



Feasibility Study for 25Gb/s 10km Transmission Using DML

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- Scope of discussions
 - 4x25Gb/s WDM architecture
 - Uncooled DML
- 25Gb/s Transmission experiments using direct modulated AlGaInAs DFB-LD
 - 25Gb/s direct modulation waveform
 - Chromatic Dispersion (CD) penalty
- Summary

Proposal

■ Reach (Technical) Feasibility of 100GE Alternatives

SMF	10km 1310nm	40km 1310nm	10km 1550nm	40km 1550nm
10x10G DML	yes +CL	yes +CL+OA	yes	yes +OA
10x10G ML	yes +CL	yes +CL+OA	yes	yes +OA
5x20G/4x25G DML	yes	maybe +OA	maybe	maybe +DC
5x20G/4x25G ML	yes	yes +OA	yes	yes +DC
2x50G DQPSK I/Q ML	yes +CL	yes +CL+OA+DC	yes +CL +DC	yes +CL+OA+DC
1x100G TDM ML	yes +CL+OA	yes +CL+OA+DC	yes +CL+OA+DC	yes +CL+OA+DC

Reference: dove_01_0407.pdf

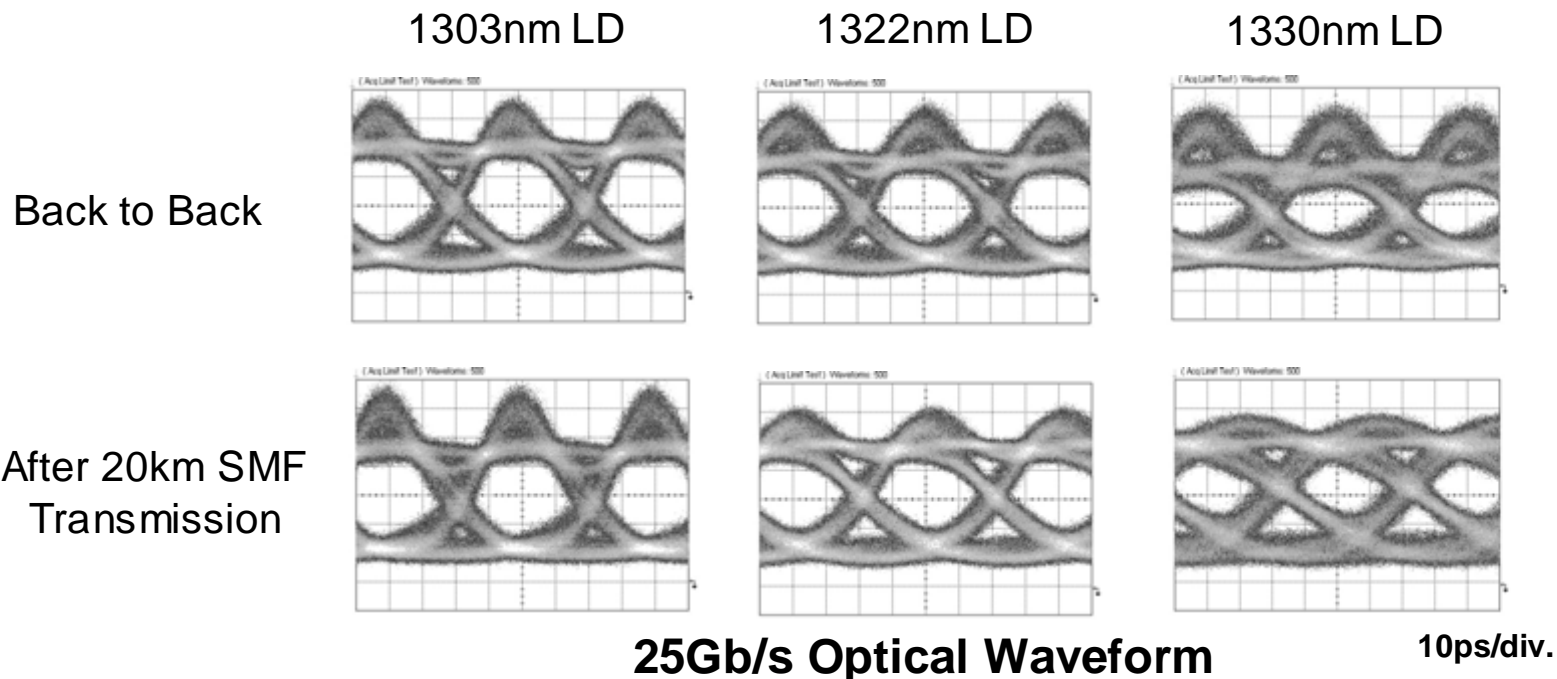
- We propose 10km application using 4x25Gb/s DML because DML has a potential capability for the reduction of transceiver cost and power dissipation.

- Near term and future solution (<10km)
 - Near term; Cooled EML (Narrow spacing / CWDM grid)
 - Future; Cooled DML (Narrow spacing / CWDM grid)
 - Uncooled DML (CWDM grid)
- Uncooled DML technical issues
 - Modulation speed
 - Transmission distance
 - Operating temperature range
- Wavelength allocation “LIMITS” applicable LD technology
 - Preferable CWDM grid set for uncooled DML
 - Which is better 1291 – 1351nm / 1271 – 1331nm?

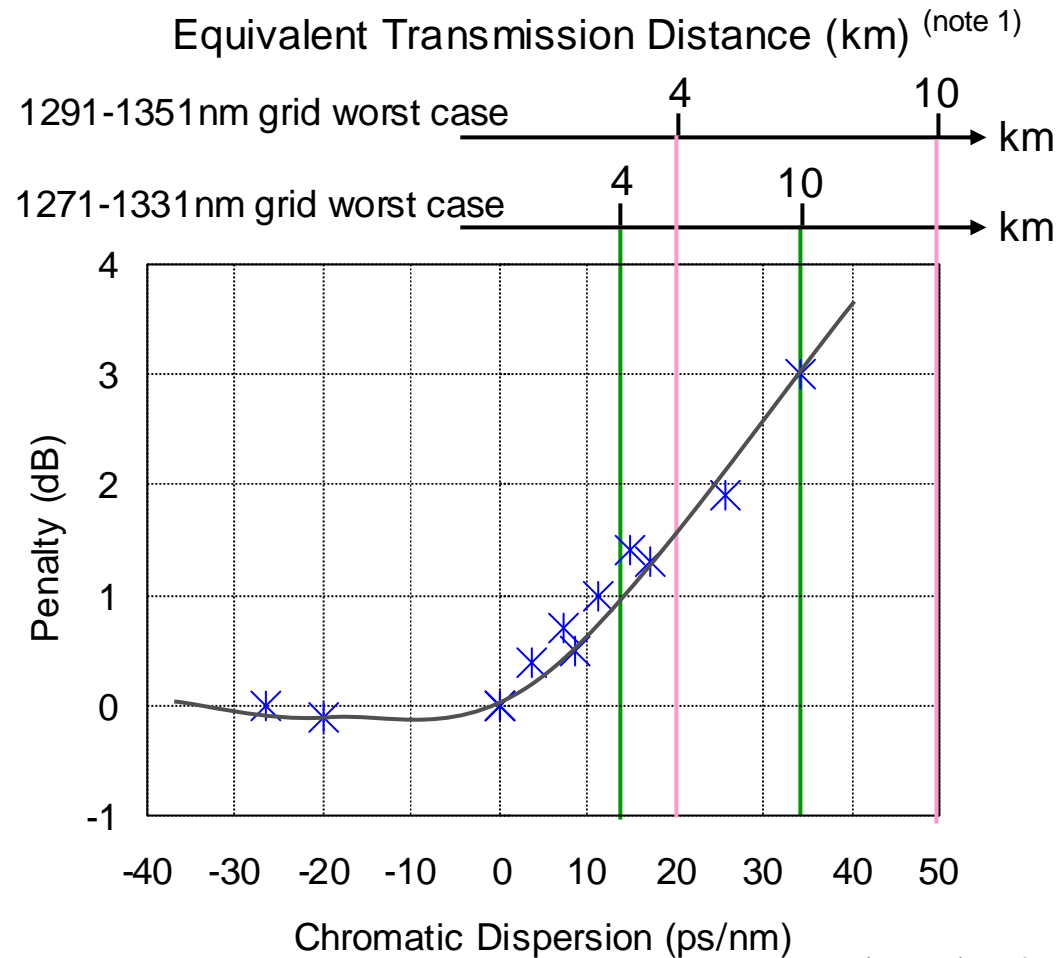
25Gb/s Direct Modulation

■ AlGaInAs Buried-Hetero structure DFB LD with multiple quantum well active layers

- ✓ LD Temp.: 25deg C
- ✓ Ith: <10mA
- ✓ fr: 15-21GHz
- ✓ Ex. Ratio: 6dB(Ib=50mA, Ip=40mA)
- ✓ $2^{31}-1$ PRBS



Power Penalty dependence on CD

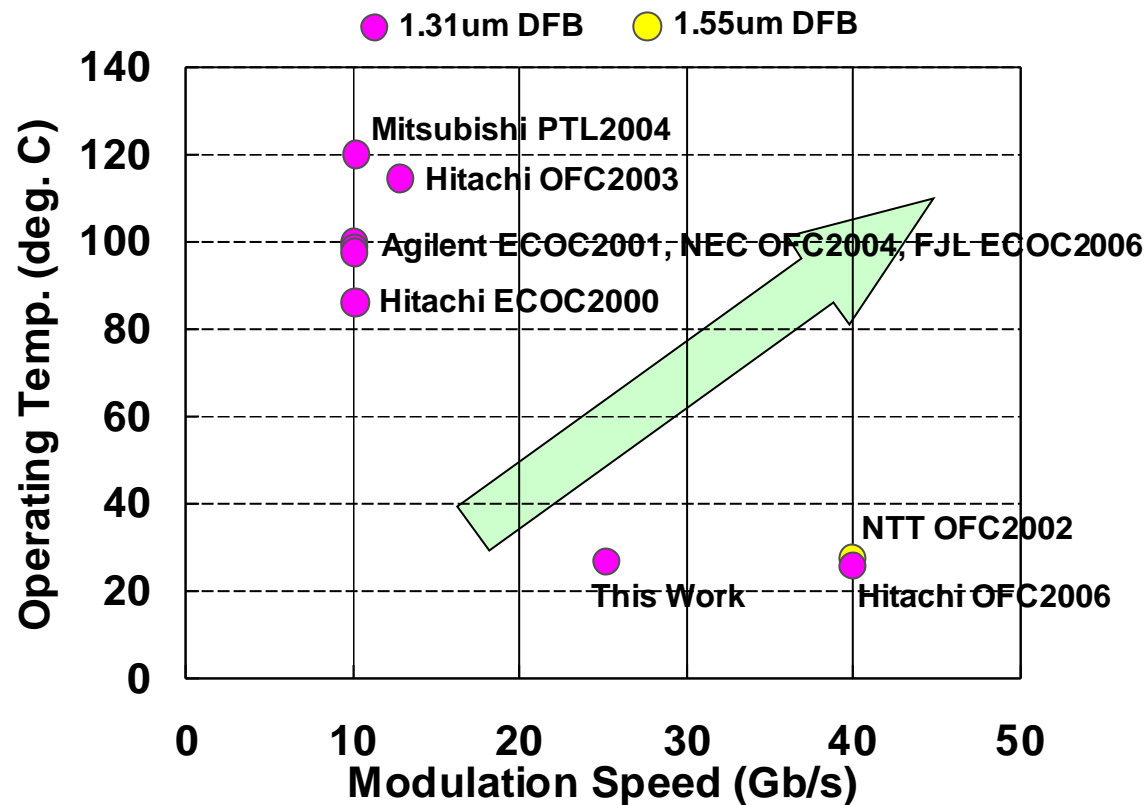


(note 1) Reference: traverso_01_0907.pdf

- CD penalty: 1dB(4km), 3dB(10km) @ 1271-1331nm CWDM grid set

DML R&D Status

- DML R&D status toward to higher speed modulation and wider operating temperature range



Summary

- Uncooled DML is proposed for future cost and power consumption reduction
- Transmission experiments using AlGaInAs DFB-LD are shown
 - 25Gb/s direct modulation
 - CD penalty @ 1271-1331nm CWDM grid set
 - 4km; 1dB penalty (Applicable)
 - 10km; 3dB penalty (Needs to be discussed)
- 1271-1331nm CWDM grid set is better for future Uncooled DML