Link Segment Insertion Loss For Low Frequencies

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Low frequency IL limit of the insertion loss

- A low frequency IL limit enables the implementation of relative lower cost PHYs.
  - Achieve consistency with the PCB and MDI connector insertion loss.
  - For the PCB insertion loss, avoids excessive baseline wander.
    - feyh_3cy_01b_11_09_21.pdf
  - TBD from PODL and MDI return loss, where the exact lower frequency limit should be:
    - 1MHz, this is the same as 1G, 2.5G, 5G and 10G.
    - 2MHz or 2.5MHz to support frequency scaling.
- Adopted Link Segment IL is adopted using a 10MHz lower IL frequency limit
  - Proposed in mueller_3cy_01_05_18_21.pdf
  - Adopted from diminico_et_all_3cy_01a_05_18_21.pdf
- George Zimmerman pointed out that the current IL limit line results in low IL values at the lowest frequency:
  - Propose for the IL limit extension to lower frequencies:
  - Constant IL of 1.0dB for the frequency range less than 10MHz.

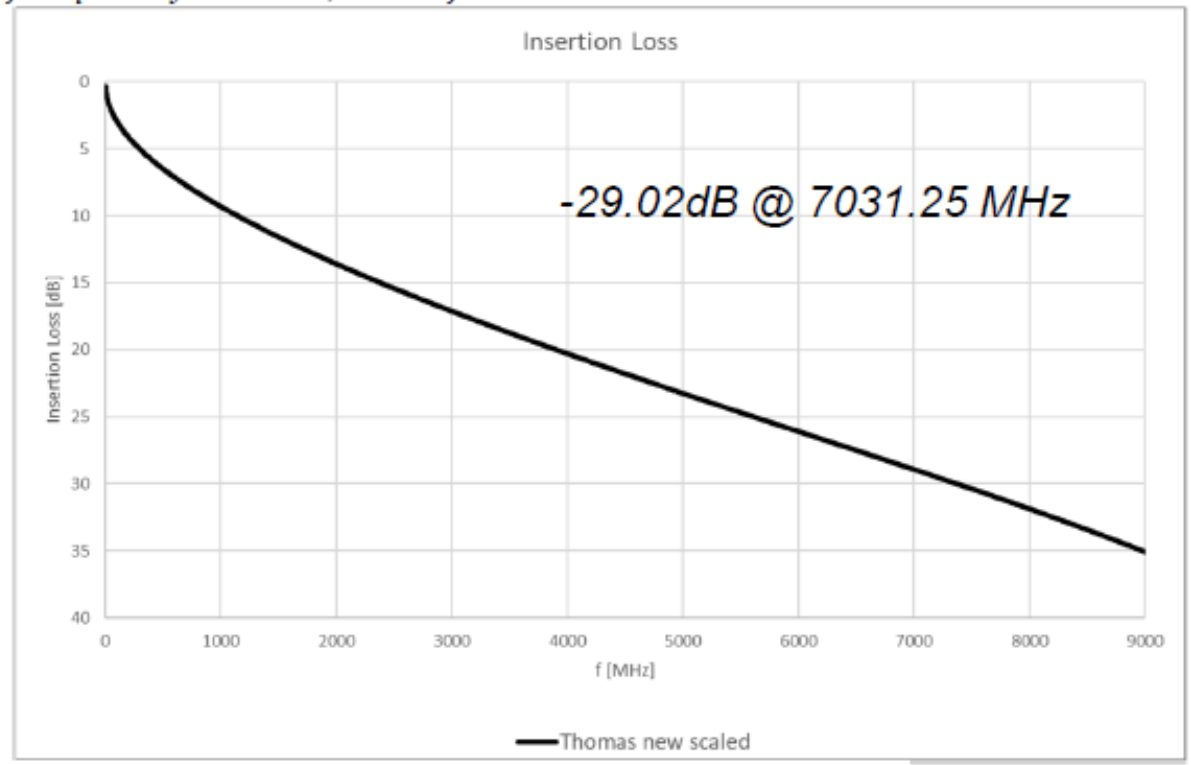
f(MHz)	IL_cy(dB)	IL_ch(dB)
10	1.02	1.94
2	0.49	0.93
1	0.36	0.68

Link Segment IL - Baseline Proposal

An adjustment to the Link Segment IL proposal was put fourth by Thomas Muller in mueller_3cy_01_05_18_21.pdf

$$IL_{LinkSegment}(dB) \leq 0.00135(f_{MHz}) + 0.3564(f_{MHz})^{0.45} + 0.495\left(\frac{f_{MHz}}{7500}\right)^{6}$$

$$where\ f\ is\ the\ frequency\ in\ MHz;\ 10 \leq f \leq 9000$$



Source: diminico_et_all_3cy_01a_05_18_21.pdf

165.7.1.1 Insertion loss

- Straw poll:
- Would you support a change of the link segment IL lower frequency limit from 10MHz down to potentially 1MHz similar to 802.3ch using the equation below?

- *Insertion loss(f)* = $\begin{cases} 1.0 & TBD(1MHz) \le f < 10MHz \\ 0.00135(f_{MHz}) + 0.3564(f_{MHz})^{0.45} + 0.495\left(\frac{f_{MHz}}{7500}\right)^{6} & 10MHz \le f < 9000MHz \end{cases}$ (dB)

IEEE 802.3cy – December 2021.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