# IEEE 802.3 Ethernet Working Group
# LMSC REVIEW DRAFT Liaison Communication

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| Source: | IEEE 802.3 Working Group[1] | |
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| | Fabio Cavaliere | Rapporteur ITU-T Q6/15 |
| | Hiroshi Ota | Advisor, ITU-T SG15 |
| CC: | Alpesh Shah | Secretary, IEEE-SA Standards Board<br>Secretary, IEEE-SA Board of Governors |
| | James Gilb | Chair, IEEE 802 LMSC |
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| | Jon Lewis | Secretary, IEEE 802.3 Ethernet Working Group |
| | John D'Ambrosia | Chair, IEEE P802.3dj Task Force |
| | Yuanqiu Luo | Chair, IEEE P802.3dk Task Force |
| From: | David Law | Chair, IEEE 802.3 Ethernet Working Group |
| Subject: | Liaison reply to ITU-T SG15 regarding G.652 | |
| Approval: | Agreed at IEEE 802.3 plenary meeting, Denver, CO, USA 14 March 2024 | |

Dear Mr. Parsons and members of ITU-T SG15,

Thank you for your liaison letter of December 2023 regarding the correspondence activity regarding the properties of ITU-T G.652 fibers. This issue is of great importance to the work of the IEEE P802.3dj 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet and IEEE P802.3dk Greater than 50 Gb/s Bidirectional Optical Access PHYs task forces, and we would like to encourage continuation of this effort for the mutual benefits for all our standards development organizations.

The optical links currently under development within the IEEE P802.3dj and IEEE P802.3dk task forces use intensity-modulation direct-detection (IMDD) technology for 200 Gb/s up to 10

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km and 100 Gb/s up to 40 km. As we shared previously, IEEE 802.3 develops channel models for the interfaces we define by referencing industry specifications for fiber and cable such as yours. The statistical link design approach, which yields data on the minimum and maximum link dispersion for a 99.99% confidence level, is very encouraging. For multiple segment links there are significant reductions in positive dispersion and a less significant reduction in negative dispersion in the wavelengths of interest around 1310 nm.

From our analysis of the data from the liaison attachment TD248-GEN, Figure 1:

- Please share both the previous data and any subsequent data in table form.
- We would like to request the data for different confidence levels so we can appropriately define our channel models. Confidence levels of 99.9% and 99% would also be of interest.
- We would also like to share the specific wavelengths of interest to our work and request if you could consider analyzing at the corner wavelengths for coarse wavelength division multiplexing (CWDM) (1264.5 nm & 1337.5 nm) and LAN-WDM (1294.53 nm & 1310.19 nm) for all reaches you covered previously.

We would like to get some insights on when you anticipate the consent date for the revised Recommendation including this appendix that summarizes the statistical link design approach that has been the topic of the ongoing liaisons between our two groups. It is our understanding that this work will be captured in G.652 Appendix I.

We would also like to inform you about some additional areas of investigation underway in IEEE P802.3dj. We have baselines for optical links with 500 m and 2 km reach that are based on 200 Gb/s IMDD modulation either as a single wavelength or four wavelengths based on the CWDM grid (ranging from 1264.5 nm to 1337.5 nm).

With regards to the single-segment data you shared with us, we found that the statistical approach does not significantly improve the dispersion limits compared to existing specifications. However, we made the following observation and would appreciate some further feedback:

- For the single-segment fitting function, the resulting dispersion values are beyond the traditional worst case dispersion limits for G.652 fibers. It appears this may be an approximation error, but we would like to get confirmation if that is true.

The usage of these shorter interfaces is primarily inside data centers, and we are aware that a different channel model to what we are considering above may be more suitable for these installations, due to their cabling requirements. The IEEE P802.3dj Task Force has indicated that they are open to exploring different channel models for the various SMF optical links under development. The goal would be to develop a statistical model specific to each application under consideration. For example, see contributions from the:

- Feb 22nd, 2024, IEEE P802.3dj optics and logic ad hoc meeting
- March 2024 IEEE P802.3dj Task Force meeting

Please note the IEEE P802.3dj Task Force is considering the dispersion values proposed in the contributions parsons_3dj_01b_2403 and rodes_3dj_01a_2403 and would appreciate your feedback on them.

IEEE 802.3 will have interim meetings in Annapolis, Maryland, USA on 13 to 16 May 2024. The next plenary meeting will be in Montreal, Quebec, Canada on 15 to 18 July 2024. In addition, the joint ITU-T/IEEE workshop on 13 July 2024 will be an excellent chance for face-to-face discussions on this topic. We look forward to continued communication on this topic, so that we can better align our work.

Sincerely,
David Law
Chair, IEEE 802.3 Ethernet Working Group