

Proposed Text for the IL and RL Link Requirements of IEEE 802.3dm

Rohit Sharma – Molex

Rich Boyer- Aptiv

Contribution to IEEE 802.3dm

Supporters

- Haysam Kadry (Molex)
- Erwin Koependoerfer (Leoni)
- Jorge Rodriguez (Condumex)
- Yunteng Huang (Aeonsemi)
- Abbas Alwishah (Molex)

Past Presentation and Discussion

- Proposal was done at the October 10, 2024 802.3dm Ad Hoc.
- https://www.ieee802.org/3/dm/public/adhoc/101024/boyer_sharma_3dm_x_x_10_10_24.pdf
- The IL and RL are the same for shielded balanced pairs and coaxial links.
- We will need to add coaxial cable link in the definitions some place in our standard.

Proposed Text for Insertion Loss.

XXX.X Link Segment Characteristics

2.5GBASE-T1, 5 GBASE-T1, and 10GBASE-T1 in one direction with up to 1 gigabit in opposite direction are designed to operate over a single shielded balanced pair of conductors or a coaxial cable that meet the requirements specified in this subclause. The single shielded balanced pair of conductors or coaxial cable supports an effective data of 2.5 Gb/s, 5 Gb/s. and 10 Gb/s in one direction and up to 1 Gb/s in opposite direction. The term *link segment* used in this clause refers to a single balanced pair of conductors (cable or backplane) operating in full duplex.

For the 3 different PHY types, link segment parameters are specified to different upper frequencies, given by the parameter F_{max} shown in Equation (xxx-01).

$$F_{max} = 4000 \times S \quad (xxx-01)$$

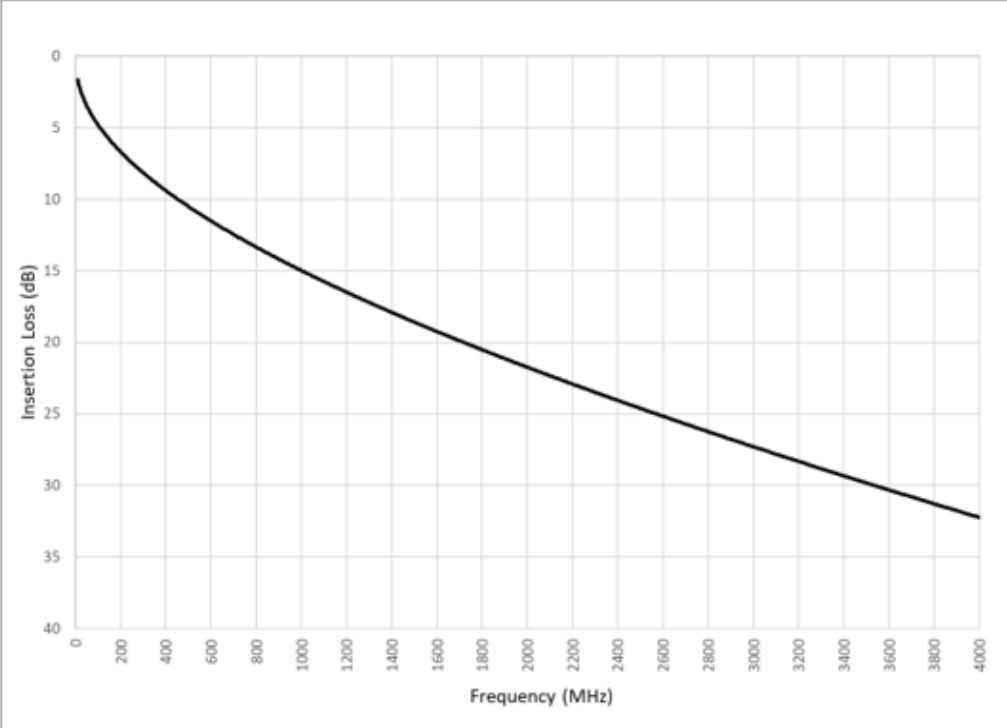
See Table xxx-01 for the definition of S. (noted here for ease-of-use S = 0.25, 0.5, and 1)

xxx.x.x.x Link segment insertion loss

The insertion loss for either single shielded balanced pair of conductors or coaxial cable

$$\text{Insertion loss}(f) \leq 0.002 f + 0.58 * f^{0.45} \quad \text{where } f \text{ is in MHz; } 1 \leq f \leq F_{max}$$

The insertion loss is illustrated in Figure xxx-01



Proposed Text for Return Loss.

xxx.x.x.x Characteristic impedance

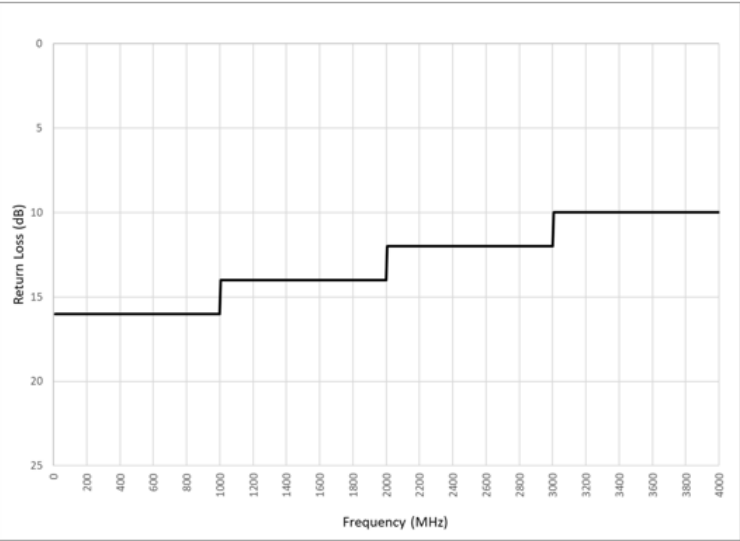
The nominal differential characteristic impedance of the single shielded balanced pair of conductors of the link segment is 100 Ω . The nominal characteristic impedance of the coaxial cable link segment is 50 Ω .

xxx.x.x.x.x. Link segment return loss

In order to limit the noise the receiver due to impedance mismatches each of the speeds of the link segment shall meet the values as listed such that F_{max} as listed above. The reference impedance for the return loss is listed in previous section. Note difference for balanced pair and coaxial links.

Return loss \geq

- 16 dB 1 MHz to 1 GHz
- 14 dB 1 GHz to 2 GHz
- 12 dB 2 GHz to 3 GHz
- 10 dB 3 GHz to 4 GHz



The 2.5 Gb/s has F_{max} of 1.0 GHz, the 5.0 Gb/s has F_{max} of 2.0 GHz and the 10 Gb/s has F_{max} of 4 GHz.

Screening Attenuation Limit Proposal

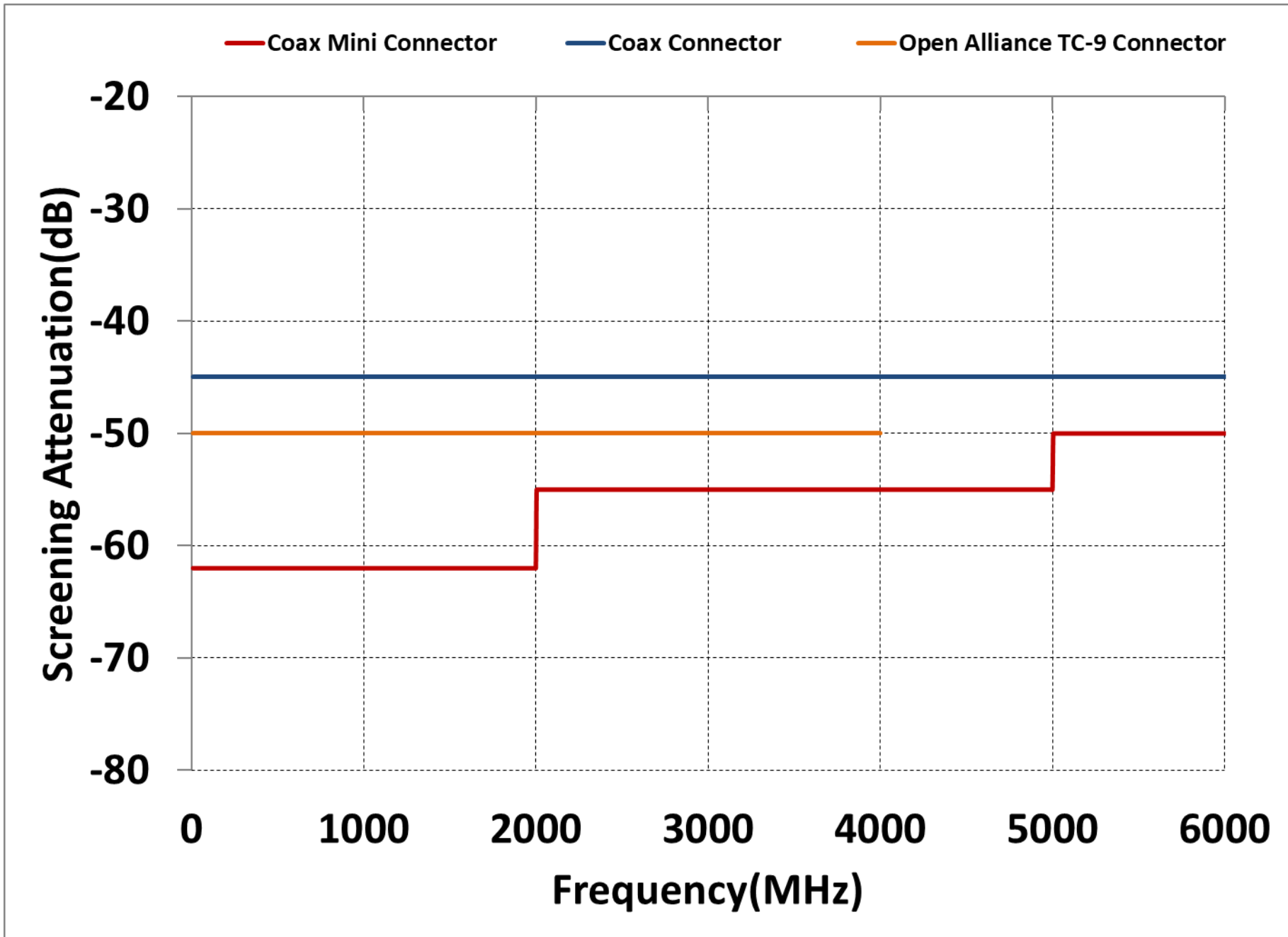
Rohit Sharma – Molex

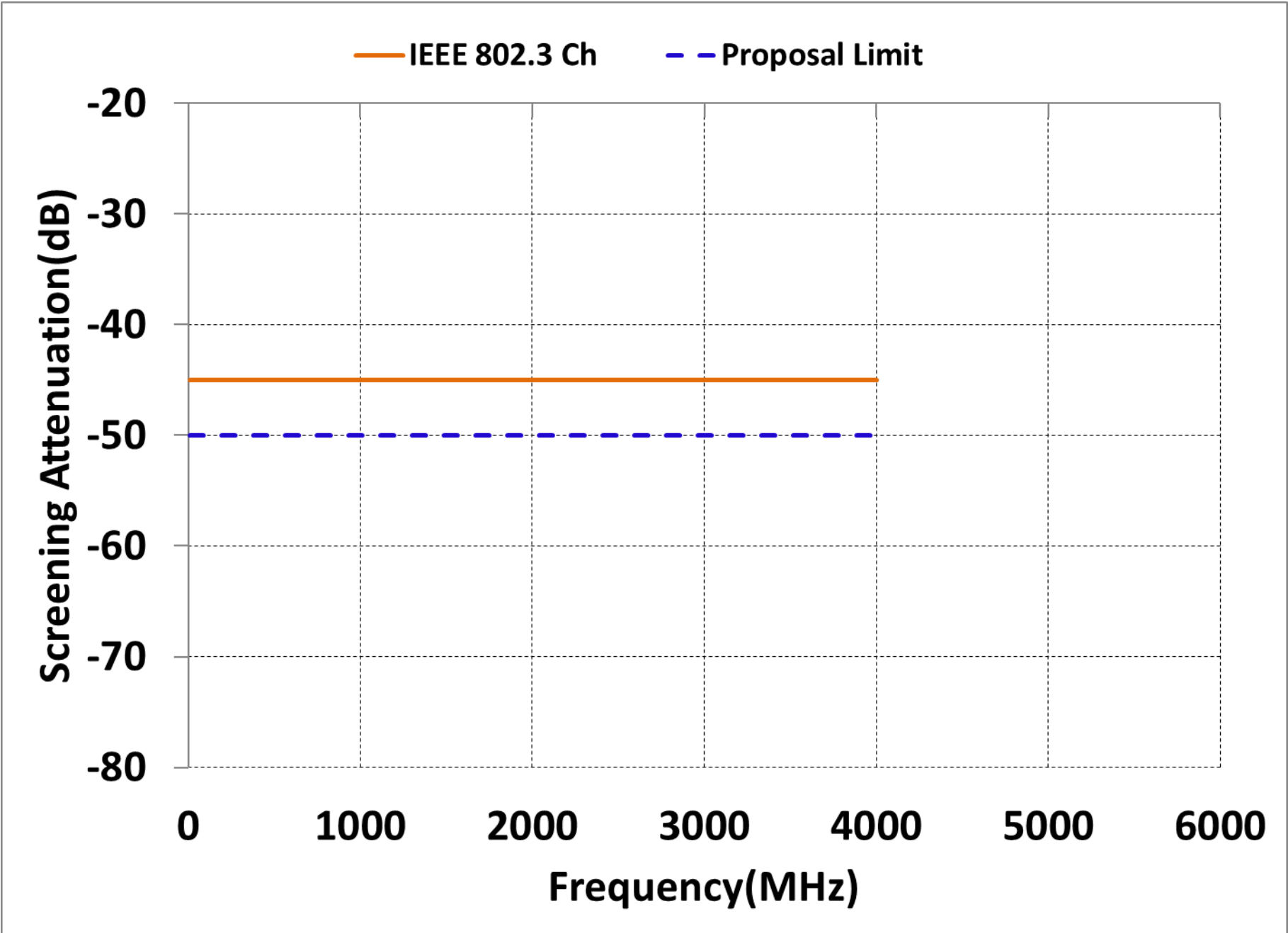
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Screening Attenuation Proposal

- Proposing only screening attenuation, as it is the common parameter for both single shielded balanced pair and coaxial links.
- This proposal is based on the experience gained from installing these links in vehicles.
- The proposal has considered the shielding performance of the existing connectors, cables, and assemblies used in vehicles.
- EMC considerations for both component and vehicle-level testing were incorporated into the proposal.





Thank You