



Compromise Insertion Loss Limit

Contribution to 802.3dm Task Force Cabling Ad Hoc

August 14, 2024

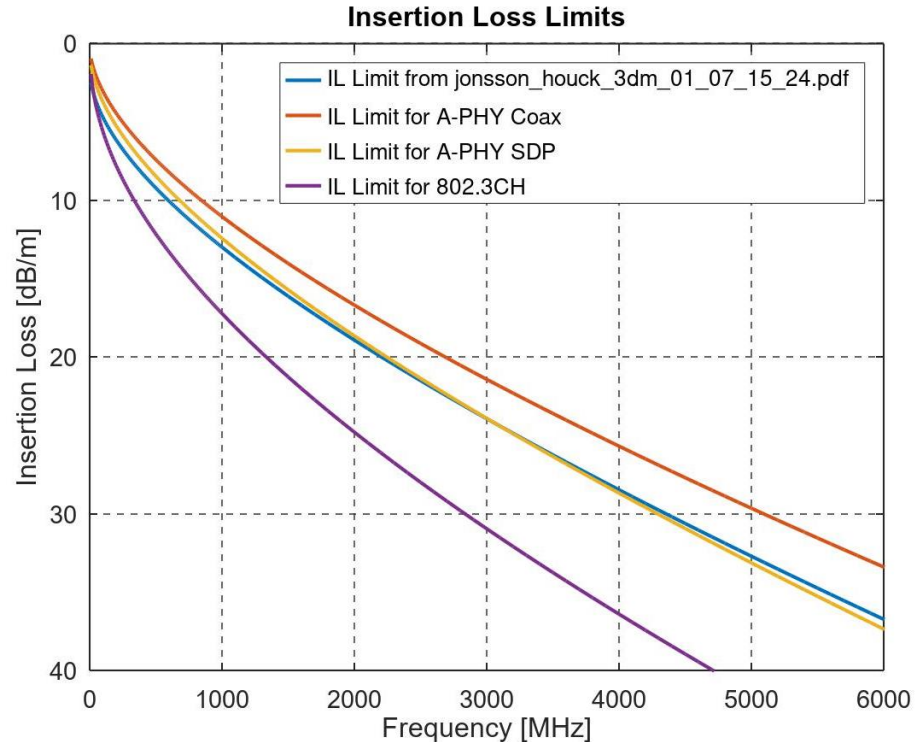
Ragnar Jonsson - Marvell

Introduction

- Specific Insertion Loss Limit was proposed in [jonsson_houck_3dm_01_07_15_24.pdf](#)
- This proposed limit allowed slightly longer cables than what is allowed by the Insertion Loss Limit for A-PHY and ASA
- In discussions in the July 802 plenary meeting and follow-up discussions in the August 1st ad hoc meeting two concerns were raised:
 - The proposed IL limit allows too much insertion loss (too long cables)
 - The same IL limit should not be used for both coax and differential pair cables
- This presentation proposes new Insertion Loss Limits, that are intended as compromise to address these two concerns

Background

- The plot to the right compares the Insertion Loss Limit was proposed in [jonsson houck 3dm 01 07 15 24.pdf](#) to the A-PHY IL limits and the 802.3ch IL limits
- The limits for ASA are very similar to the A-PHY limits, but are not included on the plot, because the ASA specification is a proprietary document
- Comparison of the IL Limits shows that the proposed limit is similar to the SDP limit for A-PHY, but allows longer coax cables
- All the other IL limits are much more restrictive than the 802.3CH IL Limit



New Insertion Loss Limit Proposal

The new proposed Insertion Loss Limit:

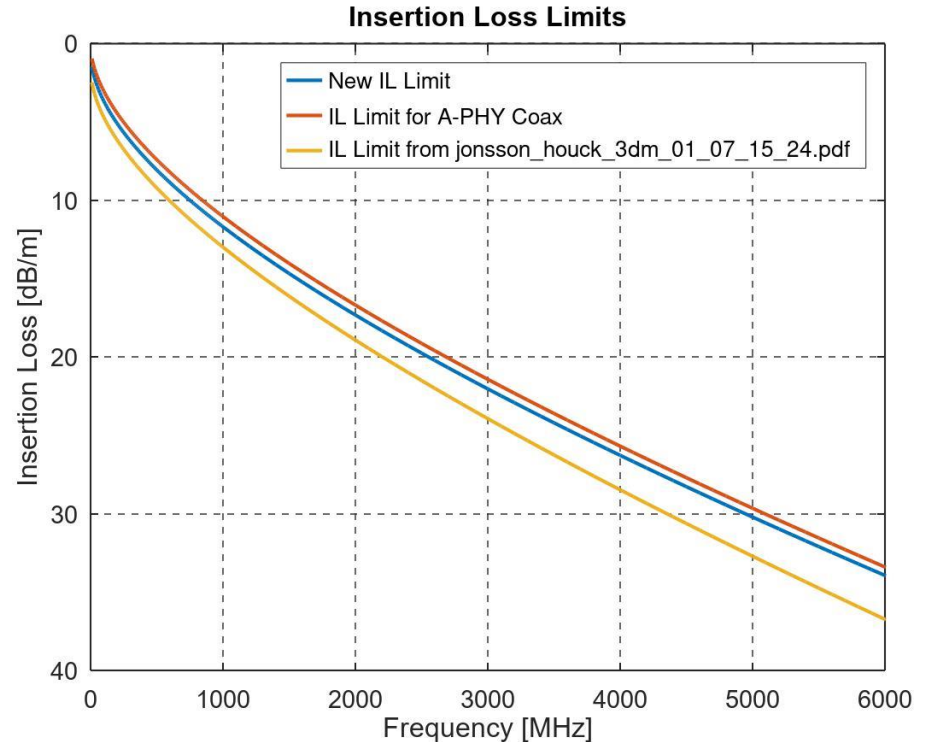
$$IL(f) < 0.0017*f + 0.3*\sqrt{f} + 0.5$$

where f is in MHz and the limit is defined in the frequency range

$$10\text{MHz} < f < F_{\text{max}}$$

This limit is only for coax cables

NOTE: F_{max} is expected to be few GHz, depending on modulated signal bandwidth



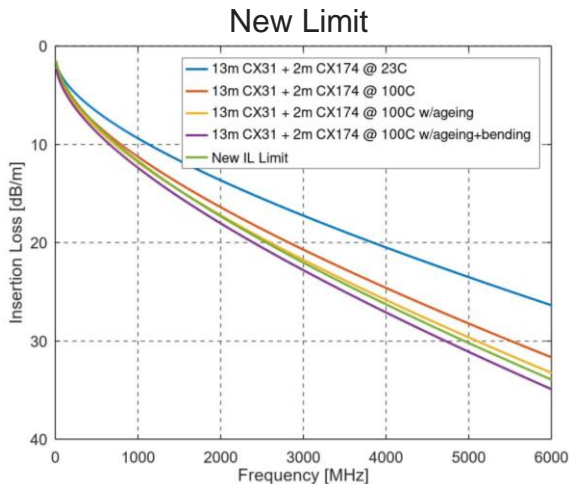
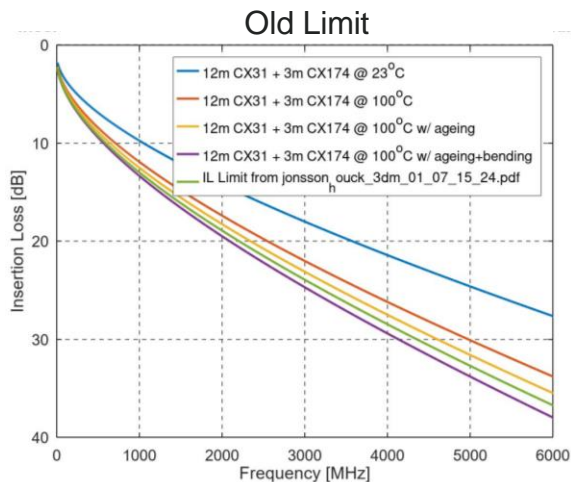
Explanation

The Insertion Loss Limit in [jonsson houck 3dm 01 07 15 24.pdf](#) was based on 12m CX31 + 3m CX174 cable topology as suggested David Cliber and Bert Bergner in [03May24 802.3dm Cliber.pdf](#)

The new Insertion Loss Limit is based on 13m CX31 + 2m CX174 cable topology in line with comment by Kirsten Matheus in her email on August 8th, 2024:

<https://www.ieee802.org/3/ISAAC/email/msg00191.html>

In both cases Insertion Loss Limit accounts for temperature and ageing, but does not account for bending of the flexible cable (CX174)



Summary

- New compromise Insertion Loss Limit is proposed
- The new limit is only defined for coax cables
- The new limit is more restrictive than previous proposal
- The new limit is more similar to Insertion Loss Limits for A-PHY and ASA



Essential technology, done right™