

FX10 Demo Board

Channel Measurement

October 2, 2009



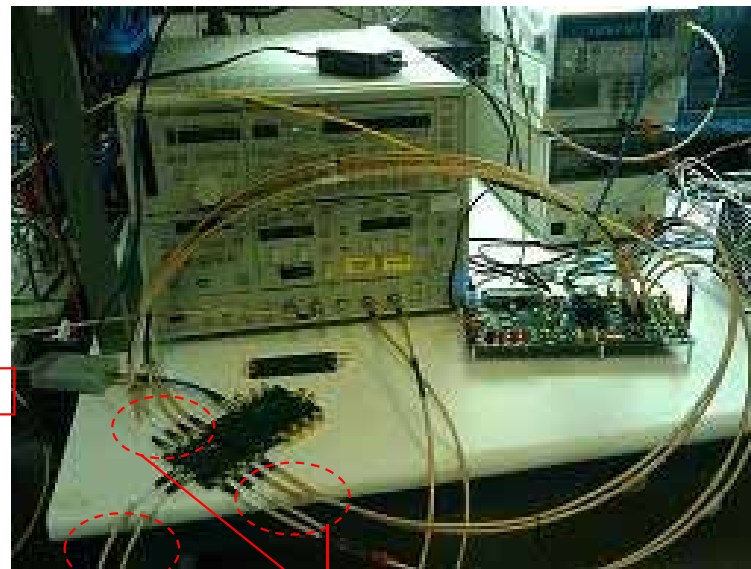
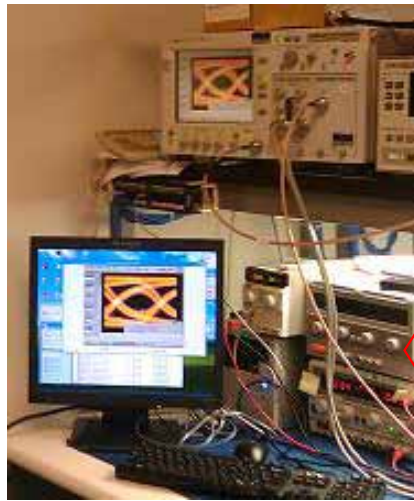
HIROSE ELECTRIC CO., LTD.

Outline

- Demo board
- Measurement setup
- FX10-4mm channel measurement
 - Insertion loss, return loss, NEXT, FEXT, and ICR
 - Insertion loss with and without connector
 - Eye diagram @11.2 Gbps with and without connector, and with and without FEXT
- FX10-5mm channel measurement
 - Insertion loss, return loss, NEXT, FEXT, and ICR
 - Insertion loss with and without connector
 - Eye diagram @11.2 Gbps with and without connector, and with and without FEXT
- Summary

Measurement setup

- Besides VNA and TDR measurements, eyes were measured @11.2 Gbps with 800mV swing, PRBS31 data pattern, 4 aggressor pairs, and no transmit emphasis.



Victim

4 aggressor pairs



FX10-4mm

Channel Measurement

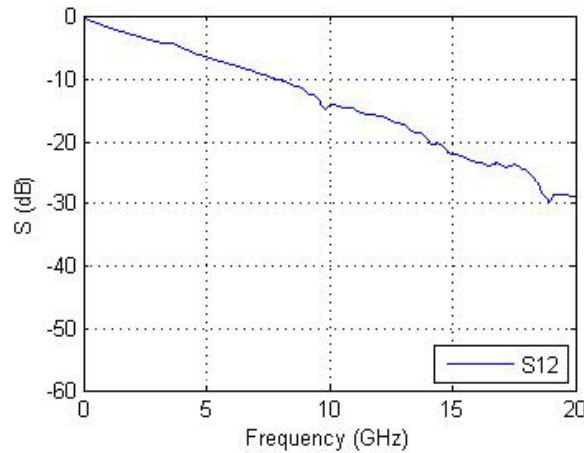
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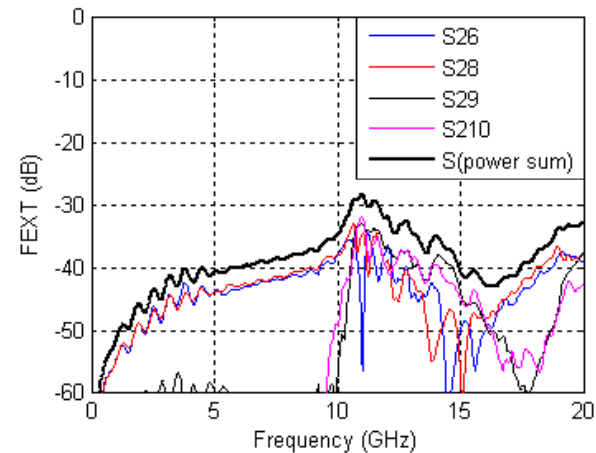
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FX10-4mm measurement results

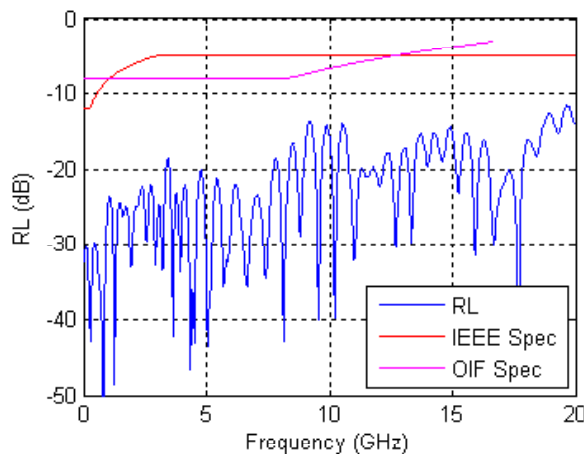
- FX10-4mm channel's return loss and insertion-loss-to-crosstalk ratio (ICR) meet extrapolated IEEE802.3ap spec. to 20 Gbps.



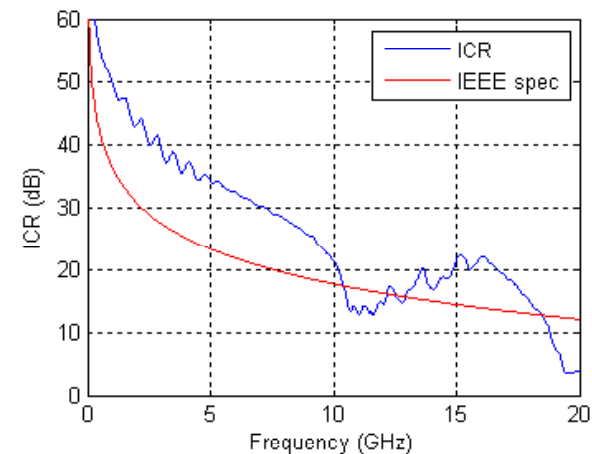
Insertion loss



FEXT



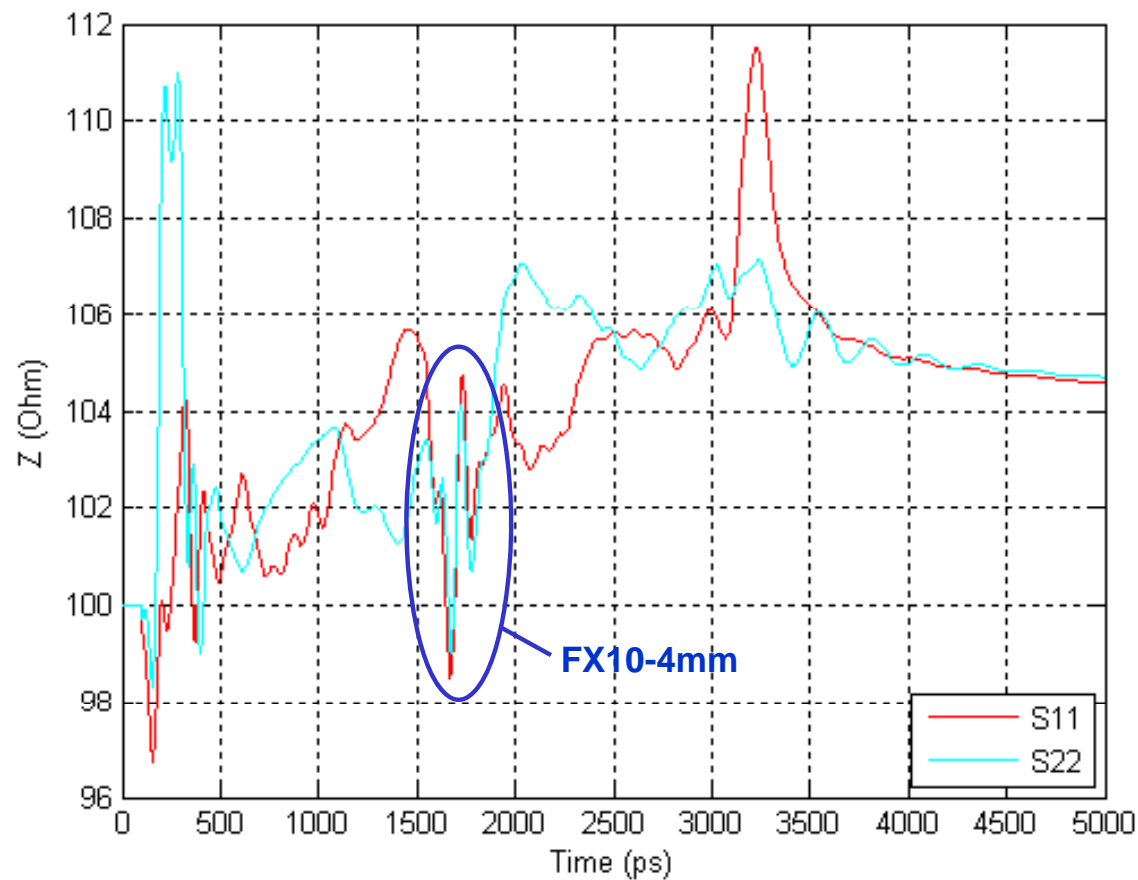
Return loss



ICR with FEXT

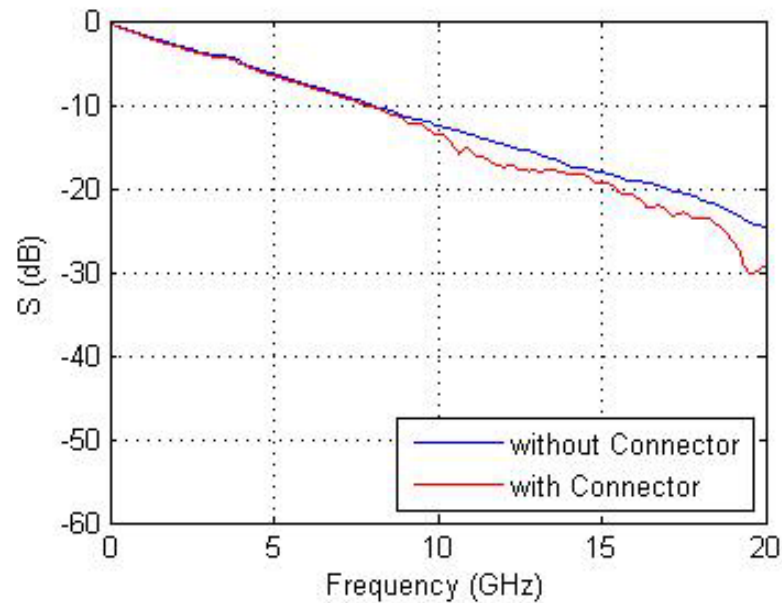
TDR @30 ps rise time (20% to 80%)

- FX10-4mm gives very well-balanced impedance.



Comparison with test coupon

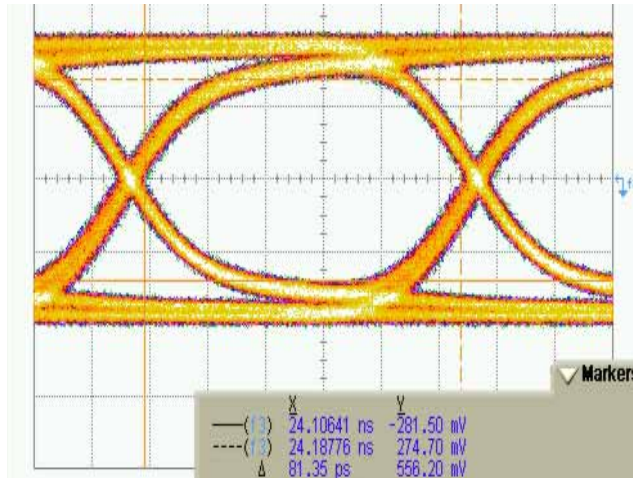
- Full-channel measurements with and without FX10-4mm connector shows little difference in insertion loss below 9 GHz.



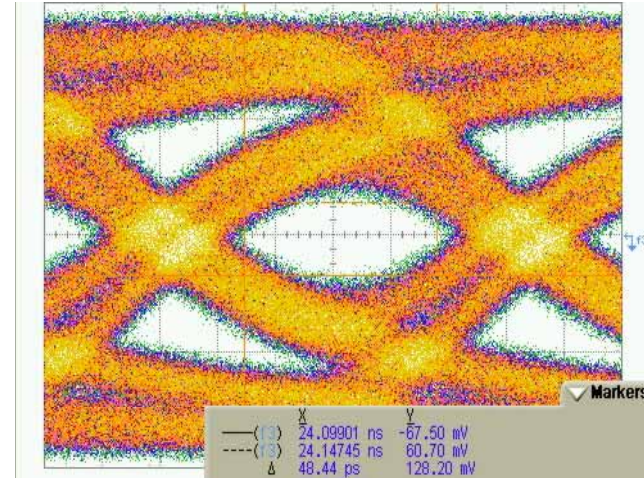
FX10-4mm

Channel @11.2 Gbps w/o TX emphasis

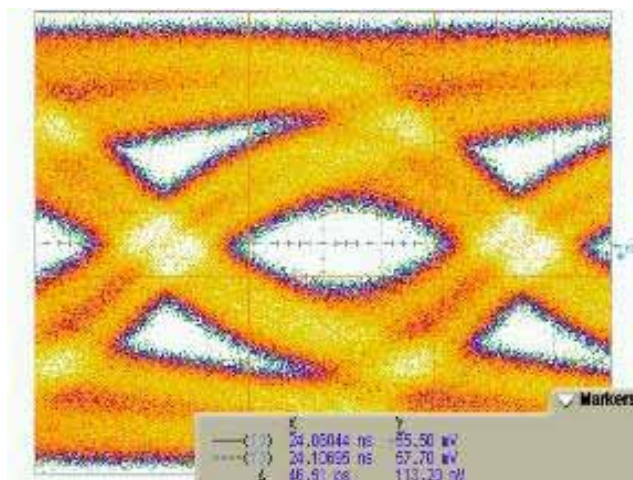
- Very little voltage and timing loss with FX10-4mm.



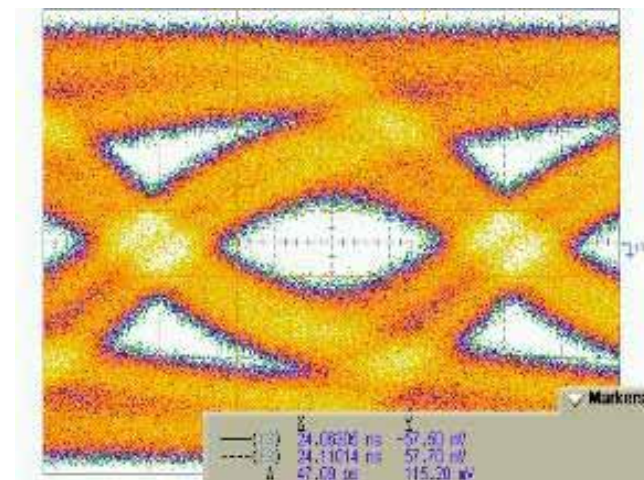
PPG output @800 mV swing



Pass through (no connector)



FX10-4mm channel
w/o Xtalk



FX10-4mm channel
with 4-aggressor FEXT



FX10-5mm

Channel Measurement

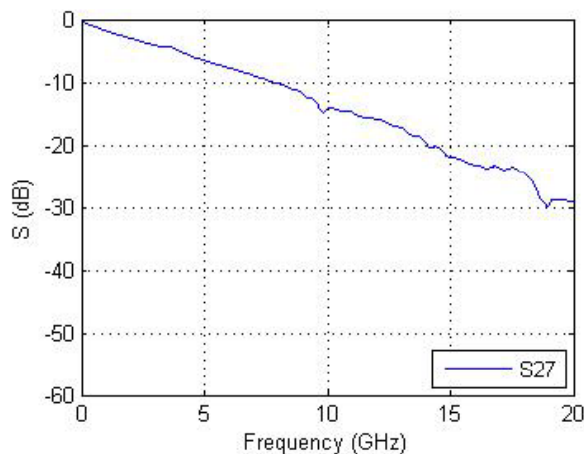
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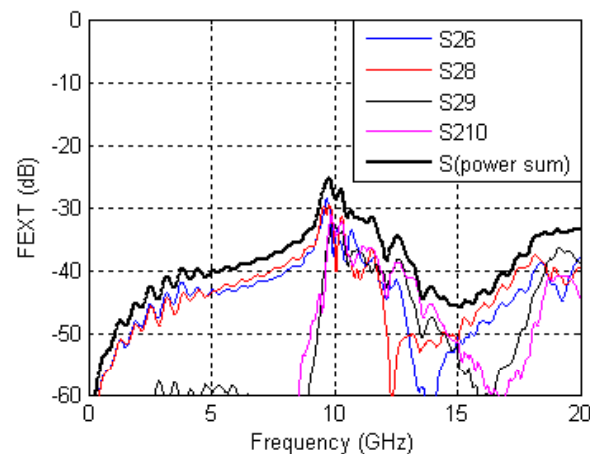
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FX10-5mm measurement results

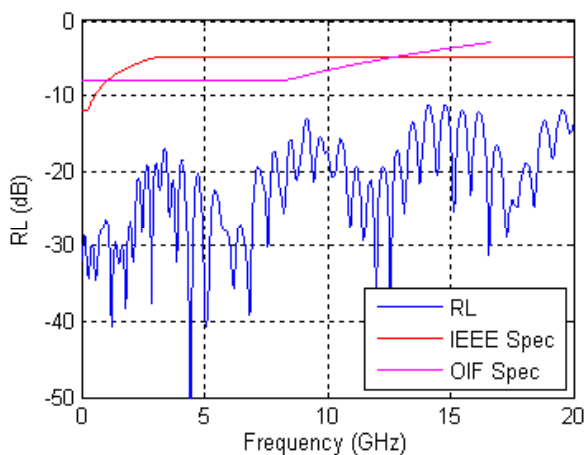
- FX10-5mm channel's return loss and insertion-loss-to-crosstalk ratio (ICR) meet extrapolated IEEE802.3ap spec. to 18 Gbps.



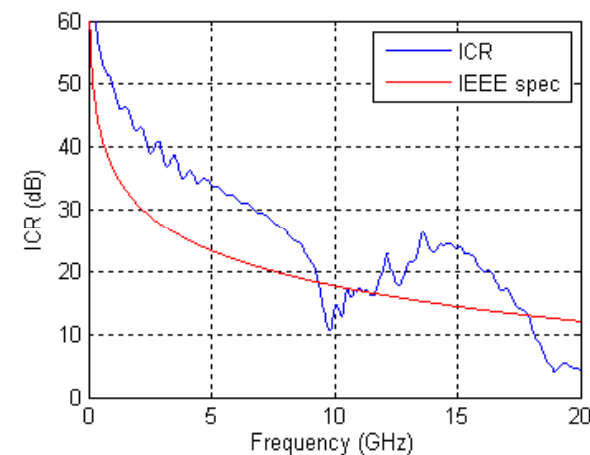
Insertion loss



FEXT



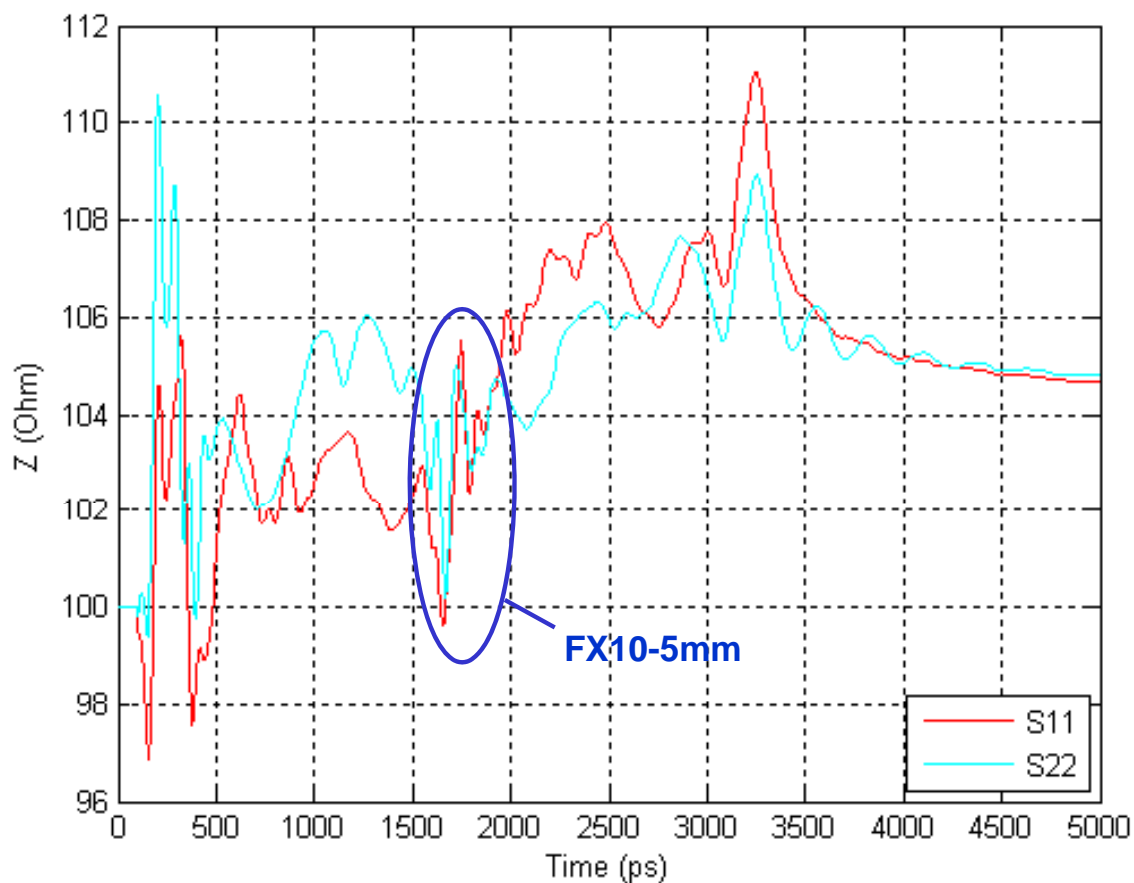
Return loss



ICR with FEXT

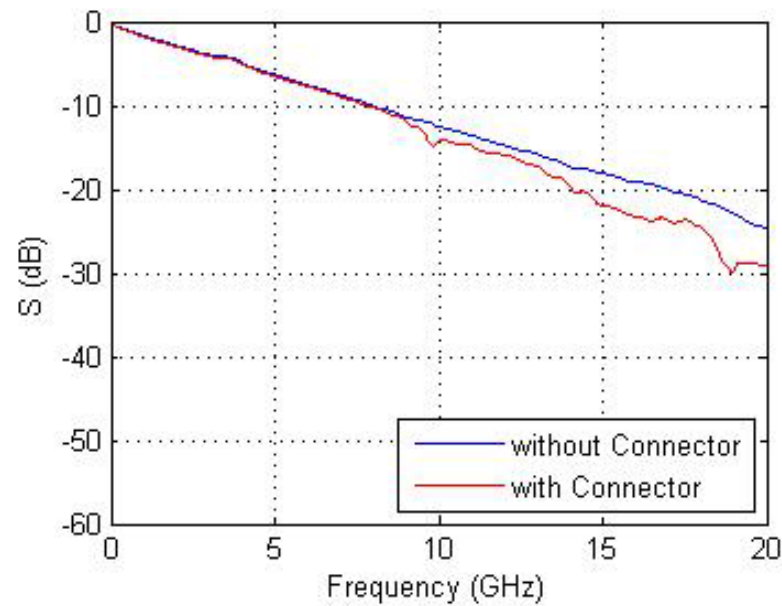
TDR @30 ps rise time (20% to 80%)

- FX10-5mm gives very well-balanced impedance.



Comparison with test coupon

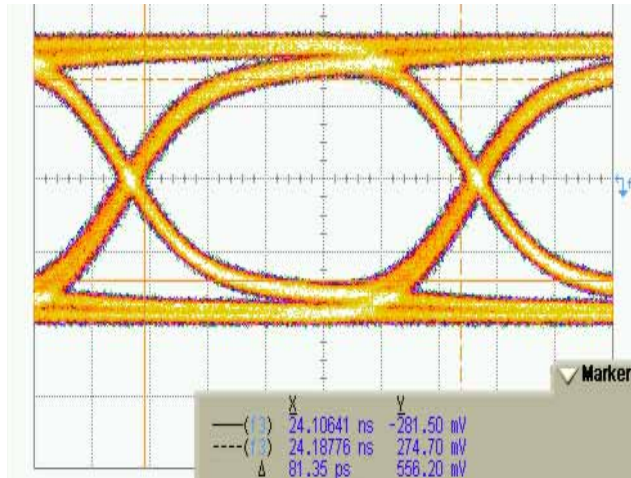
- Full-channel measurements with and without FX10-5mm connector shows little difference in insertion loss below 9 GHz.



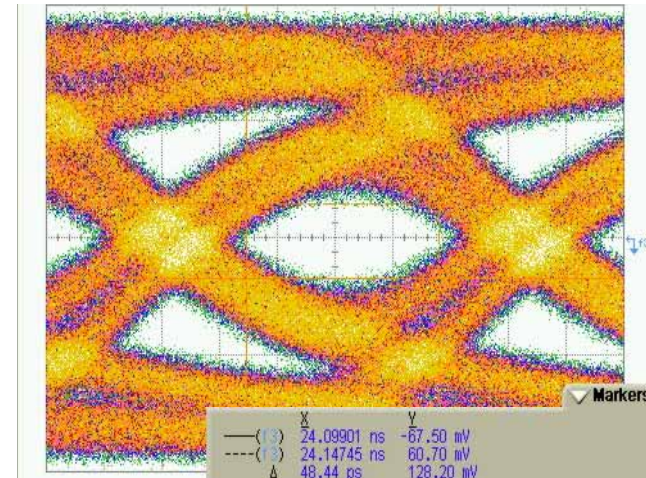
FX10-5mm

Channel @11.2 Gbps w/o TX emphasis

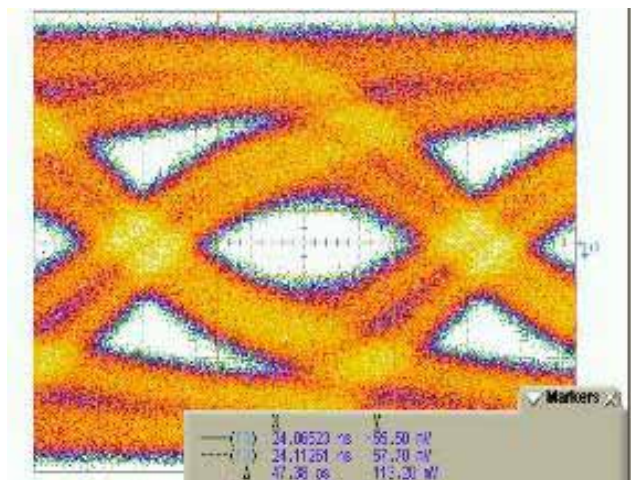
- Very little voltage and timing loss with FX10-5mm.



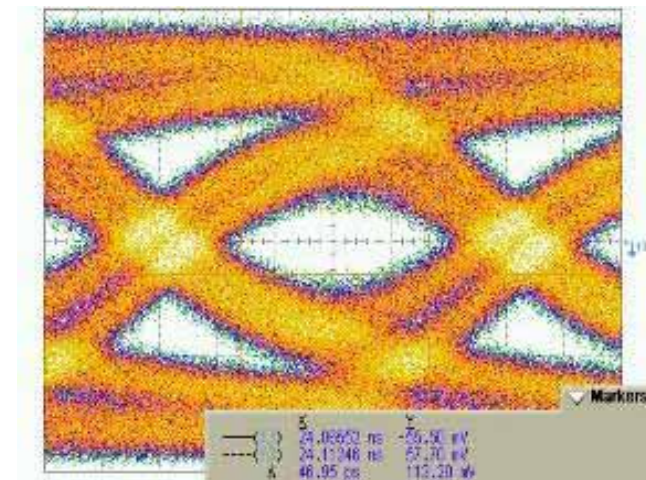
PPG output @800 mV swing



Pass through (no connector)



FX10-5mm channel
w/o Xtalk



FX10-5mm channel
with 4-aggressor FEXT

Summary

- VNA measurements show that FX10 connectors meet the OIF spec. to 12.5+ Gbps and IEEE 802.3ap spec. to 18+ Gbps.
- Eye measurements show that FX10 connectors result in very little voltage and timing loss @11.2 Gbps.