More detailed baseline proposal for a 100 Gb/s SMF PHY 500 m using single wavelength PAM4 modulation 100GBASE-DR

Authors on next page

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Baseline Proposal for single lane duplex SMF 100 Gb/s PHY up to 500 m

Same as shown in traverso_3cd_01_0916

- 100GBASE-DR, to be consistent with the latest 400GBASE-DR4 in Clause 124, but
  - with 1 lane instead of 4 lanes
  - with penalties consistent with a channel allowing up to 4 discrete reflectances of -35 dB
  - leveraging PCS per nicholl_3cd_01_0716

More detailed Baseline Proposal: Transmitter

- Utilize the same transmitter specifications as the latest 400GBASE-DR4 in Clause 124, but
  - Modify the Optical Return Loss to be 17.8 dB & subscript in the $RIN_{XX}OMA$ to be 17.8
  - These modifications are consistent with “a channel allowing up to 4 discrete reflectances of -35 dB”
  - Change font color to magenta for the OMA min, OMAmax & OMAmin – TDECQ

More detailed Baseline Proposal: Receiver

- Utilize the same receiver specifications as the latest 400GBASE-DR4 in Clause 124, but
  - Change font color to magenta for the Receiver Sensitivity & Stressed Receiver Sensitivity yet keep values the same

More detailed Baseline Proposal: Link Budget & PCS

- Utilize the same illustrative link budget specifications as the latest 400GBASE-DR4 in Clause 124, but
  - Modify the Power Budget to be 5.8 dB, the Maximum discrete reflectance to be -35 dB, and the Allocation for penalties to be 2.8 dB
  - Change font color to magenta for the Power Budget & Allocation for penalties
  - These modifications are consistent with “a channel allowing up to 4 discrete reflectances of -35 dB”
- Modify the FEC references in the PHY definition to be consistent with nicholl_3cd_01_0716

Proposed Straw Poll

Straw Poll #:

I would support adopting traverso_3cd_03_0916 as the baseline to address the single lane 100 Gb/s PHY for operation over duplex SMF with lengths up to at least 500 m.

- Y: N: A:

BACKUP

Example Transmitter Specification

Description	100GBASE-DR Proposal	400GBASE-DR4, D2.0	Unit
Signaling rate, each lane (range)	53.125 ± 100 ppm	53.125 ± 100 ppm	GBd
Modulation format	PAM4	PAM4	-
Lane wavelength (range)	1304.5 to 1317.5	1304.5 to 1317.5	nm
Side-mode suppression ratio (SMSR), (min)	30	30	dB
Average launch power, each lane (max)	4	4	dBm
Average launch power, each lane (min)	-2.4	-2.4	dBm
Outer Optical Modulation Amplitude (OMA_{outer}), each lane (max)	4.2	4.2	dBm
Outer Optical Modulation Amplitude (OMA_{outer}), each lane (min)	-0.3	-0.3	dBm
Launch power in OMA_{outer} minus TDECQ, (min)	-1.3	-1.3	dBm
Transmitter & dispersion eye closure for PAM4 (TDECQ), each lane (max)	2.5	2.5	dB
Average launch power of OFF transmitter, each lane (max)	-30	-30	dBm
Extinction ratio, each lane (min)	5	5	dB
$RIN_{17.8}OMA$	-142	-	dB/Hz
$RIN_{22.8}OMA$	-	-142	
Optical return loss tolerance (max)	17.8	22.8	
Transmitter reflectance (max)	-26	-26	dB

Example Receiver Specification

Description	100GBASE-DR Proposal	400GBASE-DR4, D2.0	Unit
Signaling rate, each lane (range)	53.125 ± 100 ppm	53.125 ± 100 ppm	GBd
Modulation format	PAM4	PAM4	-
Lane wavelength (range)	1304.5 to 1317.5	1304.5 to 1317.5	nm
Damage threshold , each lane	6.5	6.5	dBm
Average receive power, each lane (max)	4	4	dBm
Average receive power, each lane (min)	-5.4	-5.4	dBm
Receive power (OMA_{outer}), each lane (max)	4.2	4.2	dBm
Receiver reflectance (max)	-26	-26	dB
Receiver sensitivity (OMA_{outer}), each lane (max)	-4.4	-4.4	dBm
Stressed receiver sensitivity (OMA_{outer}), each lane (max)	-1.9	-1.9	dBm
Conditions of stressed receiver sensitivity test:			
Stressed eye closure for PAM4 (SECQ), lane under test	2.5	2.5	dB
OMA_{outer} of each aggressor lane	4.2	4.2	dBm

Example 100GBASE-DR link budget

Description	100GBASE-DR Proposal	400GBASE-DR4, D2.0	Unit
Power budget (for max TDECQ)	5.8	5.6	dB
Operating distance	500	500	m
Channel insertion loss	3	3	dB
Maximum discrete reflectance	-35	-45	dB
Allocation for penalties (for max TDECQ)	2.8	2.6	dB
Additional insertion loss allowed	0	0	dB