



On Cable Length Objectives

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Thanks to Kirsten Matheus for very valuable feedback on this presentation.

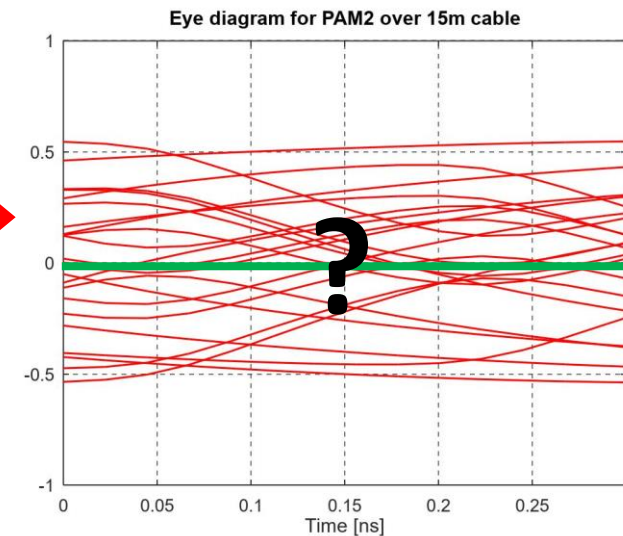
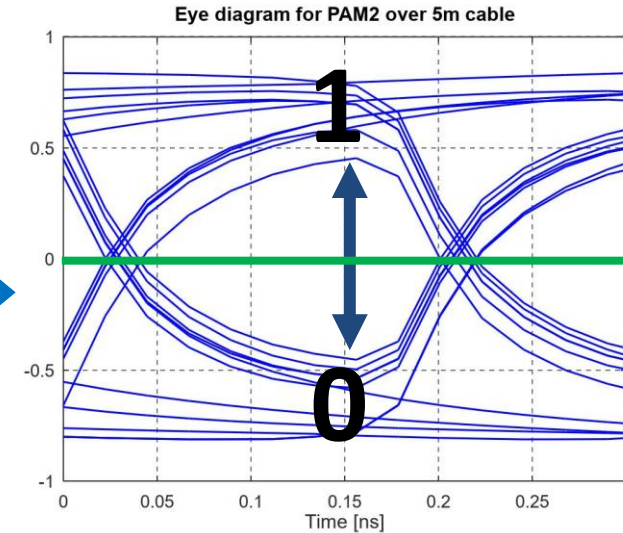
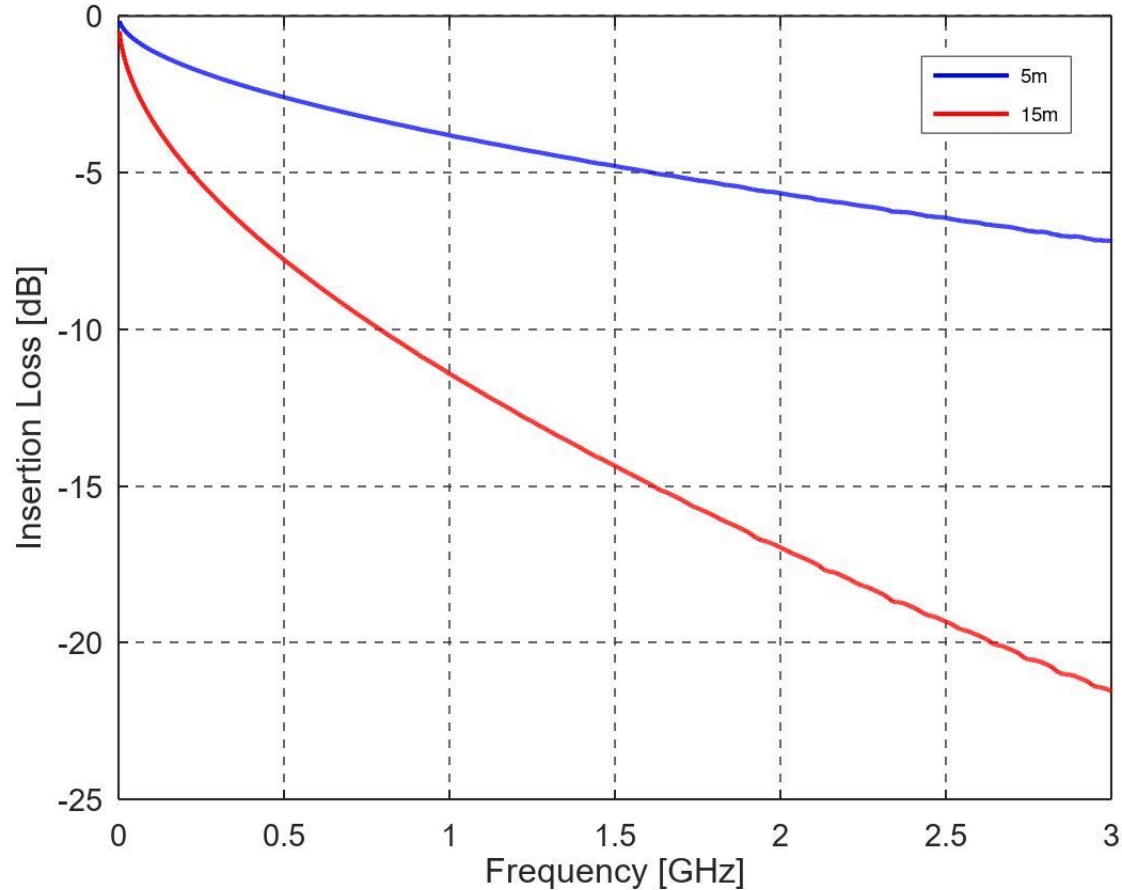
Introduction

- This presentation discussed some options for cable length objectives for the ISAAC project
- The objectives should state the longest links segments that the PHY must support, and this statement should be based on the needs of the automotive market
- Three possible cable length objectives are reviewed:
 - Up to 5m
 - Up to 11m
 - Up to 15m
- Based on a short analysis, the recommendation is to adopt an objective of “link segment supporting up to **2 inline** connectors for at least **11 m**”

Differential Pair and Coax Cables

- There is general agreement within the study group to support both differential pair and coax cables in the ISAAC project
- The task force may decide to define different performance characteristics for the differential pair and the coax cable
- The objectives should state the longest links segments that the PHY must support, and this statement should be based on the needs of the automotive market

Shorter Cable = Simpler PHY



Up to 5m link segment

- Limiting the cable length to about **5m** would make equalization simpler than for longer cables
- This would be good choice if the camera were always connected to zonal controllers only (i.e., always deployed within zonal-architecture)
- This is too short for cameras connected directly to the central processing ECU (in legacy or transition architectures)
- Limiting the ISAAC objective to **5m** is probably too restrictive

Up to 15m link segment

- IEEE 802.3ch supports up to **15m** cables, for 2.5Gbps, 5Gbps, and 10Gbps data rates
- ISAAC discusses similar data rates, so **15m** is technically feasible, but this requires advanced signal processing
- For most camera applications, the **15m** reach is probably more than what is needed, so some savings can be achieved by choosing shorter reach limit

Up to 11m link segment

- IEEE 802.3cy supports up to **11m** cables for 25Gbps data rate
- Limiting the objectives to **11m** may simplify PHY design and reduce the power consumption, compared with 15m
- The 802.3cy project had **11m** objective, based on consolidated information from multiple OEMs:
 - See “OEM CONSOLIDATED GREATER THAN 10GB/S ETHERNET TOPOLOGIES”
https://www.ieee802.org/3/B10GAUTO/public/may19/wienckowski_3+10G_01a_0519.pdf

Inline Connectors

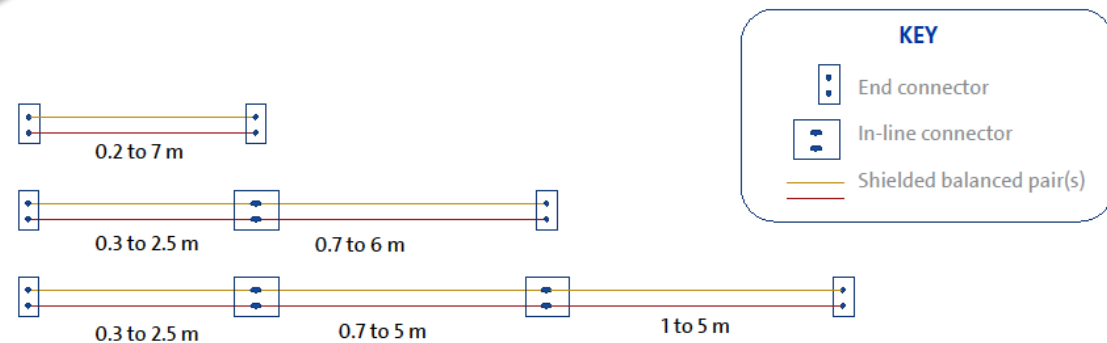
- The 802.3cy project had up to **2 inline** connectors in the objectives
- This was based on consolidated information from multiple OEMs:
 - See “OEM CONSOLIDATED GREATER THAN 10GB/S ETHERNET TOPOLOGIES”
https://www.ieee802.org/3/B10GAUTO/public/may19/wienckowski_3+10G_01a_0519.pdf

CAMERAS

- Contain 0, 1 or 2 in-line connections
- Are 0.2 m to 11.0 m in total length (not all combinations of the below lengths are possible)
 - Note: Segment lengths will vary by at least 10%

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Modify text from 802.3cy Objectives

Text from 802.3cy:

Define the performance characteristics of an automotive link segment and an electrical PHY to support 25 Gb/s point-to-point operation over this link segment supporting up to 2 inline connectors for at least 11 m on at least one type of automotive cabling.

Modified text for ISAAC:

Define the performance characteristics of ~~an automotive~~ link segments for automotive balanced pair and automotive coax cables. Define ~~and~~ an electrical PHY to support ~~25 Gb/s~~ point-to-point operation over ~~this~~ such link segment supporting up to 2 inline connectors for at least 11 m on at least one type of automotive cabling.

Suggested Objectives

Define the performance characteristics of link segments for automotive balanced pair and automotive coax cables.

Define an electrical PHY to support point-to-point operation over such link segment supporting up to **2 inline** connectors for at least **11 m** on at least one type of automotive cabling.

Note: There should probably be a statement about data rates in the text above, when the study group is ready to add such statement



Discussion

What is missing?

Is anything controversial in this presentation?

What needs more presentations?