



Question(s): 2, 5, 6/15

Geneva, 20 November – 1 December 2023

LS

Source: ITU-T Study Group 15

Title: Statistical link design initial results: response to TD-190/GEN and TD-260/GEN: LS/r regarding G.652 fiber link property (reply to [IEEE802.3EthernetWG-LS129](#))

LIAISON STATEMENT

For action to: -

For information to: IEEE 802.3 Ethernet Working Group

Approval: ITU-T SG15 (Geneva, 1 December 2023)

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Abstract: This is a liaison to share the progress on the examination of the statistical chromatic dispersion properties of G.652 / G.657 fiber. Some initial results are previewed here, and further work in SG15 is expected.

As optical fiber signalling rates increase, the impact of chromatic dispersion (CD) becomes more serious. The currently in-force Recommendations (G.652 and G.657) given minimum and maximum boundaries for the dispersion parameters; however, it is known that practical fiber links have better effective dispersion properties. Study group 15 has undertaken an examination of the statistical properties of CD for G.652 / G.657 fiber links. This has been done as a correspondence activity between questions Q2, Q5, and Q6 of the study group. This report gives a preliminary readout of this work.

The initial phase of the work was to determine what is the best way to represent the statistical nature of fiber link CD. It was agreed that a set of prototypical links (each of a certain overall length and composed of a certain number of fiber cable segments) would be considered. The CD of these links would be analyzed using a Monte-Carlo simulation, with the objective of finding the 99.99% confidence maximum and

minimum CD curves (as a function of wavelength). The exact formulation of the study is given in the attached WD06-37r1.

It was agreed to make a questionnaire to the fiber manufacturers to gather their estimations of the minimum and maximum CD curves. That information was collected from eight fiber manufacturers, representing installed G.652.D and G.657.A fibers. It should be noted that this examination has been done with past and present data but it is not predictive of future fiber performance. The Q5/15 rapporteur compiled the information, and determined global minimum and maximum curves that would enclose all the individual responses. These curves and their representative Sellmeier equations, as well as one numerical example which illustrates the impact of qualification level, are given in the attached [\[248-GEN\]](#).

At the [\[190-GEN\]](#) current plenary meeting of SG15 (Nov. 20 to Dec. 1), this analysis was considered. The objective is to find a consensus position on these results. This consensus position can then be captured as an informative appendix to G.652. The formal initiation of this work is described in [\[Annex D of TD218/P\]](#) of this liaison statement, which anticipates completion mid 2024. Once that is achieved, the results can then be used as a reference for further standardization work.

We look forward to continued communications to align our work as much as possible. Specifically, any comments on the initial results, as well as suggestions on how to improve them would be most welcome. SG15 appreciates further input from IEEE experts regarding the information on Tx/Rx technology which may be developed for high-speed links. Questions 2, 5, and 6 will maintain the correspondence activity to receive any additional liaisons and to formulate responses.

[Attachments: Correspondence WDs from July Q6 meeting (WD-37r1), [\[248-GEN\]](#), [\[190-GEN\]](#), [\[Annex D of TD218/P\]](#)