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MOPA Liaison:

To: David Law, IEEE 802.3 WG Chair < [redacted] >

CC: John D'Ambrosia, Chair IEEE 802.3dj Task Force < [redacted] >

From:

Stefan Dahlfort, MOPA Chairman and President < [redacted]

Subject: MOPA addressing the contribution of Optical Pluggable Transceivers to time synchronisation error in PTP networks, concerns over "segmented" FEC.

The Mobile Optical Pluggables Alliance (MOPA) is an industry effort among leading RAN and optical pluggables and IC vendors. MOPA also has an operator advisory board with leading mobile operators. See https://mopa-alliance.org/. MOPA is driving the industry towards agreement on the optimum optical pluggables to be developed & made widely available to underpin high performance 5G and future 6G network build-outs. This is done by creating publicly available technical papers, which describe the high-level requirements and optical solutions, called blueprints, necessary for critical parts of the mobile network (fronthaul, backhaul, etc.), recommending data rates & the most suitable technologies (grey, WDM, packet). In addition to creating technical papers, MOPA is very active liaising with standards development organisations (SDOs) making contributions to areas important for mobile optics. Specific to this liaison, the new MOPA paper v2.2 includes an in-depth section on tight synchronization (see Appendix B: Optical pluggable performance for tight synchronization).

One of the challenges tackled by MOPA is to consider the role of optical pluggables in the overall time synchronization in networks.

Given the tight synchronization requirements of mobile transport on the one hand, and the increase in module complexity and hence related possible latency variations on the other hand, their contribution should be considered.

To this purpose, MOPA proposes to characterize pluggables according to their performance and store values in the internal EEPROM: namely, how much static latency a module introduces and what is the associated uncertainty, the latter by using a set of classes derived from ITU-T G.8273.2. The goal is to characterize pluggables in isolation, independently from any host.

The host can use the pluggable EEPROM values while calculating precision timestamp in accordance with IEEE 802.3cx-2003 Annex 90A. In particular, IEEE 802.3cx-2003 90A.7, "General method for dealing with repeating delay variation patterns", assumes the transmitter and

receiver delay variation pattern is mirrored and the sum of the two intrinsic delays is a known constant value.

It has come to our attention that “segmented” FEC schemes, which could challenge these assumptions, are being discussed in several projects.

For example, 800GBASE-ER implementing an “MII extender” (see nicholl_3dj_02a_2307.pdf) can potentially add extra layers in the pluggable, capable of adding and removing Alignment Markers on their own, possibly at arbitrary times and without the host being aware of them. Any unknown (and therefore un-correctable) time variation would directly have an impact on the class of the module.

Mobile transport networks rely on IEEE802.3 technologies to achieve the most stringent classes of time synchronization error at node level, and MOPA would like to raise awareness in the IEEE community about the potential impacts that selected solutions could have on time synchronization accuracy in PTP networks.

We look forward to your considerations, and to continued exchanges in this regard.

Sincerely,

Francois Fredricx and Antonio Tartaglia, MOPA *“SFP performance for tight time sync”* Work Item Drivers.

Cc:

Stefan Dahlfort, MOPA President
Kenneth Jackson, MOPA “Contributions to SDOs” Work Item Driver.