TWDP and OMAmin comments #38 (and others) and #35

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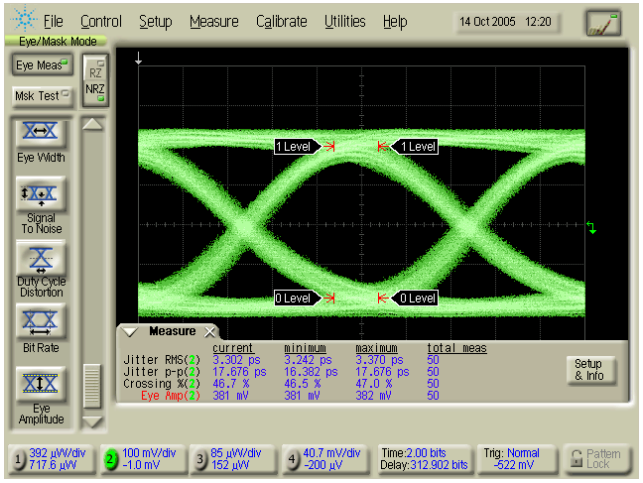
Comment 38

Increase the TWDP limit to 5 dB

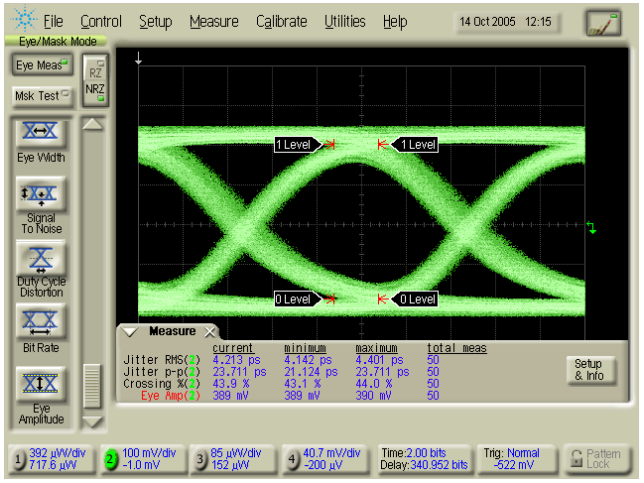
- EDC IC technologies will continue to improve
- History has shown that lasers will not improve as quickly as IC technologies
  - Future implementations will be limited by Tx
- LRM's success will be tied to its cost
  - Relaxed Tx specs will allow lower cost in the long term

Measured results with TWDP > 4.7 dB

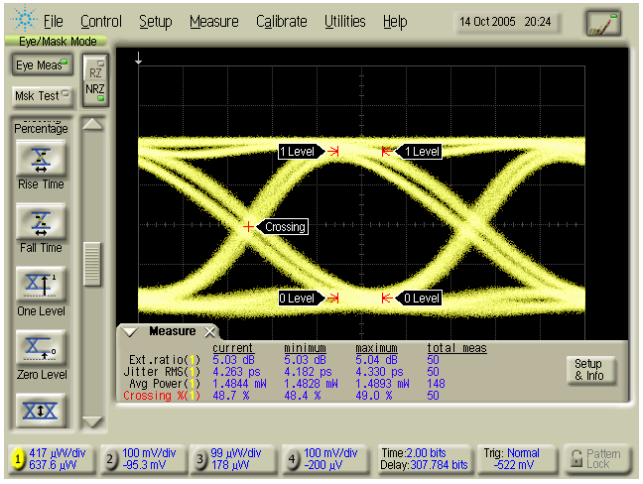
Scope waveforms from Sumitomo Electric, 10G FP



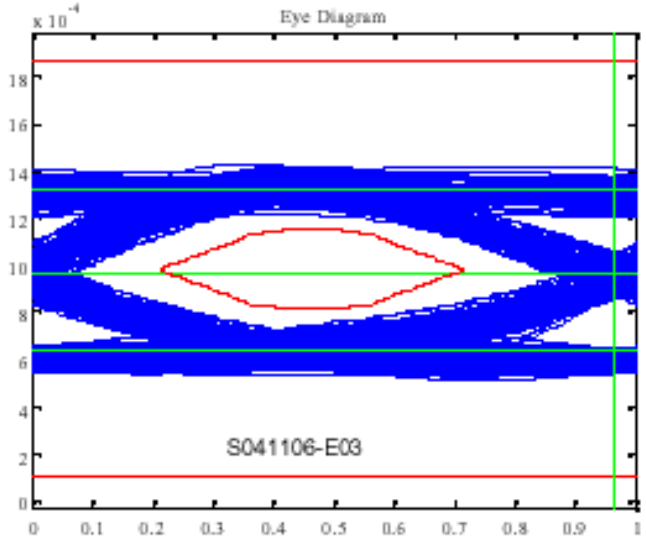
4.83



5.07



4.81



5.17; 4GFC FP

Comment 35

Allow lower OMA if TWDP < 4.7 dB

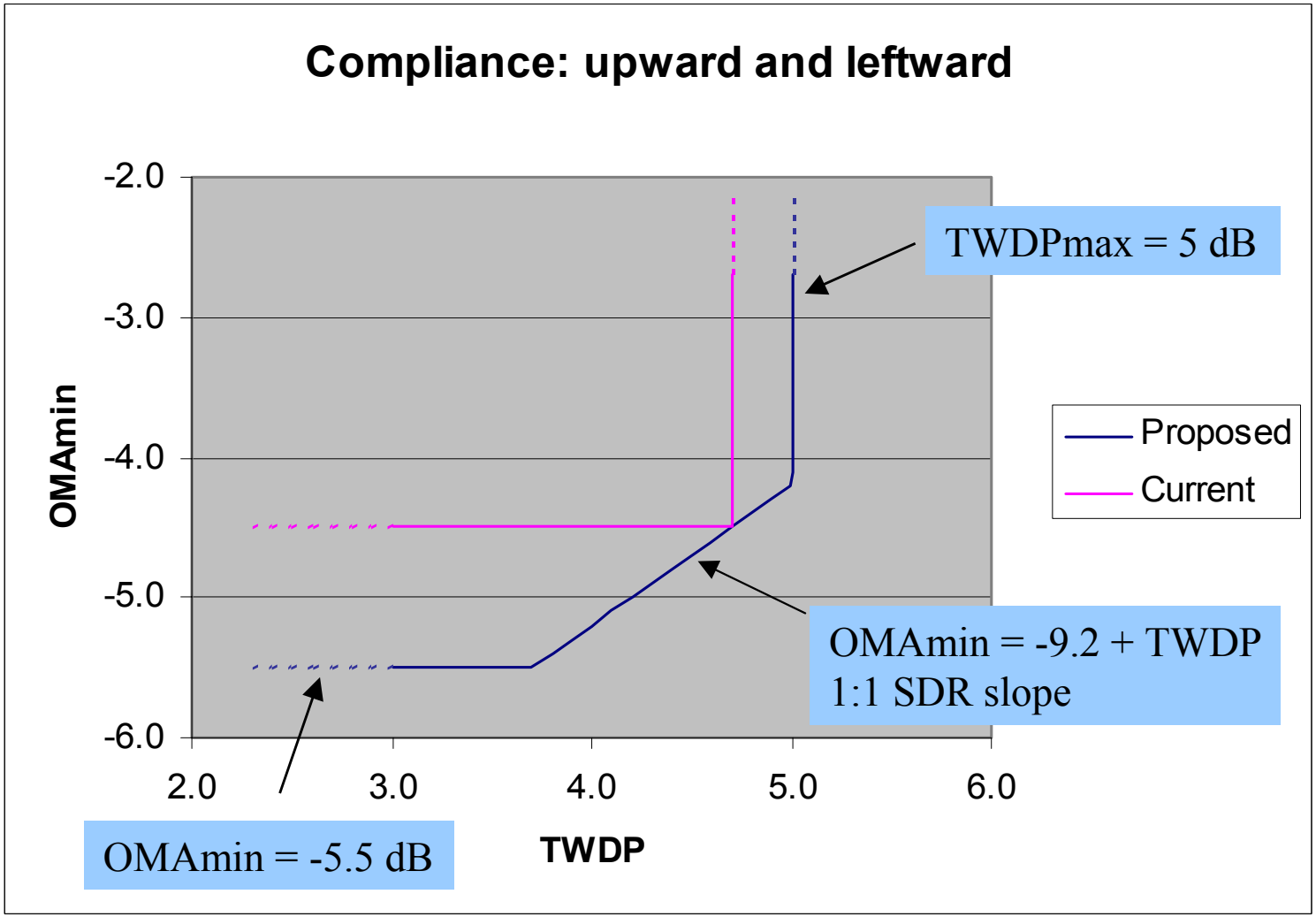
- Remedy in comment:
  - Change OMA min to -5.5 dB
  - Add new line: OMA min = -9.2+TWDP
- *Intended* remedy:
  - OMA min = max(-5.5, -9.2+TWDP)
- Benefits/rationale
  - Help enable 1300 nm VCSELs
  - Lower power consumption
  - Lower EMI
  - Note – P_{avg}min not affected (still –6.5 dBm)

Goal: Combine remedies

- OMA min can decrease if TWDP < 4.7 dB
  - But not less than –5.5 dBm
- OMA min must increase if TWDP > 4.7 dB
  - But TWDP cannot exceed 5 dB
- This tradeoff is analogous to OMA min vs. TDP in LR

Graphical view of combined remedies

TWDP and OMAmin limits are independent



Implementation penalties vs. higher TWDP

- There is general consensus that margin exists in the current power budget
  - It should be used to relax specs and reduce cost
- It is expected that Rx implementation penalties will increase with higher TWDP
- Therefore, an increase in TWDP must preserve power margin for Rx implementation
- This is accomplished herein by requiring OMA to increase 1:1 with TWDP

Backup

Budget analysis from lindsay_1_1105

TP3 tester budget

Item	dB	dBm
Stress test OMA		-6.5
Stress TWDP(14,5)	4.2	
Noise penalty	0.5	
Required effective Rx sensitivity(14,5)		-11.2

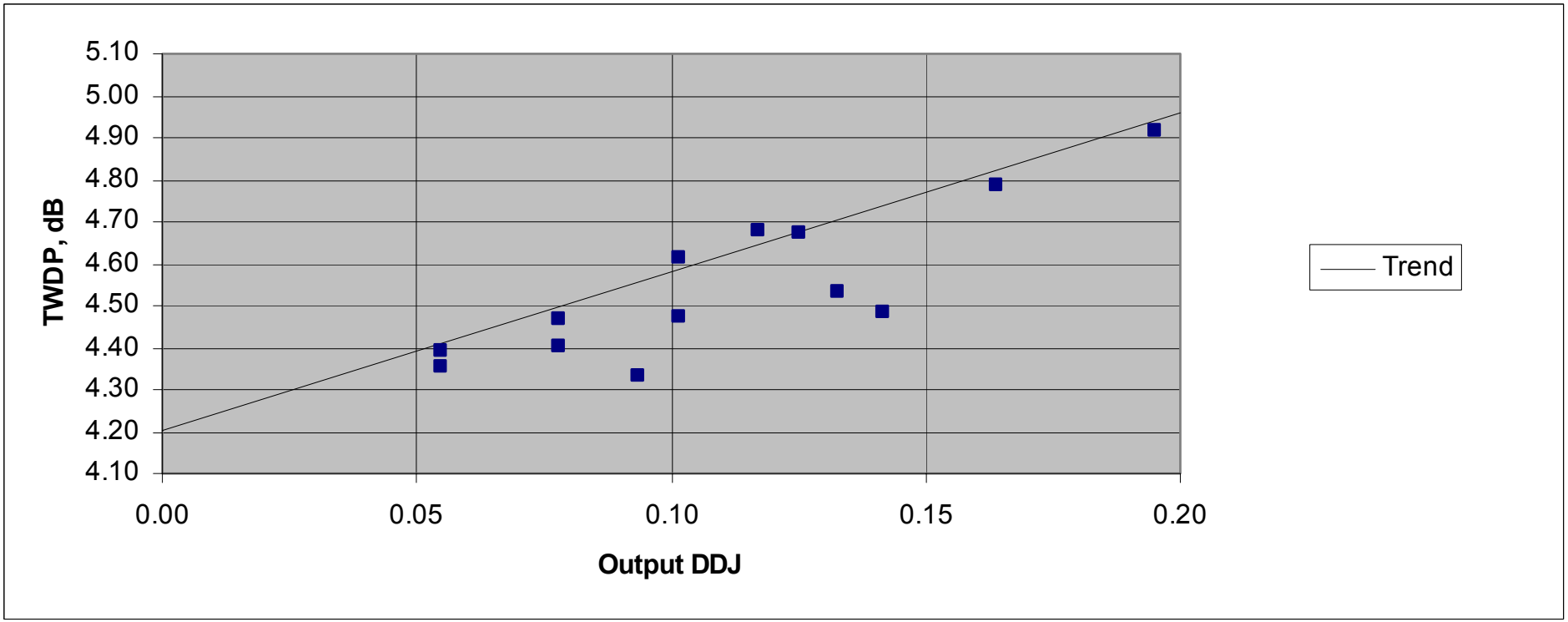
Overall budget w/ TWDP, TP3 test, and combined dispersion & connector losses

Item	dB	dBm
TWDP limit	4.7	
Tx_OMAmin		-4.5
Fiber DC loss	0.4	
TP3_TWDP(14,5)⊗conn_losses@99%220m	4.4	
Tx implementation penalty (TWDP limit - Stress TWDP(14,5))	0.5	
RIN penalty	0.3	
Modal noise penalty	0.2	
Required effective Rx sensitivity(14,5)		-10.30
Unallocated margin		**0.9**

Some additional budget should be allocated to other connector loss mechanisms, but margin will still exist

TWDP vs. DDJ

- Based on 47.1 psec Gaussian Tx



Proposed Figure 68-5

New area