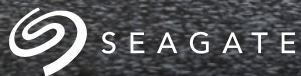




CU4HDD Channel Test Points and Loss



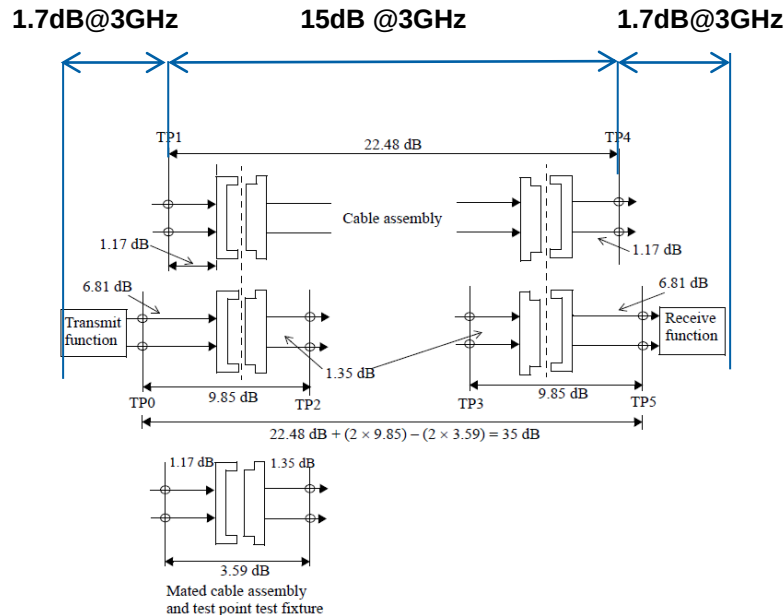
Anthony Calbone 1/7/2016

Introduction

- The purpose of this presentation is to begin defining the test points to be used in 802.3cb, as well as the insertion losses associated with these test points
- There are two different models shown in the presentation that use 802.3bj as a starting point
 - A backplane reference model that is a generic model that could be a closed and/or proprietary system in which the only loss budget is ball-to-ball
 - A storage reference model that is more focused and allows for insertion loss budgeting of the HDD since it's an external interface
 - The ball-to-ball budgets are equivalent between the two models
- Loss numbers at 2.578GHz are given in the presentation, with is the fundamental frequency of 5G assuming 64b/66b encoding
- The loss numbers are only a starting point and may shift around

SAS to 802.3bj Test Point Mapping

- The figure shows how the SAS test points differ from 802.3bj
- The 15dB refers to the 10m cable reference model for 6G SAS
- The 1.7dB comes from the reference termination models
- Shifting loss to 2.578 GHz
 - This equates to 16.61 dB of die-to-die loss at 2.578 GHz
 - 10m Cable: 13.87 dB at 2.578 GHz
 - Reference terminations: 1.37 dB at 2.578 GHz
- SAS Channel
 - The channel includes the mated pair connectors and everything in between, plus 2 Zero-Length test loads (TP1 to TP4 equivalent)
 - Zero-Length test load has a max loss of 1.27dB at 2.578 GHz, but no minimum loss is defined
 - The loss of the zero-length test loads are included in the simulations
 - The reference termination models include everything behind the connectors (traces, package)

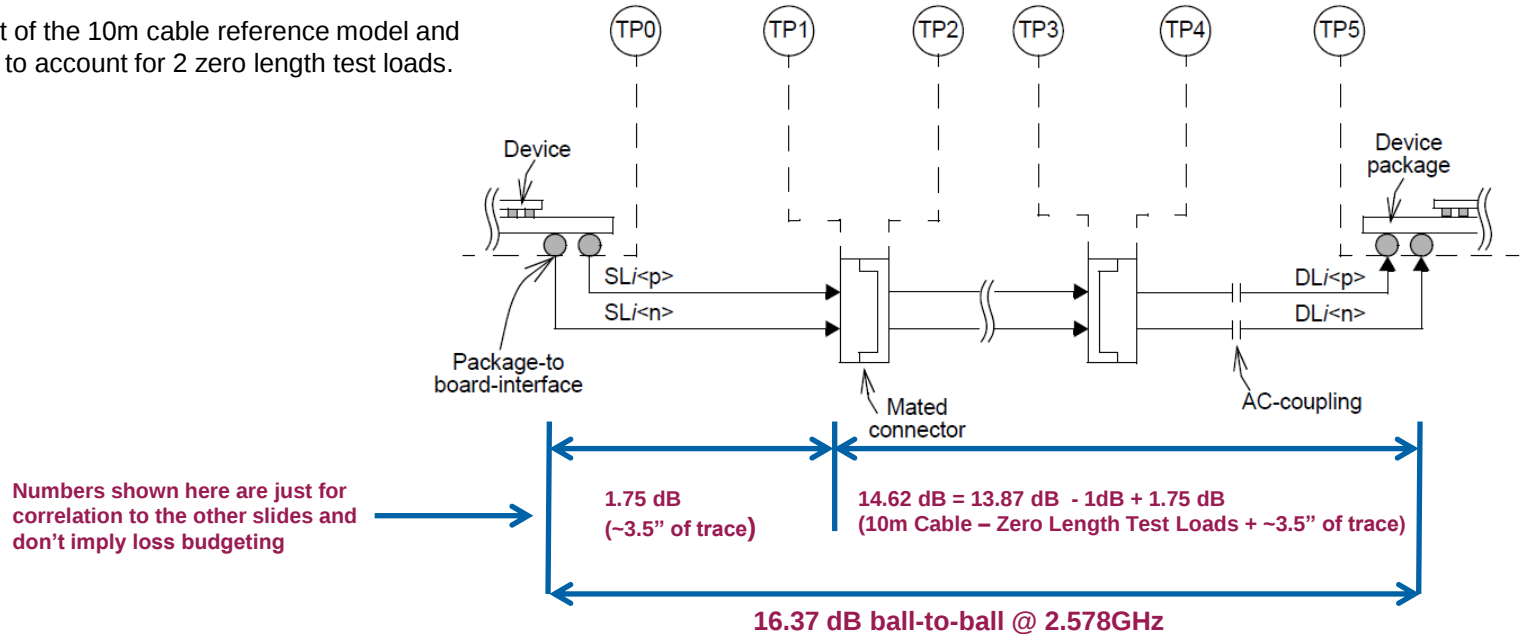


NOTE—The connector insertion loss is 1.07 dB for the mated test fixture. The host connector is allocated 0.62 dB of additional margin.

Figure 92A-2—35 dB channel insertion loss budget at 12.8906 GHz

Backplane Reference Model

- Use 802.3bj as a reference to define ball-to-ball loss @ 2.578 GHz
- There is a closed and/or proprietary environment in which the only loss budget is ball-to-ball
- 1dB was taken out of the 10m cable reference model and given to each end to account for 2 zero length test loads.



Storage Reference Model

- For the storage application, it's important to budget the drive loss since it's an external component.
- The rest of the “box” is vender specific and can be any combination of cable and backplane
- The numbers shown are a starting point
 - Drive board loss: 1.75 dB equating to roughly 3.5” of fr4 trace
 - Mated connector loss: 0.3 dB
 - Fixture trace loss: 0.5 dB equating to roughly 2.5” of Rogers 4350B trace plus SMA connectors
- The tolerances defined for the mated connector assembly would need to allow for variances in connectors from different vendors in addition to manufacturing variation

