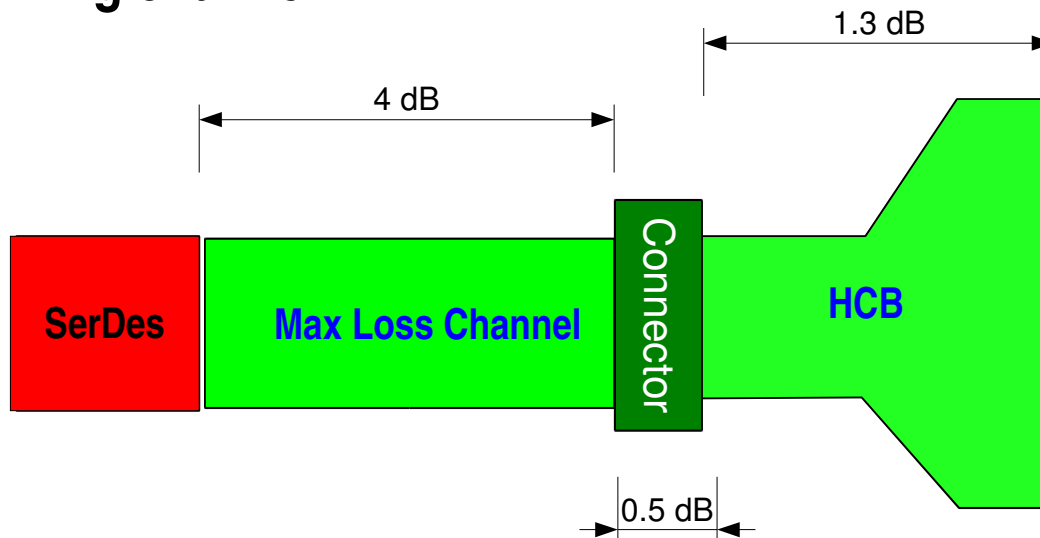
- **PMA to TP1 and TP4 to PMA loss**
- **Test point definition**
- **Channel loss budget**
- **Jitter Methodology**

SR4/SR10 Loss Budget

- SerDes test board driving MCB

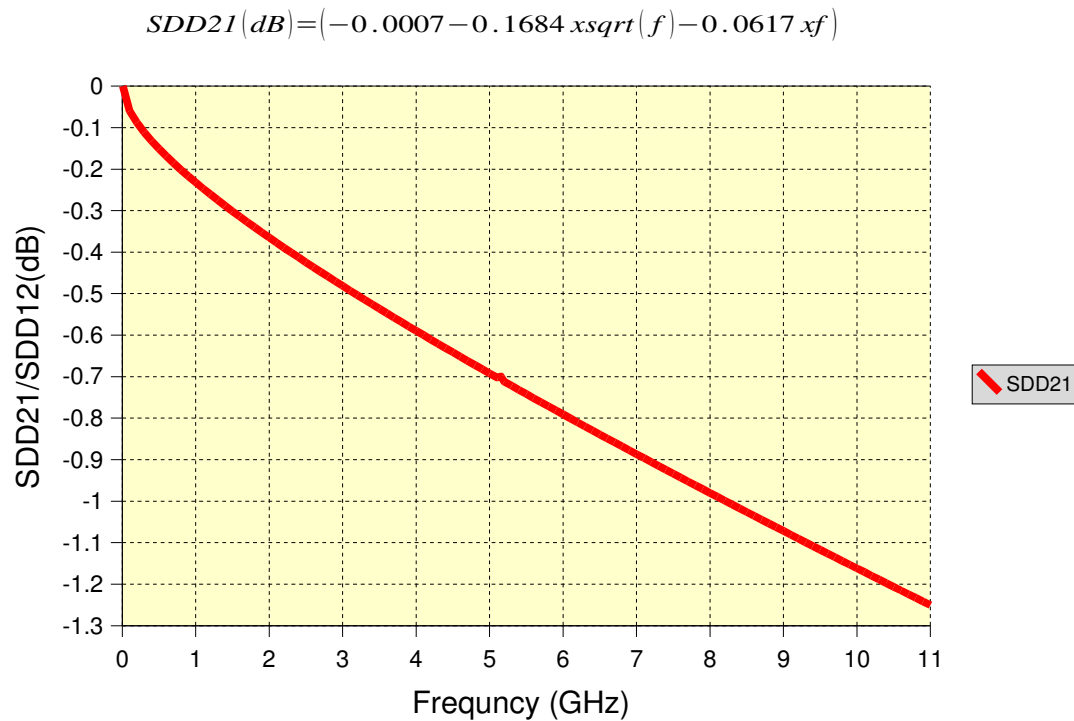


- SerDes driving channel



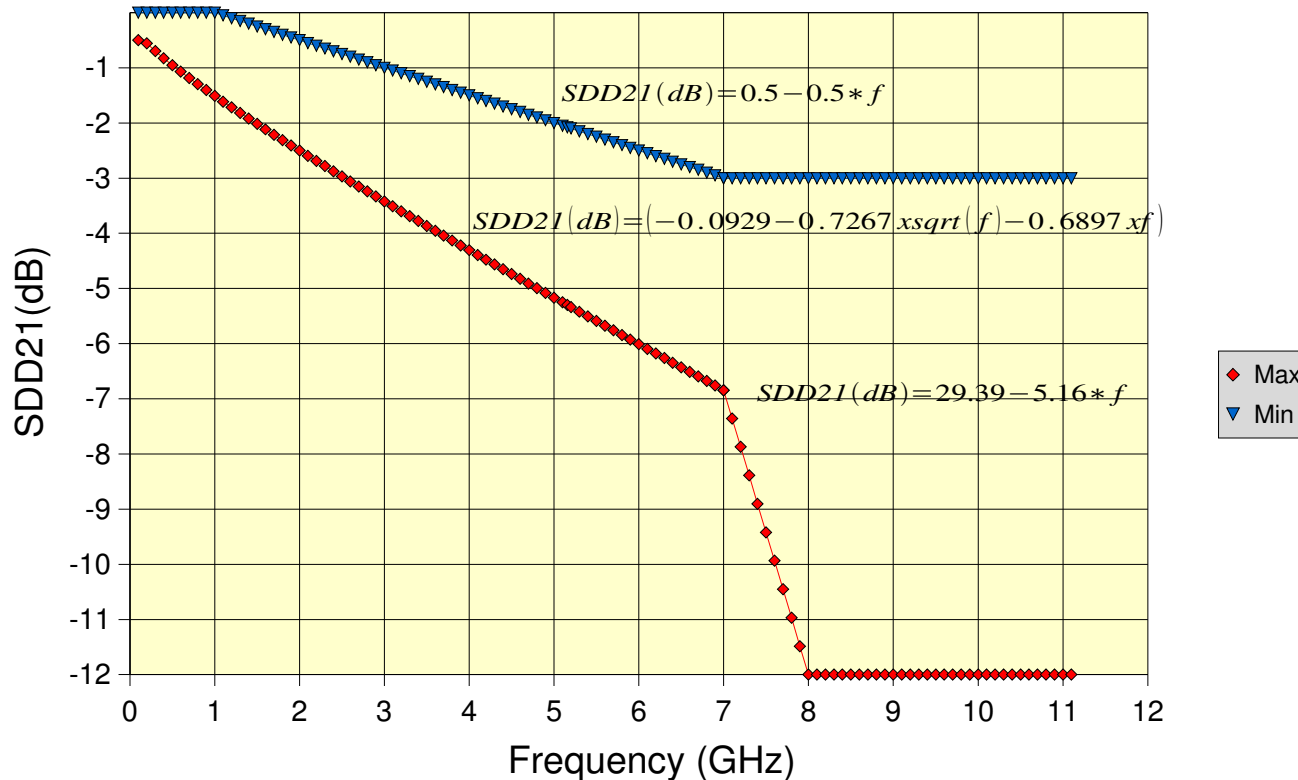
PMA Chip to TP1 or TP4 Loss

- It has been suggested 3” of PCB traces for SerDes to TP1 or TP4 which is unacceptable even on low loss material which will mask the measurement and reduce accuracy.
- PMA chip to TP1 or TP4 loss ≤ 0.7 dB at Nyquist 0.2 dB higher than SFP+.
 - About 40 mm trace length in Rogers 4350B material with RF connector.



Updated SR4/SR10 Channel Loss

- 5.3 dB loss at Nyquist include HCB loss assuming 1.3 dB
 - Host PCB Loss = 5.3 dB – 1.3 dB (HCB loss) – 0.5 (Connector loss)=3.5 dB
 - Supports 3 to 6” of PCB trace



Jitter Methodology

- **Use of MJSQ if the jitter PDF is not dual-dirac often results in DJ values which much smaller than high probability jitter $BER < 1E-2$.**
 - The host output waveform may have significant DDPWS which is not fully captured by the DJ and it could result in significant optical penalty.
 - The high frequency jitter which is suppose to be captured by DJ could be could be severely underestimated due to the presence of RJ which will result in over stressing the host.
- **Transmitter DDJ and DDPWS captures the high probability jitter effect without the DJ baggage**
 - Replace DJ TBD with DDJ with value of 0.15 UI, also add DDPWS with value of 0.1 UI.
 - DDJ and DDPWS are tested with PRBS9

Jitter Methodology cont.

- **For robust CDR operation high probability jitter must be limited.**
 - MJSQ DJ is not the right metric for high probability jitter.
 - After about a year of investigation SFP+ went with 99% probability
 - Replace DJ=0.42 UI with 99% probability J2=0.42 UI.
- **TP4 specifications TJ=0.7 UI is the same as SFP+ which means there is no SerDes, PCB routing, or crosstalk degradation on a SR4/SR10 link except the fibre reach was cut by 1/3!**
 - The proposed TP4 jitter is on cliff.
 - Jitter tolerance is very expensive test.
 - Propose to reduce TP4 TJ from 0.7 UI to 0.65 UI.