EFM FEC STATUS and PLAN

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Background
Guiding Motion

A group of interested EFM TF members has been working to come up with an FEC baseline for consideration by the EFM TF. Our work has been guided by the following motion passed in Edinburgh, May 2002:

Add an FEC option for the 1Gig P2P and P2MP Phys, maintaining backward compatibility with the 1000BASE-X PCS, for the following reasons:

- *Improves reach of a MPN limited link by 50% for links with MPN penalty of about 2dB.*
- *Permits operation at a SNR lower by 2.5dB for non dispersion limited links.*

Background
Previous EFM TF Presentations

1. Baseline Proposals:
   "FEC in EPON Technical Proposal" khermosh_general_1_0702.pdf
   "Stream-based FEC Proposal", effenberger_general_1_0702.pdf

2. FEC Performance and Impact:
   "Responses to FEC Work Items List". Rennie_1_0502.pdf
   "EFM FEC: Operation, Cost, Complexity", rennie_1_0302.pdf
   "FEC in PON", berman_1_0302.pdf
   "FEC framing in EFM", khermosh_1_0102.pdf
   "FEC Cost Effectiveness in EFM", khermosh_2_0102.pdf
   "FEC Effect on MPN", khermosh_2_1101.pdf
   "BER Requirements", khermosh_3_1101.pdf
   "FEC for EFM: A Tutorial", rennie_1_0901.pdf
   "FEC and Line Coding for EFM", ivry_1_0901.pdf
   "FEC Framing Considerations for EFM", khermosh_1_0901.pdf

Outstanding Issues

There are two major issues that need resolution before presenting our proposed FEC Baseline to the group for ratification. They are:

1. Low BER Effect. The effect of the 10E-4 BER on CDR performance and design.

2. Baseline Selection. Selection of one baseline from the current two proposals (Stream and Frame).

The Plan

The plan for the FEC group is to resolve the two major outstanding issues with the goal of presenting the results to the group at the November 2002 EFM TF meeting and then voting for the selected baseline. The plan consists of:

1. Resolution of the low BER issue by conducting lab testing of OTS transceivers to measure CDR operation.

2. Selection of one baseline approach based on an agreed upon metric set.

Low BER effect on PMA/PMD Current Thinking

The current opinion from several PMA/PMD experts is that the lower BER of 10E-4 would not have significant impact on PMA/PMD performance relative to 10E-12 BER. However, the FEC group proposes to do some lab testing to quantify this issue.

Low BER effect on PMA/PMD Lab Testing

1. Test with existing OTS components. Volunteers to help conduct this testing are:
   - Meir Bartur of Zonu. Will provide limited lab space, equipment and personnel.
   - Larry Rennie of National Semiconductor. Will help configure, conduct and document test results.

2. Additional Support needed:
   a) Need other companies to conduct similar testing with different components to get a good cross section.
   b) Need anyone that may have done similar testing (either lab or simulations) to come forward and present their data.

Low BER effect on PMA/PMD Measurements

The following list summarizes the parameters to be measured:

1. CDR lock time at BER of 10E-4. Absolute value and delta relative to 10E-12.
   between and 10E-12.
2. CDR stability at BER of 10E-4 . Absolute and delta relative to 10E-12
3. Jitter Impact.

FEC Proposal Selection
The Metrics

FEC Baseline

1. Stream based.
2. Frame based.

Efficiency, Cost and Performance (absolute and relative to other baseline)

1. FEC overhead.
2. Complexity.
3. Performance.
4. Cost.

Legacy Impact/Operation

1. Operation with legacy equipment.
2. Changes (if any) to PCS, PMA, PMD.

EFM Impact

1. On OMA.
2. On PMA/PMD test methodology (for example, equipment).
3. On Mac rate control and rate control scheme.

Summary

1. Low BER lab test results by November Plenary meeting.

2. One baseline proposal by November Plenary meeting for TF consideration.