

100GE 10km SMF Power Budgets

IEEE 802.3ba Task Force

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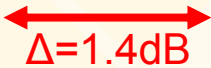

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10km SMF Propagation Properties

10km G.652 A&B SMF Max dispersion and fiber loss

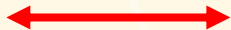

- LAN WDM (4nm spacing) (1306 – 1318nm DML or EML grid)
 - $\lambda = 1318\text{nm}$ (worst case LAN WDM DML or EML λ)
 - Max Dispersion (1319nm) = 18ps/nm
 - Max Loss (1319nm) = 4.2dB
- CWDM (20nm spacing) (1271 – 1331nm only feasible DML grid)
 - $\lambda = 1331\text{nm}$ (worst case CWDM DML λ)
 - Max Dispersion (1336nm) = 33ps/nm
 - Max Loss (1336nm) = 4.3dB
- For DML, LAN WDM has 55% CD and 0.1dB lower loss than CWDM
- CWDM (20nm spacing) (same grid has to be used for EML and DML)
 - $\lambda = 1271\text{nm}$ (worst case CWDM EML λ)
 - Max Dispersion (1266nm) = -58ps/nm
 - Max Loss (1266nm) = 4.7dB
- For EML, LAN WDM has 32% CD and 0.5dB lower loss than CWDM

10km SMF Link Budgets

10km SMF 25G TP2 → TP3 Entries in dB	CWDM Cooled EML $\lambda = 1271\text{nm}$ ER = 7dB	LAN WDM Cooled EML $\lambda = 1318\text{nm}$ ER = 7dB	CWDM Uncooled DML $\lambda = 1331\text{nm}$ ER = 3.5dB	LAN WDM Cooled DML $\lambda = 1318\text{nm}$ ER = 4.5dB
Fiber Loss (G.652 A&B)	4.7	4.2	4.3	4.2
ER penalty (vs. ER=10dB)	1.0	1.0	3.5	2.5
CD	1.3 ¹	0.4 ²	3.5 ³	1.6 ⁴
Connector & other losses	3.0	3.0	3.0	3.0
Total budget	10.0  $\Delta=1.4\text{dB}$	8.6	14.3  $\Delta=3.0\text{dB}$	11.3

- ¹ traverso_01_0907, EML: $\lambda = 1264.5\text{nm}$, $\alpha = -1.0$, 10km (p10)
- ² traverso_01_0907, EML: $\lambda = 1319.0\text{nm}$, $\alpha = 1.0$, 10km (p10)
- ³ traverso_01_0907, DML: $\lambda = 1337.5\text{nm}$, $\alpha = 4.0$, 10km (p11)
- ⁴ traverso_01_0907, DML: $\lambda = 1357.5\text{nm}$, $\alpha = 4.0$, 4km (p13)

10km SMF Power Budgets

10km SMF 25G λ s Power in dBm (Average)	CWDM Cooled EML $\lambda = 1271\text{nm}$ ¹ ER = 7dB	LAN WDM Cooled EML $\lambda = 1318\text{nm}$ ER = 7dB	CWDM Uncooled DML ² $\lambda = 1331\text{nm}$ ER = 3.5dB	LAN WDM Cooled DML $\lambda = 1318\text{nm}$ ER = 4.5dB
TX Min / Max	1.5 / 4.5	0.1 / 3.1	5.8 / 8.8	2.8 / 5.8
TP2 TX Min 2.5dB Mux loss	-1.0  -2.4 $\Delta=1.4\text{dB}$ ¹	-2.4	3.3  0.3 $\Delta=3.0\text{dB}$ ²	0.3
TP2 4 λ TX Max (TX Min + 9dB)	8.0	6.6	12.3 (>12.0)	9.3
Link Budget (dB)	10.0	8.6	14.3	11.3
TP3 RX Min 2.5dB DeMux loss	-11	-11	-11	-11
RX Min / Max (ER = 10dB)	-13.5 / -16.5	-13.5 / -16.5	-13.5 / -16.5	-13.5 / -16.5

- ¹ EML on CWDM grid only feasible for EML use has $\Delta=1.1\text{dB}$ for $\lambda = 1351\text{nm}$
- ² Cooled DML has $\Delta = 2.0\text{dB}$ for $\lambda = 1331\text{nm}$