



# APD receiver for 50G PON

P802.3ca 25 Gb/s, 50 Gb/s and 100 Gb/s EPON Task Force  
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# SiFotonics Contributors

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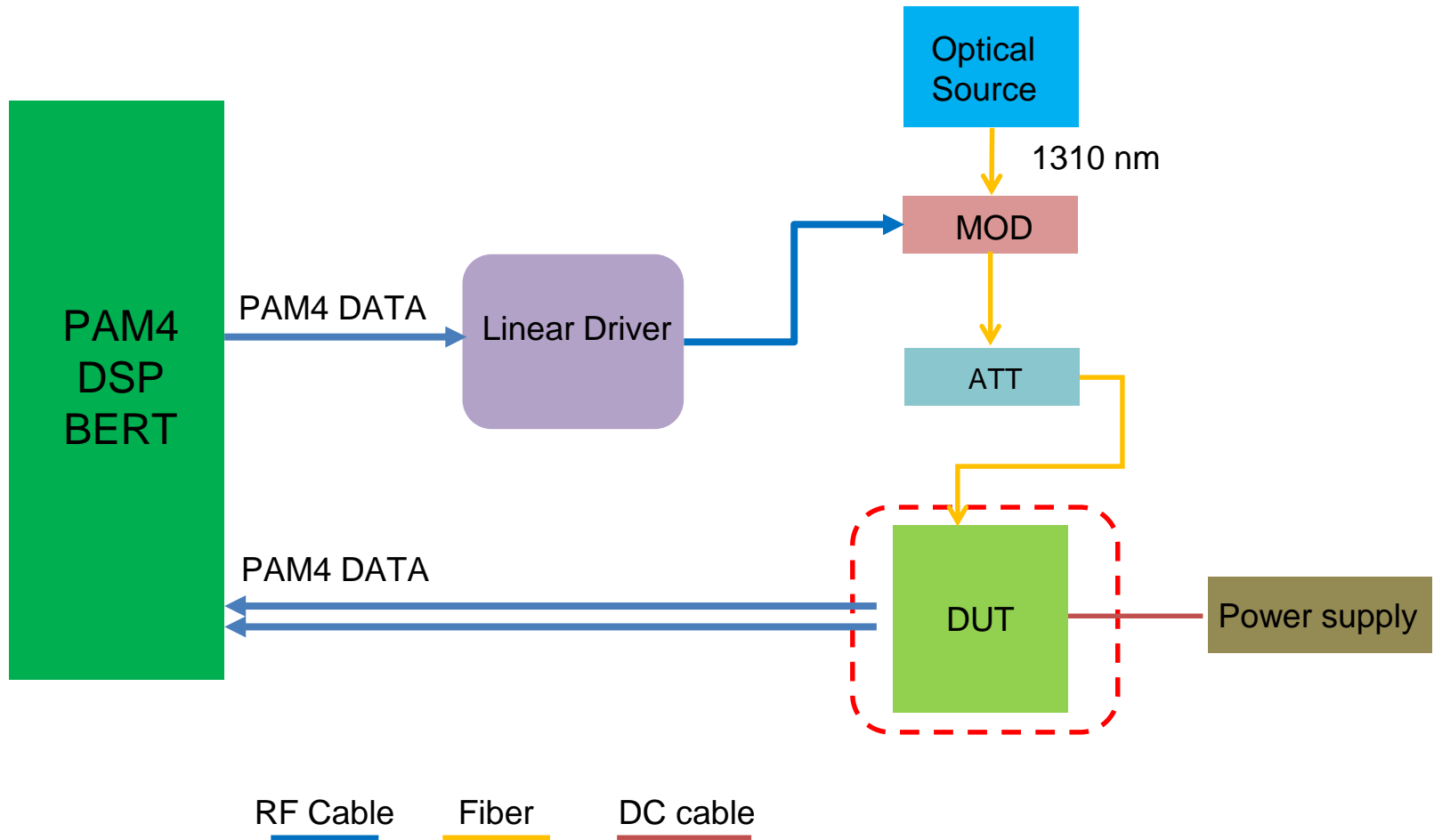
# Solution 1: TO-can based 25Gbaud APD receiver

- TO-can based APD receiver
  - Linear 25Gbaud APD and TIA inside
  - Commercial TO-46 7pin header
  - Compatible with current BOSA module for PON





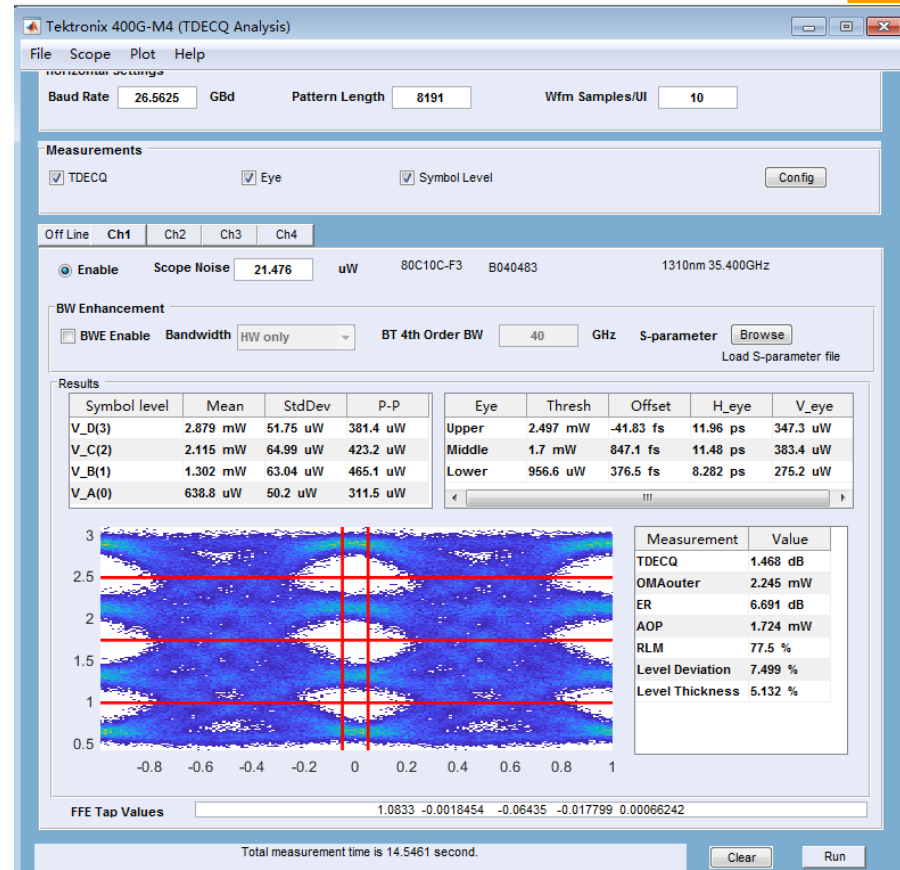
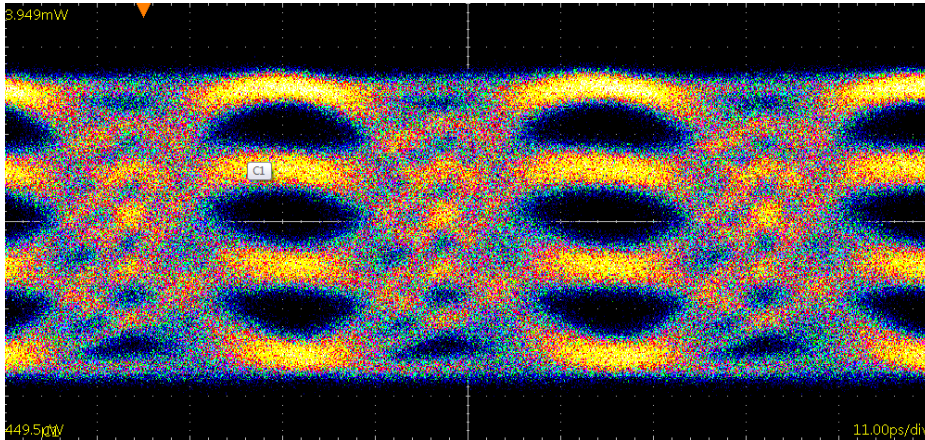
# PAM4 test setup





# Tx's optical eye

Data Rate: 26.5625GBaud  
TDECQ: 1.468dB  
ER: 6.691dB





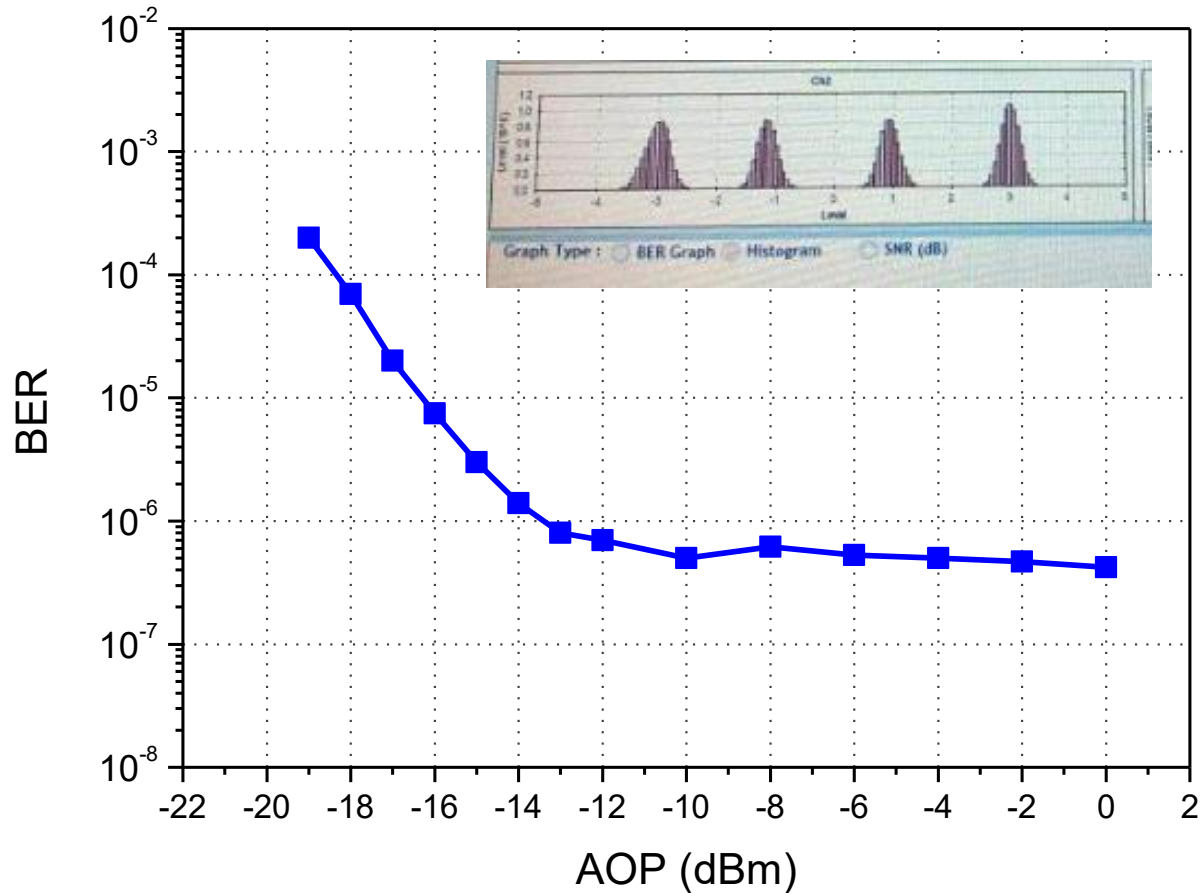
# TO-can APD receiver PAM4 BER Curve and BERT/DSP PAM4 histogram

Test conditions:  
26.6Gbaud PAM4,  
PRBS31Q,  
RT,

Sensitivity:  
-19dBm at  
BER=2e-4

Overload: >0dBm,  
limited by Tx power

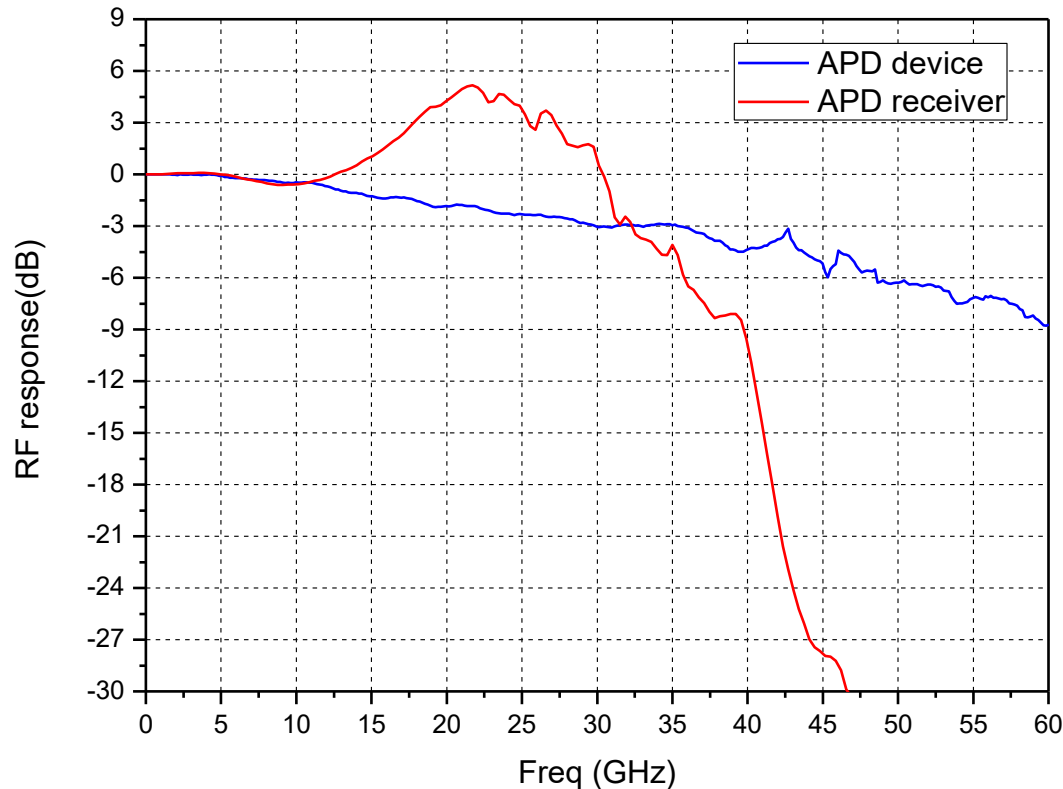
Dynamic range:  
>19dB





# Solution 2: 50Gbaud APD receiver

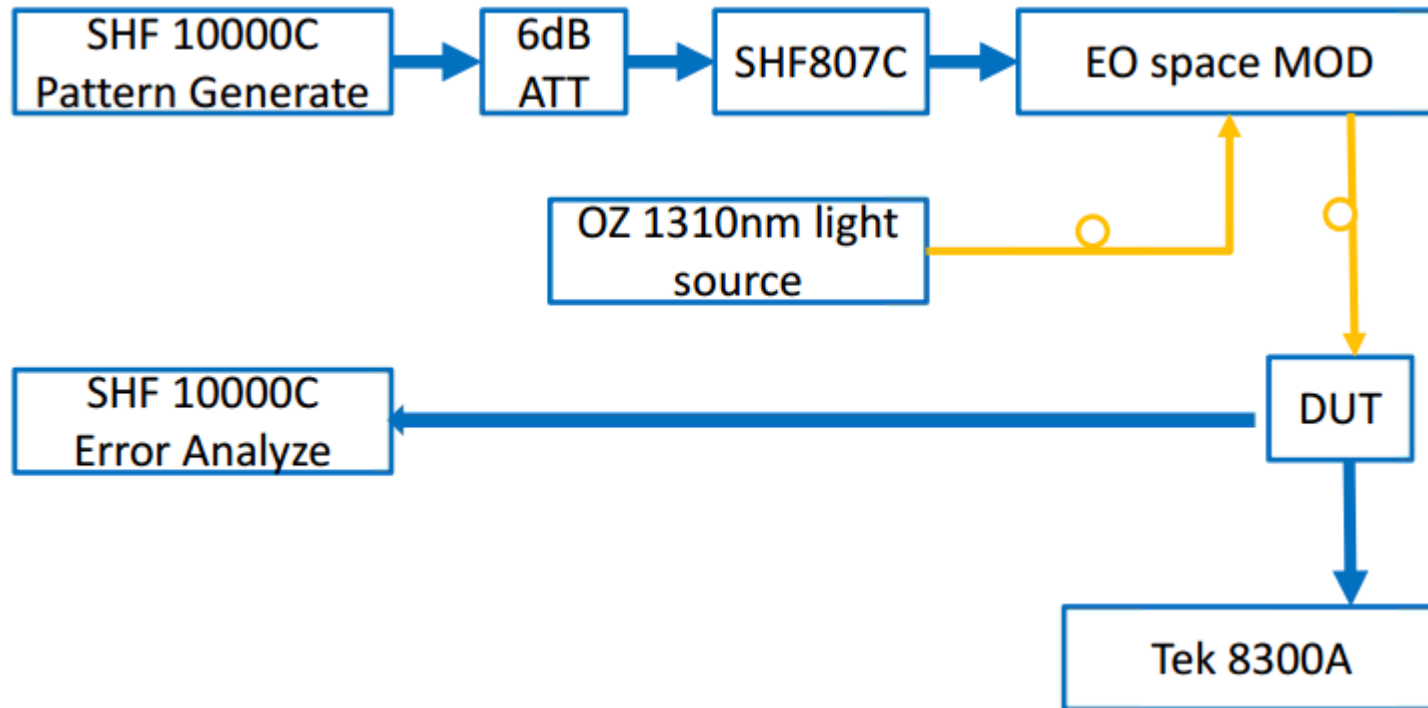
- 50Gbaud APD receiver has a very large 3-dB bandwidth  $\sim 32\text{GHz}$  for 50Gb/s operation;



Test conditions:  
1310nm,  
-13dBm input power,  
50-Ohm load, room  
temperature,  
APD biased at  
gain=10



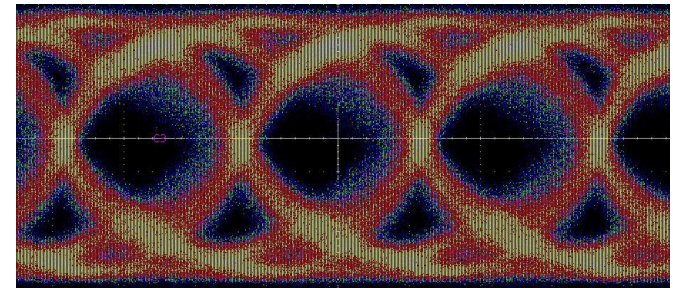
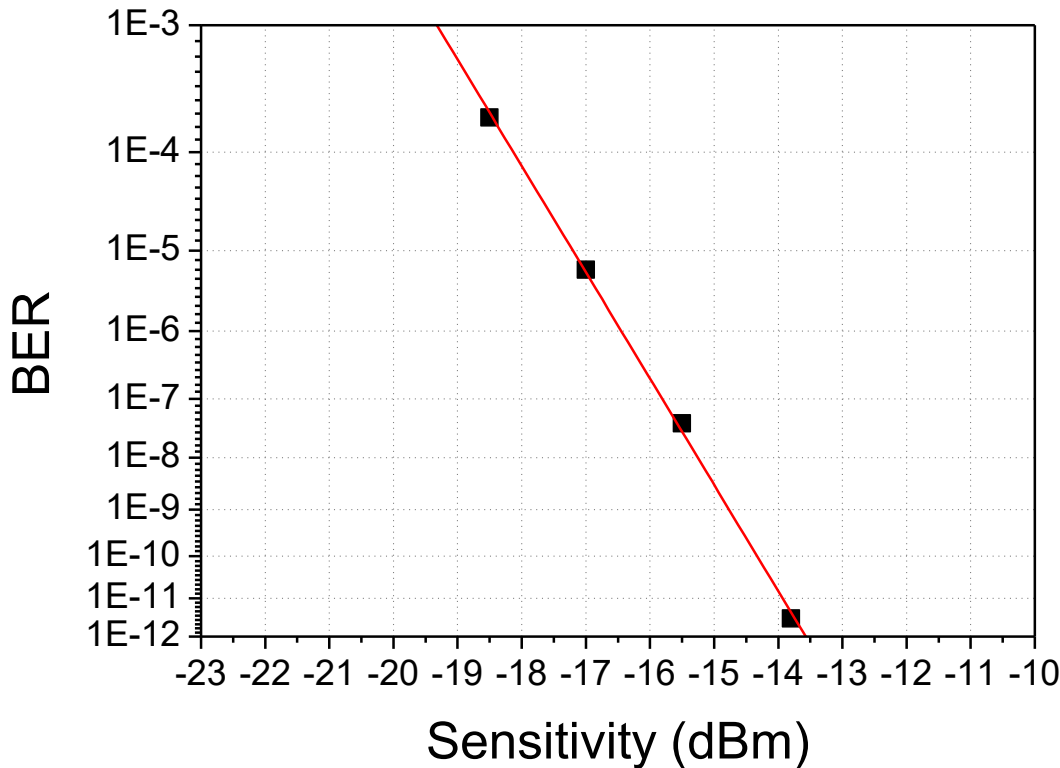
# 50Gbaud test setup







# 50G APD receiver BER curve and eye-diagram



Eye-diagram of APD receiver

Test conditions: 50Gb/s NRZ, back to back, ER=9dB, 1310nm, room temperature



# Summary

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- 25Gbaud PAM4 TO-can based APD receiver realized a sensitivity of -19dBm at BER=2e-4;
- 50G APD receiver NRZ sensitivity realized a sensitivity of <-19dBm at BER=1e-3 with only BERT;
- With proper Tx launch powers, both APD receivers' solutions can support 50G PON PR20 link budget request without additional optical amplifier;