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

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Contribution to IEEE 802.3dm March Plenary in Atlanta GA

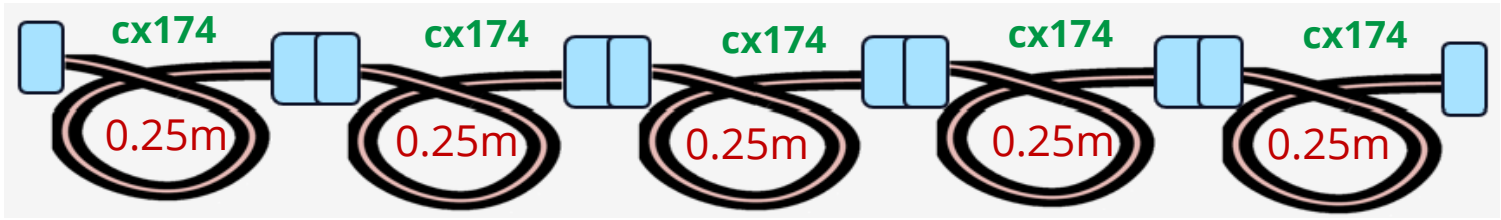
Past Presentation and Discussion

- IL and RL are back as one topic.
- Link to proposal for text made in January Interim in Phoenix.
- https://www.ieee802.org/3/dm/public/0125/boyer_sharma-3dm_02_RevA_01-22-25.pdf .
- RL data as requested by a few individuals as unrealistic topology yet high RL.
- This PPT includes adjustments from individuals for requested changes to the RL proposals.
- Want to start to make some agreements.
  - Can IL and RL be the same for shielded balanced pairs and coaxial links?
  - Can we have a stepped RL line?
  - If we can get the IL and RL can focus on the shield performance requirements.

Measured RL Worse Case Link Segment Topologies (Not Simulated)

Topology 1

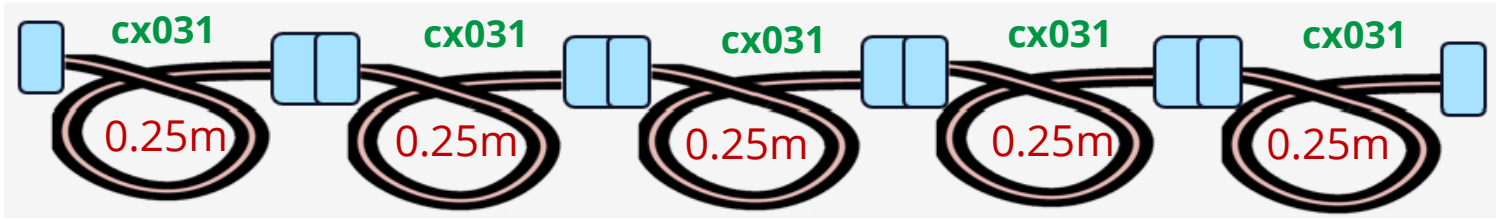
Port 1



Port 2

Topology 2

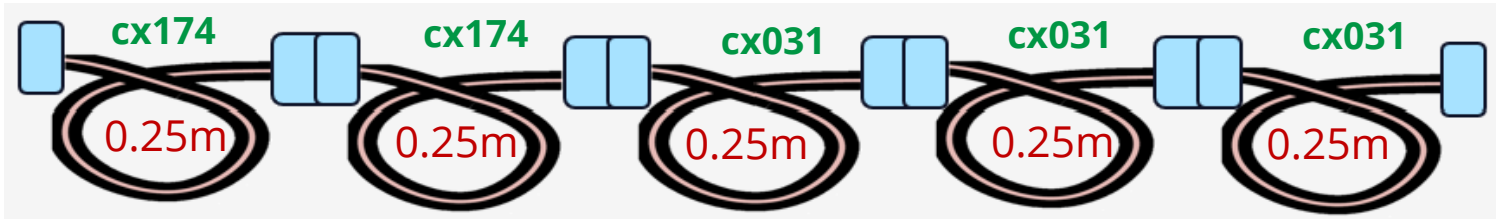
Port 1



Port 2

Topology 3

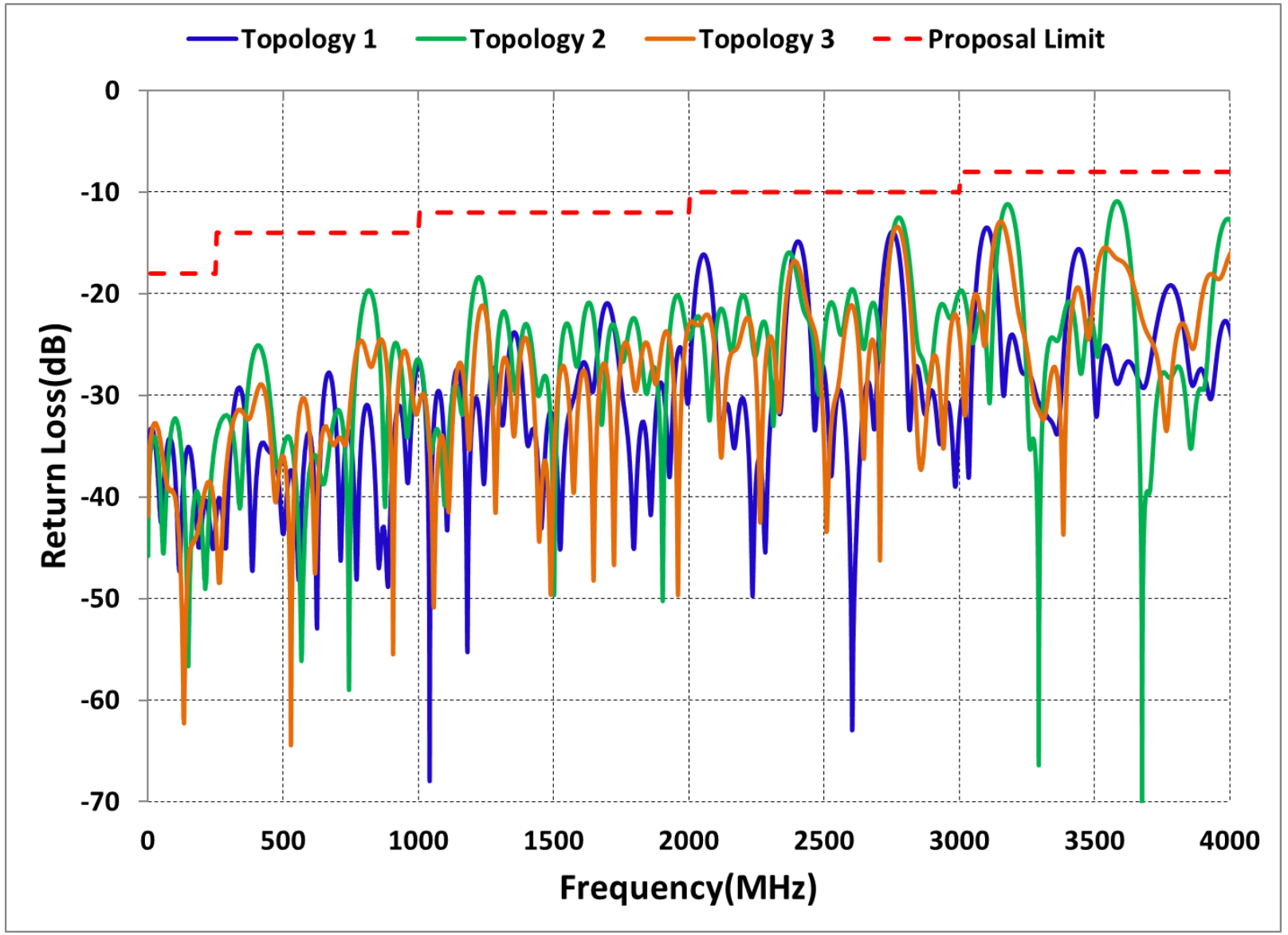
Port 1



Port 2

Connector & Mated Inline
(USCAR-49)

Measured RL Data at 23°C (Not Simulated)



Consideration for Proposed Text for Return Loss. Discussion for ATL in March.

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.

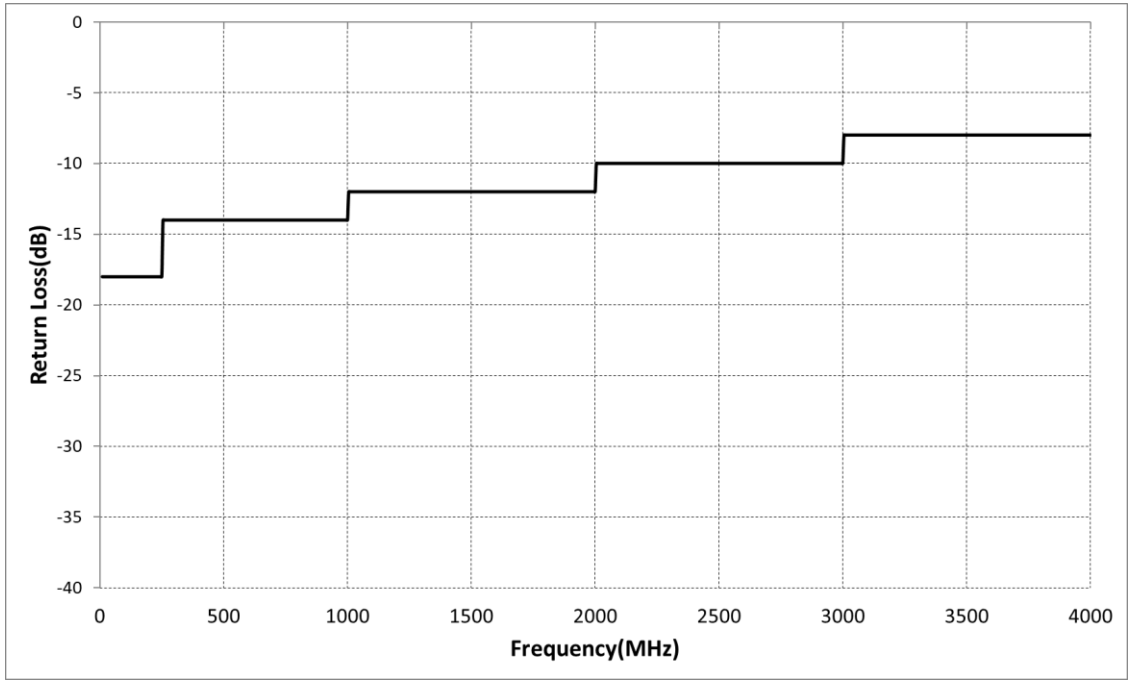
xxx.x.x.x.x. Link segment return loss

To limit the noise to the receiver due to impedance mismatches each of the speeds of the link segment shall meet the values listed in Table XXX-XX to the F_{max} for the given data rate. The reference impedance for the return loss is listed in previous section. (Note the difference in reference impedance for balanced pair and coaxial links).

Table XXX-xx – Return Loss Limits

Return loss ≥

18 dB: 1 MHz to 250 MHz
14 dB: 250 MHz to 1 GHz
12 dB: 1 GHz to 2 GHz
10 dB: 2 GHz to 3 GHz
8 dB: 3 GHz to 4 GHz



The 2.5 Gb/s has Fmax of 1.0 GHz, the 5.0 Gb/s has Fmax of 2.0 GHz and the 10 Gb/s has Fmax of 4 GHz.

Proposed Text for Insertion Loss

XXX.X Link Segment Characteristics

2.5GBASE-T1, 5 GBASE-T1, and 10GBASE-T1 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 single shielded balanced pair of conductors or coaxial cable support an effective data of 2.5 Gb/s, 5 Gb/s. and 10 Gb/s in one direction and 100 Mb/s in the opposite direction. The term link segment used in this clause refers to a single balanced pair of conductors (cable or backplane) or a single coaxial cable operating in TBD 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).

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

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

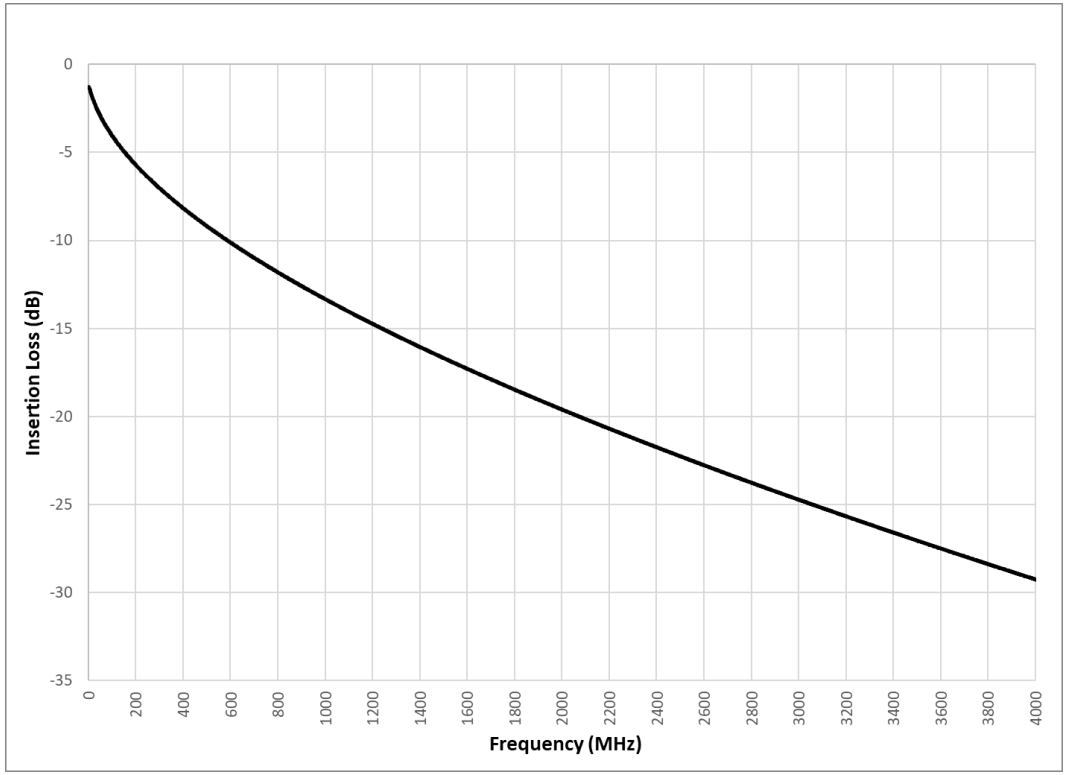
xxx.x.x.x Link segment insertion loss

The insertion loss 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- 0.3785*√f - 1.1785/ √f (dB) (2xx-TBD)

Where; f is in MHz; $1 \le f \le F_{max}$

The insertion loss is illustrated in Figure 2xx-TBD



Thank You