

Further considerations on C-band channel losses for 20 km and 40 km 800G applications in P802.3dj

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Supporters

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Introduction

- During the P802.3dj meeting in St. Petersburg, 22 – 25 January 2024, a baseline was adopted for the 40 km ER1 objective with operation in the C-band.
- Additionally a new objective for operation over 20 km on the basis of coherent technically was agreed.
- Therefore it is a good moment to review and discuss channel losses appropriate for 20 km and 40 km C-band applications. In this presentation it is assumed that the 20 km PMD will be also operating in the C-band.
- Previously [stassar_3dj_optx_01a_230427](#) was presented during the SMF ad hoc on 23 April 2023 with similar considerations.
- During the meeting in St. Petersburg a presentation [fan_3dj_01a_2401](#) was presented with considerations for losses in the O-band, referring to some work in 802.3cs on C-band losses. The latter is relevant for the considerations in this presentation.

Previous thoughts on channel insertion loss for 40 km

- In [stassar_3dj_optx_01a_230427](#) a minimum channel loss of 11 dB was suggested plus some allocation for connector losses or unallocated loss.
- In the adopted baseline for 800GBASE-ER1 in [williams_3dj_01a_2305](#) a channel loss of 14 dB was specified, which is consistent with the value of 11 dB in [stassar_3dj_optx_01a_230427](#), adding 3 dB for connector losses.
- After the presentation of the adopted baseline specification in May 2023 further proposals were made:
 - In [maniloff_3dj_01a_2307](#) 10.9 dB plus 1 dB for additional loss (e.g. connectors) was proposed.
 - In [stassar_3dj_01a_2307](#) two values were proposed, 11 dB for an engineered link and 13 dB for a non-engineered link.
 - In [maniloff_3dj_01a_2309](#) a fiber loss of 11.2 dB was suggested, assuming a loss coefficient of 0.28 dB/km
 - In [maniloff_3dj_01_2311](#) again 11.9 dB was proposed.
- Some offline discussions on 1.6T have already started and it may be prudent to avoid precedents on a high C-band loss for 40 km distances for future applications.
- There have also been recent discussions on channel losses, e.g. [fan_3dj_01a_2401](#), suggesting also consider lower values than previously considered.

Proposals for 20 km and 40 km C-band channel losses

Distance	Adopted	Considered	Proposed	Comments
40 km	14 dB	11 – 14 dB	12 dB	0.25 dB/km plus 2 dB for connectors or 0.275 dB/km plus 1 dB for connectors
20 km	NA	NA	6.5 dB	0.25 dB/km plus 1.5 dB for connectors or 0.275 dB/km plus 1 dB for connector

- For 40 km applications, operating in the C-band, 12 dB is considered to be an appropriate channel loss value, in view of past considerations and proposals, consistent with the adoption on 0.24 dB/km in 802.3cs for ribbon fiber cables, as well as the usage of 11 dB in several in-force ITU-T Recommendations.
- On the same basis the author believes that a channel loss of 6.5 dB is appropriate for 20 km applications operating in the C-band.

Summary

It is proposed to revise the channel loss value for 40 km in the adopted baseline in [williams_3dj_01a_2305](#) (pages 7 – 10) from 14 dB to 12 dB.

Furthermore it is proposed to use a channel loss value of 6.5 dB in the C-band for the new adopted objective for 20 km coherent applications.

Thanks!