

IEEE 802.3 Ethernet Working Group
DRAFT Liaison Communication

Source: IEEE 802.3 Working Group¹

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From: David Law Chair, IEEE 802.3 Ethernet Working Group

Subject: Response to ITU-T SG15, SG15-LS9, LS/I on information on new work items on weakly-coupled multi-core fibre (WC-MCF) standards in Q5/15

Approval Agreed at IEEE 802.3 Interim meeting, New Orleans, LA, USA, 15 May 2025

Dear Mr. Parsons and members of ITU-T Study Group 15,

The IEEE 802.3 Working Group would like to thank you for your recent liaison regarding the two work items and the draft of G Supple.G.65x.

IEEE 802.3 appreciates Q5/15's interest in identifying the applicability of WC-MCF technology to short reach and data center networks. Currently, there are no IEEE 802.3 project or study group efforts targeting WC-MCF. However, the IEEE 802.3 NEA "Ethernet for AI" assessment recently heard a technical presentation on this fiber type (https://www.ieee802.org/3/ad_hoc/E4AI/public/25_0327/you_e4ai_01_250327.pdf), which

¹ This document solely represents the views of the IEEE 802.3 Working Group, and does not necessarily represent a position of the IEEE, the IEEE Standards Association, or IEEE 802.

was also reviewed by the P802.3dj Task Force (see https://www.ieee802.org/3/dj/public/25_05/you_3dj_01_2505.pdf) while preparing a response to your liaison.

At this time, given that there are no official projects or study groups to draw upon, IEEE 802.3 has no basis to which it can point to that highlights market interest. Our experts, however, did note that there has been significant discussion of this fiber type at recent conferences, such as OFC.

IEEE 802.3 agrees with Q5/15 on the need for the continuous harmonized discussions between our two groups. Based on the observed industry interest in 400 Gb/s electrical and optical signaling, as currently being explored in our "Ethernet for AI" assessment, once market demand is identified, it will be imperative for organizations to be able to respond in a rapid fashion.

As the ITU-T considers WC-MCF going forward, IEEE 802.3 would like to share our initial thoughts.

IEEE 802.3 PHY specifications provide references to industry fiber specifications, and specify the channel which is derived from these fiber specifications, which is also inclusive of connector and cable considerations. Our interface specifications are based on link methodologies that consider the various impairments that would affect link performance.

To that end, when looking to incorporate a new WC-MCF fiber specification, we would look at parameters that might deviate from current G.652/7 fiber specifications and whether new parameters may exist that would affect the definition of any new interface specifications. Initial conversations identified these areas of interest:

- ~~Any Changes to the in~~ PMD/DGD ~~or chromatic dispersion~~ specifications? At the anticipated signaling speeds of some upcoming projects, these parameters can be impactful even over shorter reaches
- ~~Changes-Any changes in-to the loss, chromatic dispersion~~ specifications?
- Consideration of typical installation approaches for these short reach links in a data center environment where high-density cables are used and bend sensitivity becomes a consideration for any of the fiber parameters
- Consideration of whether fan-in/fan-out fiber transitions affect any of the fiber parameters
- Definition of insertion loss of connectors and fiber splices
- Definition of return loss at connectors
- Definition of crosstalk parameters that could occur at connectors or within the fiber between cores (co-propagating and / or counter-propagating), as applicable.
- What wavelength bands will the fiber support?
- Will there be any constraints with the maximum optical power that a fiber will support?
- Will this fiber support the use of amplification?
- Consideration of multi-path interference impairments that arise from the connectors or fiber bending
- Field testing and validation of these parameters over typical installations consistent with short reach cables.
- Considerations of economic feasibility of these solutions

The typical reaches of SMF optical interfaces that 802.3 define are 500 m, 2 km, 10 km, 20 km, and 40 km. If reach affects any of these parameters due to a statistical consideration, this would also be a something we would need to consider.

We look forward to continued conversations on this topic.

Sincerely,

David Law

Chair, IEEE 802.3 Ethernet Working Group

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