Extended Temperature Optics

Supporters

- Brad Booth (Intel)
- Ben Brown (AMCC)
- Kevin Daines (WWP)
- Jonathan Thatcher (WWP)
- Bruce Tolley (Cisco)

P802.3ah Objective

- “Provide a family of physical layer specifications: 1000BASE-LX extended temperature range optics”

Problem

- Objective not succinct
- Committee direction ambiguous based on motions and comment resolutions
- P802.3ah must provide clear direction to resolve comments and make progress

Issue

- Some believe that objective cannot be met without explicitly specifying the temperature range; that capability must be assured.

- Some believe that temperature range is an implementation issue; that the existing specifications support the possibility of extended temperature.

History

- Mar 01: Ext Temp Objective
- Jan 02:
  - Ext Temp Range set to –40 to +85 degrees C
  - Objective changed from 1000BASE-X to 1000BASE-LX
- Mar 02:
  - 1000BASE-LX Baseline – Informative range –40 to +85 degrees C
  - Fail addition of 100BASE-FX Ext Temp Objective
  - Create Informative Annex (64A)
- Nov 02: Adopt PMD naming convention

Current State

- TRs Unresolved from Jan ‘03 Interim
  - Failed attempt to resolve issue with motion to add Temp Extended PMD set
  - Extensive reflector discussion
- Positive, unambiguous, definitive decision required for optical STF to move forward

Reflector Recommendation (Howard Frazier)

A) Ensure that all of the Active Optical Input and Active Optical Output Interface parameters in clauses 58-60 can be met, and the corresponding links function properly, across an "extended temperature range" of operation.

B) Define what an "extended temperature range" is, and place this definition in informative Annex 66A

C) Provide an optional PICS entry for each [optical] PMD indicating operation over the "extended temperature range."

D) Require that compliant systems and field pluggable components be clearly labeled with the operating temperature range over which their operation is guaranteed.

Sample D1.4 Implementation

To be inserted before existing 59.5 subclause. All subsequent C59 subclauses to be renumbered.

59.5 1000BASE-LX10 and 1000BASE-BX10 extended temperature option

A 1000BASE-LX10 or 1000BASE-BX10 PMD that supports the XX to YY degrees Centigrade, extended temperature range option described in Annex 64A shall meet all requirements for that PMD across the entire temperature range.

Note: similar text would exist in clauses 58 and 60

Motion: Adopt following as means to accomplish the P802.3ah objective for extended temperature:

A) Ensure that all of the Active Optical Input and Active Optical Output Interface parameters in clauses 58-60 can be met, and the corresponding links function properly, across an "extended temperature range" of operation.

B) Define what an "extended temperature range" is, and place this definition in informative Annex 66A

C) Provide an optional PICS entry for each [optical] PMD indicating operation over the "extended temperature range."

D) Require that compliant systems and field pluggable components be clearly labeled with the operating temperature range over which their operation is guaranteed.

Mover: Seconder:

Technical (75% required) Motion Passes / Fails

EFM: For Against Abstain

802.3: For Against Abstain

Backup

Baseline Motion

The basis for the first draft of the 802.3ah 1000Base-LX extended temperature objective be met with text that uses 1000Base- LX 5 km single mode specification (clause 38) as the starting point with the following changes and additions:

- Informative temperature range -40-+ 85 deg C
- 10 km link length
- Wavelength range = 1260 – 1360 nm
- Use EFM link budget spreadsheet (v3.1.16) to create triple tradeoff curve for spectral width vs. wavelength vs OMA
- Conversion to OMA spec methodology
- Tx output power (min): -9.5 dBm (ER= 9)
- Rx input (min): -20 dBm (ER= 9)

Made: Steve Joiner; Ignis Optics

Second: Schelto vanDoorn

For: 42 No: 0 Abstain: 5

This motion passes.

From http://grouper.ieee.org/groups/802/3/efm/public/mar02/joiner_1_0302.pdf

Extended Temp Motion #2

The temperature ranges (PMD case) for the various PMDs will be:

- P2MP ONU end: -40C to 85C
- P2P ONU end: -40C to 85C
- P2MP OLT end: TBD
- P2P OLT end: TBD

Ammendment [sic] to remove the part in red due to the TBDs.

- Motion: Richard Brand
- Second: Hugh Barass
- 802.3ah: Y:97 N:0 A:11

Motion: Vipul Bhatt

- Second: not needed as it was approved by OPMDSTF
- 802.3ah: Y:95 N:4 A:8
- 802.3 voting members: Y:55 N:3 A:1

From http://grouper.ieee.org/groups/802/3/efm/public/mar02/minutes_01_2002.pdf

Objective for 100BASE-FX Ext Temp

- Motion to add an objective to the family of physical layer specifications- “100BASE-FX Extended Temp Optics”
- Moved : Chris DiMinico
- Second: Lisa Peng
- ALL – for 32; Against 30; Abstained 72
- 802.3voters - for 16; Against 21; Abstained 30
- Motion fails

From http://www.ieee802.org/3/efm/public/mar02/minutes_03_2002.pdf

Motion to Create Annex

- Motion #11
- Motion: to create informative annex to address environmental considerations.
- Mover: Chris DiMinico
- Second: Alan Flatman
- All: For - 59; Against - 1; Abstained - 40;
- 802.3 voters: For - 40; Against - 1 ; Abstained – 17
- Motion passed

From http://www.ieee802.org/3/efm/public/mar02/minutes_03_2002.pdf

Adopt PMD naming

9. Motion to adopt the optical PMD naming nomenclature per Naming #1 [see next slide] in diab_general_1_1102

- Moved: Wael Diab
- Second: Jonathan Thatcher

- *Technical motion, requires >= 75% in favour to pass*
- Among those present:
- Y:74 N:0 A:10
- MOTION PASSES

From http://www.ieee802.org/3/efm/public/nov02/minutes_1_1102.pdf

Naming 1

PMD layer type	PMD
• **100M**	
Dual Fiber: 100BASE-LX10	100BASE-LX10
BiDi: 100BASE-BX10	100BASE-BX10-U
BiDi: 100BASE-BX10	100BASE-BX10-D
• **1G**	
Dual Fiber: 1000BASE-LX10	1000BASE-LX10
BiDi: 1000BASE-BX10	1000BASE-BX10-U
BiDi: 1000BASE-BX10	1000BASE-BX10-D
• **ePON**	
10km: 1000BASE-PX10	1000BASE-PX10-U
10km: 1000BASE-PX10	1000BASE-PX10-D
20km: 1000BASE-PX20	1000BASE-PX20-U
20km : 1000BASE-PX20	1000BASE-PX20-D

From http://www.ieee802.org/3/efm/public/nov02/minutes_1_1102.pdf

Add Extended Temp PMDs

- *17. Motion to normatively specify additional optional PMDs addressing extended temperature (referenced to PMD case). These PMD's will have identical optical parameters as specified in the current EFM PMD's. Additional specifications are required in order to define test procedures for the extended temperature range.*
- 1000BASE-LX(E)10 -40C to 85C
- 1000BASE-BX(E)-U -40C to 85C
- 100BASE-BX(E)-U -40C to 85C
- 100BASE-LX(E) -40C to 85C
- 1000BASE-PX(E)-U -40C to 85C
- 1000BASE-BX(E)-D TBD
- 100BASE-BX(E)-D TBD
- 1000BASE-PX(E)-D TBD
- Moved: Vipul Bhatt on behalf of the Optical STF
- *Technical motion, requires >= 75% in favour to pass*
- Among those present:
- Y:28 N:38 A:20
- MOTION FAILS
- Among 802.3 voters:
- Y:17 N:23 A:14

From http://www.ieee802.org/3/efm/public/jan03/minutes_1_0103.pdf

Comments of interest

- http://www.ieee802.org/3/efm/public/comments/d1/D10_comments_responses_all.pdf
  - # 313
- http://www.ieee802.org/3/efm/public/comments/d1_1/D11_comments_responses_all.pdf
  - # 565
- http://www.ieee802.org/3/efm/public/comments/d1_2/D12_comments_final.pdf
  - # 296
  - # 678

Annex 66A (D1.3)

66A.2.1 Temperature, humidity, and handling

Ethernet Subscriber Access optical and copper links are expected to operate in environmental conditions consistent with the outside plant. **Explicit requirements for the operating temperature range are given for 1000BASE-LX10. Other values for these parameters related to temperature,** humidity, and physical handling (such as shock and vibration) **are considered to be beyond the scope of this standard.**

Manufacturers are recommended to indicate in their literature associated with the PMD the operating envi-ronmental conditions to facilitate selection, installation, and maintenance. Outside plant operation may necessitate that a broader range of environmental specifications be supported.

Labels Required vs Recommended

- Labels Required (17)
  - 7.3.2; 8.3.2.2; 8.8.6.8; 8.8.7.1; 9.9.3.2; 10.4.2.2; 11.3.3.2; 11.6.1; 15.5.3; 16.6.6.2.1; 16.6.6.27; 18.5.6.17; 18.5.6.23; 27.6; 27.7.4.12; 38.11.4; 41.5
- Labels Recommended (26)
  - 8.6.3; 8.8.6.11; 12.6.3; 14.2.1.7; 14.8; 14.10.4.5.15; 15.7; 15.7.1; 16.6.6.31; 16.6.7.4; 17.5.6.26; 18.3.1.7; 18.5.6.27; 23.4.1.5; 23.10; 27.6; 27.7.4.12; 32.11; 38.9; 40.10; 52.12; 53.12; 58.9.5; 59.9.5, 60.9.5
- Label requirement revoked
  - 25.4.4 revokes 8.3