RL & Screening Attenuation Link Requirements of IEEE 802.3dm

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IL & RL Updates and Shield Performance

- Link to proposal for text made in May Interim in New Orleans.
  https://www.ieee802.org/3/dm/public/0525/boyer_sharma-3dm_xx_05-14-25_3.pdf
- IL frequency range correction less than 3 MHz.
- As requested, RL data for various link segment topologies.
- Introduction to shield performance requirements.

Insertion Loss Limit (needed correction of start freq.)

XXX.X Link Segment Characteristics

2.5GBASE-T1, 5 GBASE-T1, and 10GBASE-T1 PHYs in one direction with 100 Mb/s in the opposite direction are designed to operate over a single shielded balanced pair of conductors or a single coaxial cable that meet the requirements specified in this subclause. The term link segment used in this clause refers to a single balanced pair of conductors (cable or backplane) or a single coaxial cable.

xxx.x.x.x Link segment insertion loss

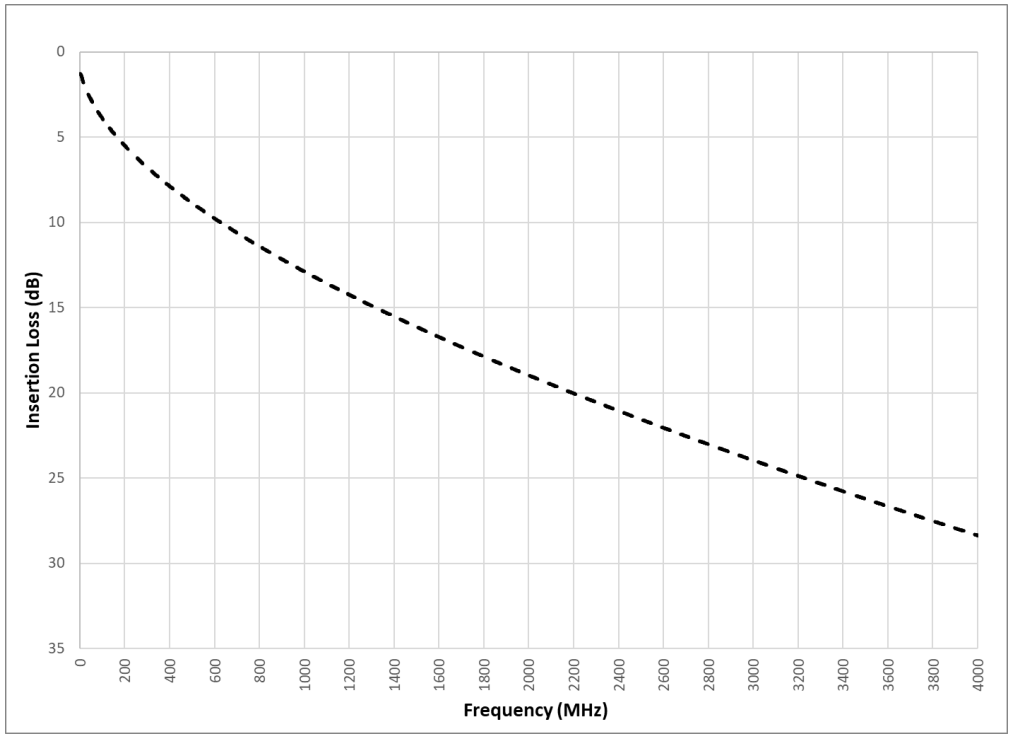
The insertion loss of each MultiG/100MBASE-T1/V1 link segment, whether single shielded balanced pair of conductors or a single coaxial cable, shall meet the values determined using Equation (2xx-TBD) .

Insertion loss(f) ≤ -0.0015 + 0.001325*f + 0.3645*√f + 1.1785/ √f (dB) (2xx-TBD)

Where; f is in MHz; 3 ≤ f ≤ 4000

Changed 1 MHz to 3 MHz This was done to fix issue with <3 MHz in equation. If <3 MHz is required, we can add a separate extension from 1 to 3 MHz.

An option might be for 1 – 3 MHz < 1.3 dB, keeping in mind excludes any properties of the PoC.

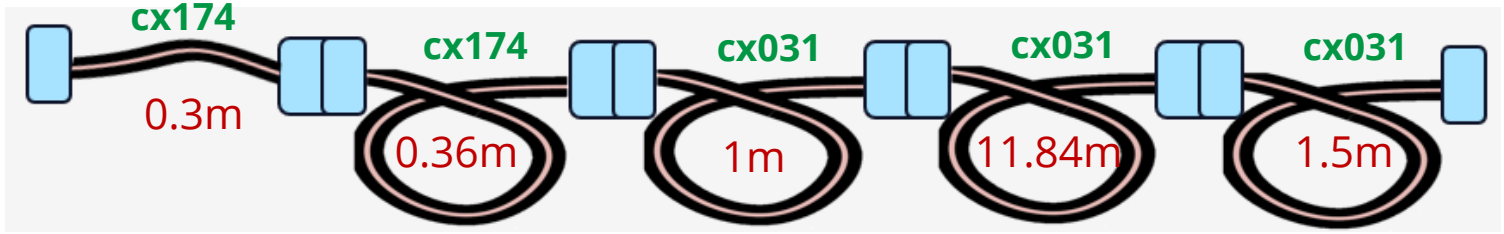


The insertion loss is illustrated in Figure 2xx-TBD. The requirements are to be based on the data rate and modulation. For the 2.5 Gb/s PAM2 the requirements are applicable to 2.0 GHz. For the 5.0 Gb/s PAM2 and the 10 Gb/s PAM 4 the requirements are applicable to 4 GHz.

Measured Link Segment Topologies (Not Simulated)

Topology 1

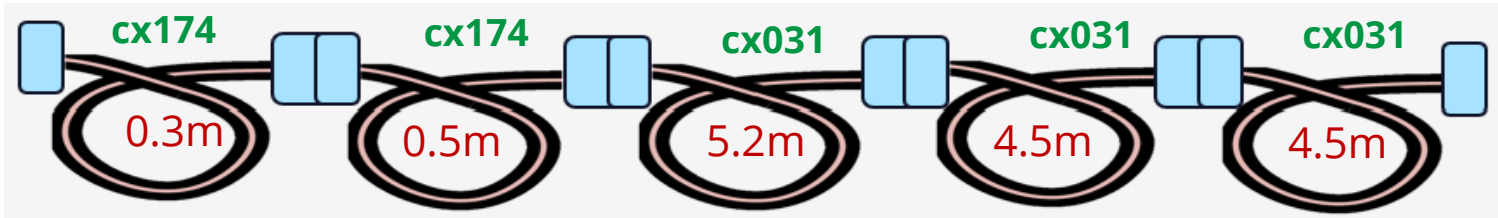
Port 1



Port 2

Topology 2

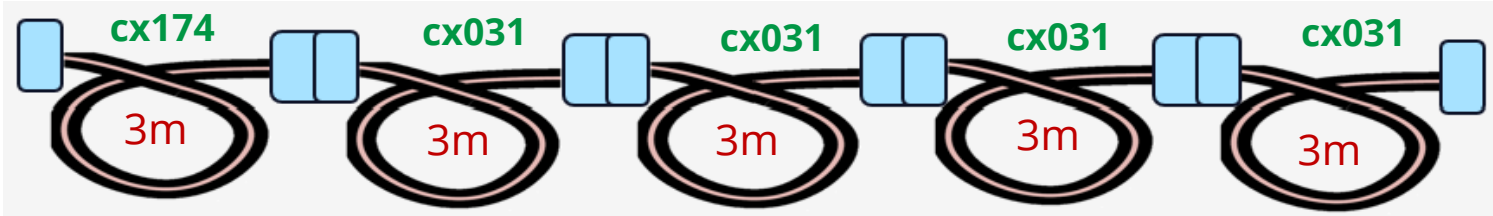
Port 1



Port 2

Topology 3

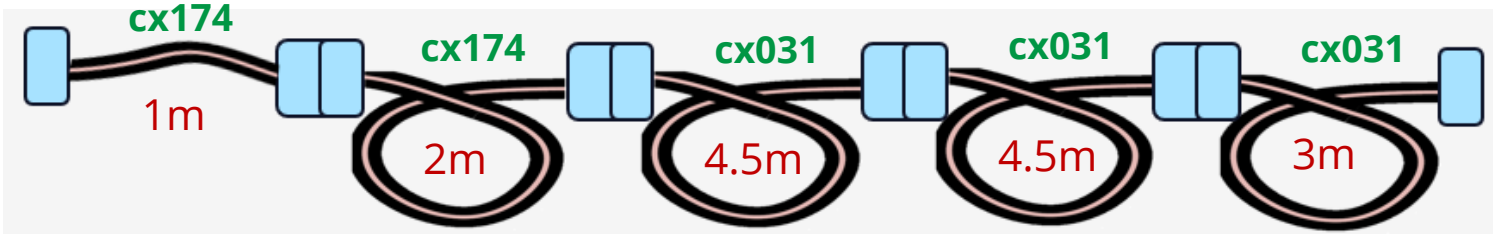
Port 1



Port 2

Topology 4

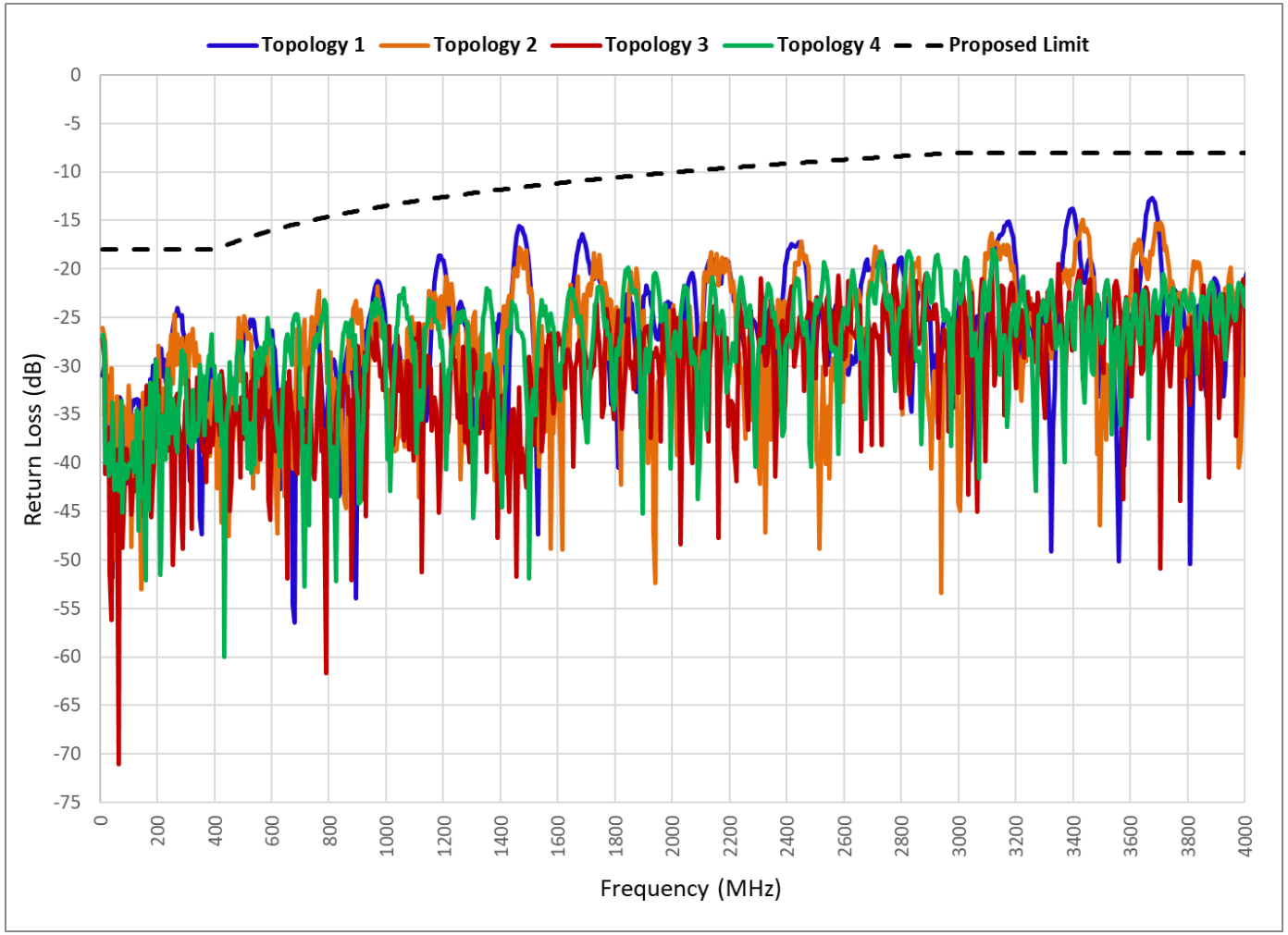
Port 1



Port 2

Connector & Mated Inline
(USCAR-49 Interface)

Measured Return Loss Segment Data (Not Simulated)

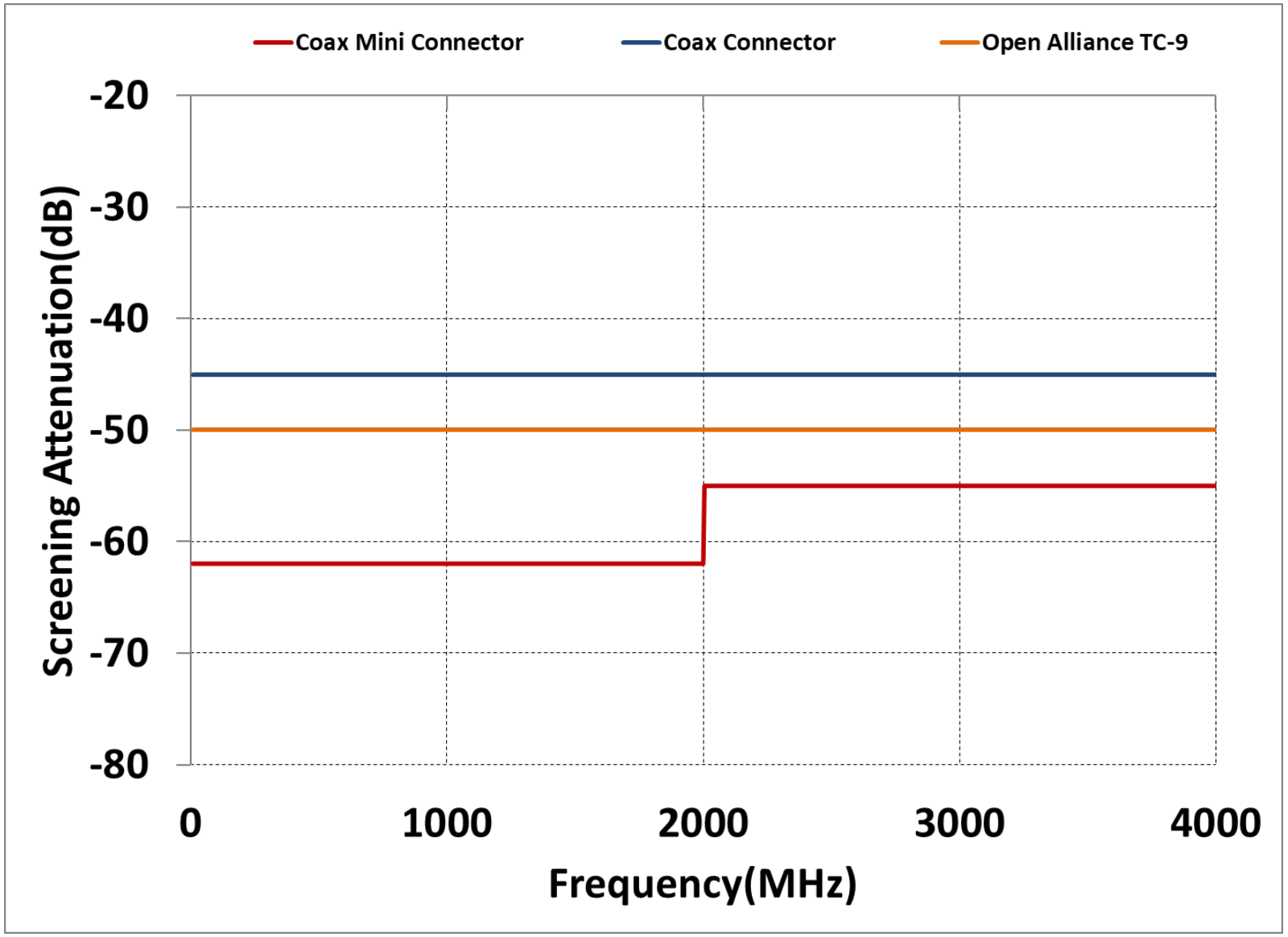


Proposed limit : from https://www.ieee802.org/3/dm/public/0525/boyer_sharma-3dm_xx_05-14-25_3.pdf

Introduction to Shield Performance

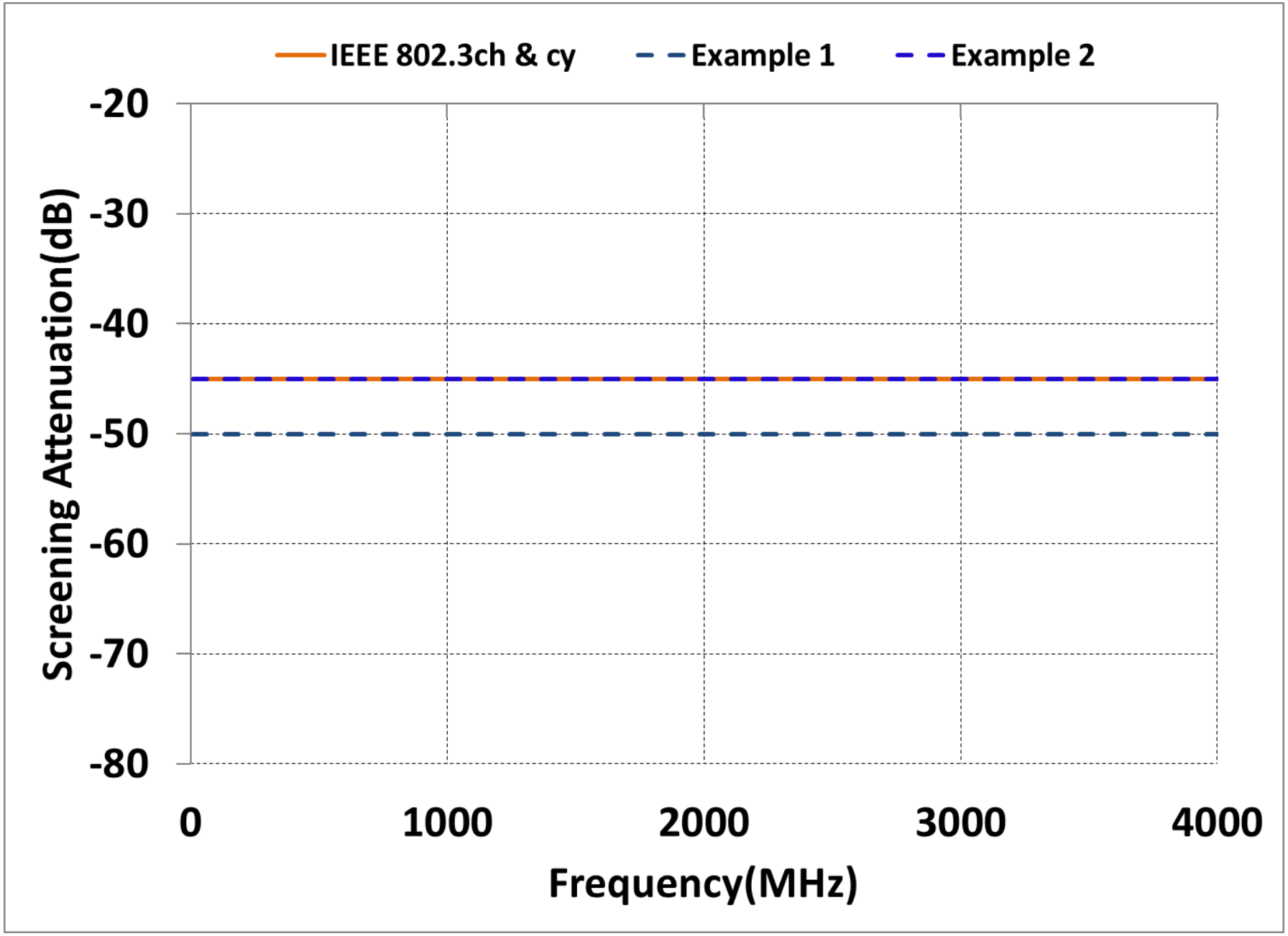
- Shield performance considerations for coax implementations are different than diff. pairs because of the single ended comm.
- The allowable ingress of automotive EMC requirements need to be considered from what the transceivers can allow and still operate.
- Can see effects from this ingress on the eye diagrams using simulations from Ragnar or other software.
- Need to consider some of the existing connection system allowable shield performance requirements such as USCAR 17 (automotive SMB), USCAR 49 (mini coax), and OA TC 9 (diff. pairs).
- Review past 802.3 allowable shield performance requirements of the T1 implementations.
- Because of PoC, we should discuss the allowable DC resistance of shield through the link segment. Because of the implementation of PoC, need to not exclude the center conductor DC resistance.

Screening Attenuation Mated Connector Limit Comparison to 4 GHz*



* Coax Mini to 9 GHz(USCAR-49) ; Coax to 6 GHz(USCAR-17) ; OA TC-9 STP to 4 GHz

Screening Attenuation Link



ch & **cy** & **Example 2** are -45 dB.

Example 1 is -50 dB.

Thank You