

New Orleans, LA., 30 September – 4 October 2002

SOURCE: IEEE® EFM Task Force  
TITLE: Communication to ITU-T Q4/15 from IEEE P802.3ah Ethernet in the First Mile Task Force  
REFERENCE: Communication Statement sent from ITU-T Q4/15 5-9 August 2002 Rapporteur meeting to IEEE P802.3ah

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### COMMUNICATION STATEMENT

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APPROVAL: Agreed to at IEEE 802.3ah EFM interim meeting, New Orleans, LA, 4 October 2002

FOR: Information and Action

DEADLINE: 3 November, 2002

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The IEEE 802.3ah EFM Task Force has received the Communication Statement from your August 2002 meeting. We would like to continue our dialogue as follows:

Regarding your request for a more detailed description of our requirements for the  $\gamma$ -interface, our objective is to achieve a level of data integrity for EFM comparable to other Ethernet standards. Specifically:

We model channels for other Ethernet PHYs as BSCs where bit errors are independent. Frames with 3 or fewer bit errors are detected, regardless of data value, by the Ethernet CRC. In addition, frame delineation boundaries are also protected against three or fewer bit errors, again regardless of data content. A Bit Error Ratio of  $10^{-9}$  to  $10^{-11}$  is assumed, which gives a worst-case mean time to false packet acceptance on the approximate order of  $10^9$  years.

We note that, in contrast, frame delineation protection in the current PTM-TC is highly data dependent. Namely, frames containing octets with a Hamming distance of 1 from the HDLC flag are vulnerable to a false frame delineation resulting from just one bit error. In cases such as this, the length of the data field will change, data octets will be considered to be CRC, and errors will go undetected for some data values

For EFM port types based on DSL technology, we note that the bit error ratio specified for the  $\alpha/\beta$ -interface in DSL standards, at  $10^{-7}$ , is significantly higher than the aforementioned Ethernet PHYs. In addition, bit errors are not independent. This makes the error analysis much more difficult. This is particularly true where Reed-Solomon coding is used, which was the main motivation for our request that an uncorrectable\_error signal be made available at the  $\alpha/\beta$ -interface.

Regardless of the differing channel characteristics, we are striving to achieve the same rarity of occurrence of undetected frame errors as other Ethernet PHYs. We require a TPS-TC which will support this goal.

Another characteristic of the frame encapsulation method used with current Ethernet PHYs is that the framing overhead is largely independent of data value. In contrast, in the current PTM-TC, overhead is dependent on data, and may reach as high as 100%. As Layer 3 data has no guarantee to be random, and in many cases is in fact quite repetitious, in some application the overhead may reach high values. The particular case of "malicious" frames has also been noted.

For EFM as well, we require an encapsulation method that also has data-independent, low overhead.

In summary, we require a TPS-TC that possesses the requirements outlined above. The existing PTM-TC does not satisfy them. We propose that either modifications to the PTM-TC be made, or a new Ethernet-specific "ETM-TC" be developed. We propose that this work be done on a cooperative basis between our two groups.

Please note that this TPS-TC will be required on all the PHYs we are considering for EFM-Copper: VDSL, SHDSL, and ADSL.

Note also that the maximum Ethernet Frame size is 1522 octets. Knowledge of this maximum length may simplify the design of a new TPS-TC.

Thank you for your offer for scheduling a joint meeting between our two groups. In terms of timing, it is not necessary to complete this work in time for your Study Group meeting in January. One opportunity for a joint session would be our 9-14 March 2003 Plenary meeting in Dallas.

Finally, ATIS Committee T1 has informed us that they are proceeding with the development of an ANSI Standard for VDSL, based on one modulation method. While we anticipate that this work will be a great assistance to us in our development of EFM standards for twisted-pair copper wiring, in general when we reference documents of other standards bodies, we prefer international standards. Accordingly, we urge you to take up the work of developing an ITU-T Recommendation for VDSL modulation, with the appropriate input from Committee T1.

We look forward to further communication and cooperation between our two groups.