Proposed Copper EFM objectives

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Proposal 1

Copper EFM should be primarily targeted to serve business customers.

Proposal 2

Copper EFM shall be optimized for symmetric bit-rate transmission.

Proposal 3

Copper EFM should be derived from existing XDSL PHYs.

Proposal 4

Copper EFM shall be optimized for data-only transmission
(baseband POTS may be an option)

Proposal 5

Copper EFM should provide the means to address a continuum of per-pair data rates and line lengths ranging from at least 512 kb/s symmetric at 4.6 km (15 kft) to at least 20 Mb/s symmetric at 765 m (2.5 kft). These bit-rates are the total aggregate of upstream rate plus downstream rate.

Proposal 6

The transmission bit-rate shall automatically adapt the bit-rate to the loop conditions in relatively small steps, with an approximate objective of no less than 12 steps in bit-rate.

Proposal 7

Copper EFM should attempt to gain the highest practical efficiency from multi-pair operation.

Proposal 8

In addition to Ethernet, copper EFM shall cooperate with T1E1 and ITU Q4/15 for the optional use of alternative upper-layer protocols (e.g. ATM)

Proposal 9

Line code options shall be excluded to enable interoperability between compliant systems at each end of the wires.

Proposal 10

Copper EFM shall meet the spectral compatibility requirements specified in T1.417, and consider the draft proposed updates for issue 2 of this standard.

Proposal 11

Copper EFM shall provide a physical-layer means to monitor transmission performance (error rate) and sub-band signal conditions (SNR, noise, loss). An in-service means shall be specified to convey this information to opposite end of the line.

Proposal 12

Copper EFM should use ITU Rec. G.994.1 (G.hs) for line initialization

Proposal 13

The following common assumptions should be used for consistency of performance analysis in papers presented to IEEE 802.3ah

- Wire gauge: 100% 0.4 mm (approximately equal to 26 AWG)
- Loop lengths: 250 m steps from 500 m to 1.5 km, 1 km steps from 2 km to 5 km
- NEXT & FEXT models: per T1.417
- Bridged tap cases: 50 m, 100 m, 200 m, 400 m (located at end of loop)
- Each of the following interferer sets shall be reported based on a 50-pair binder group model, with a summary report showing the lowest upstream and downstream bit-rate case for each loop length. Noise is inserted at receiver-end with –140 dBm/Hz added to:
  - 49 self
  - 49 basic rate ISDN
  - 49 HDSL
  - 24 basic rate ISDN + 24 Self
  - 24 T1-AMI + 24 HDSL2
  - 24 T1-AMI + 24 HDSL
  - 24 T1-AMI + 24 self
  - 24 ADSL + 24 HDSL2
  - 24 ADSL + 24 HDSL
  - 24 ADSL + 24 self

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