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100G Ethernet Test Adapter

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IEEE 802.3 Higher Speed Study Group

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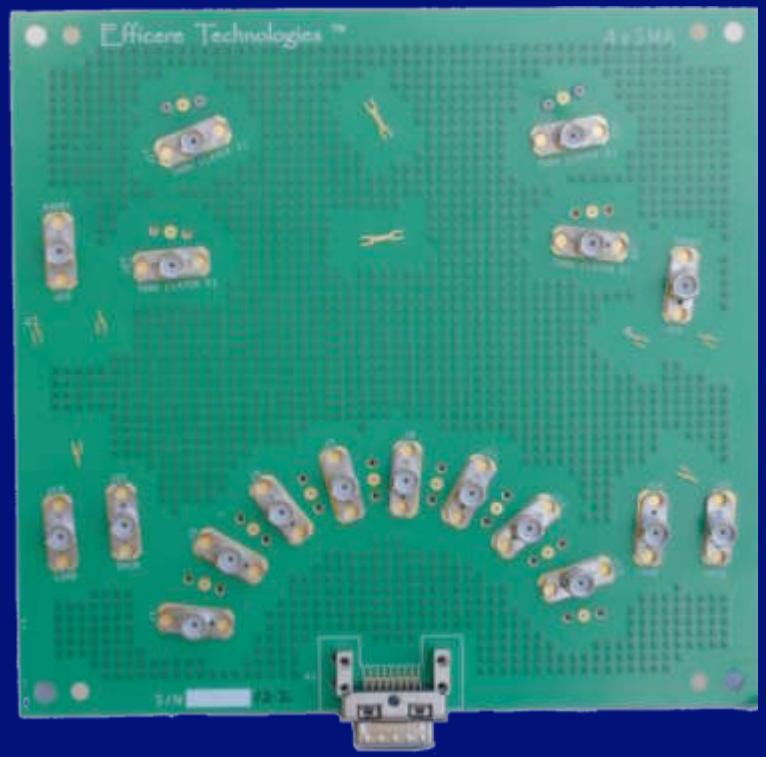
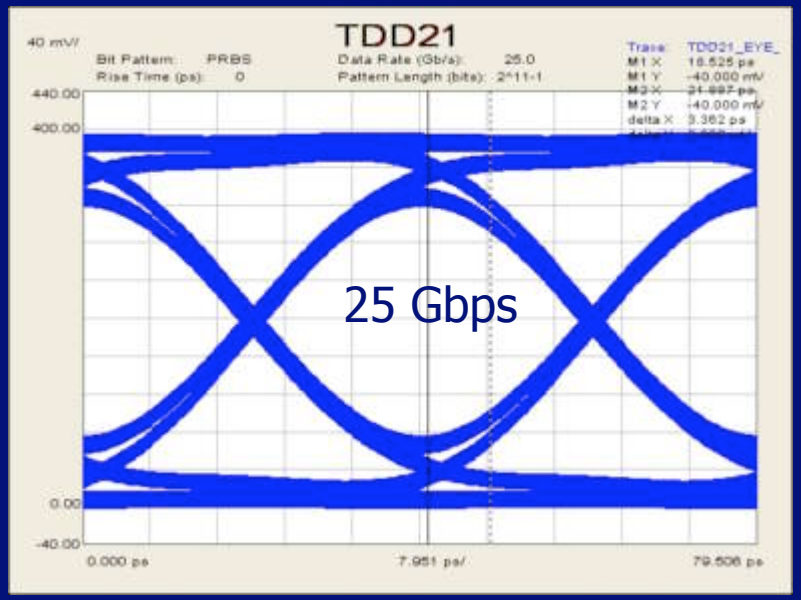
Permission to publicly publish granted

4X-SMA 25Gb Test Adapter

- 25 Gbs per differential pair





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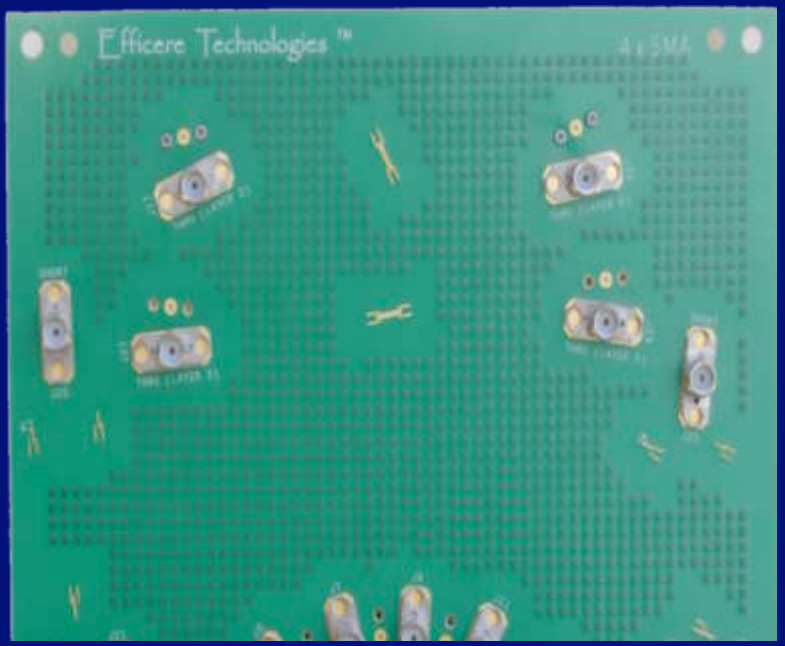
Test Methodology

- Hardware:
  - Agilent 50 GHz 4-port VNA E8364B with N4421B test set
  - Agilent 20 GHz 12-port VNA
  - Agilent DCA-J 86100C with 54754 20 GHz Differential TDR Module
- Software:
  - PLTS v3.1
- Methodology:
  - 2x Differential thru traces
  - Test Adapter to Test Adapter with receptacles

Calibration Structures

- SOLT Cal Structures
- Structures work well to ~8GHz
- More development in the structures is needed to extend the bandwidth of structures
- Consider other Calibration methodologies



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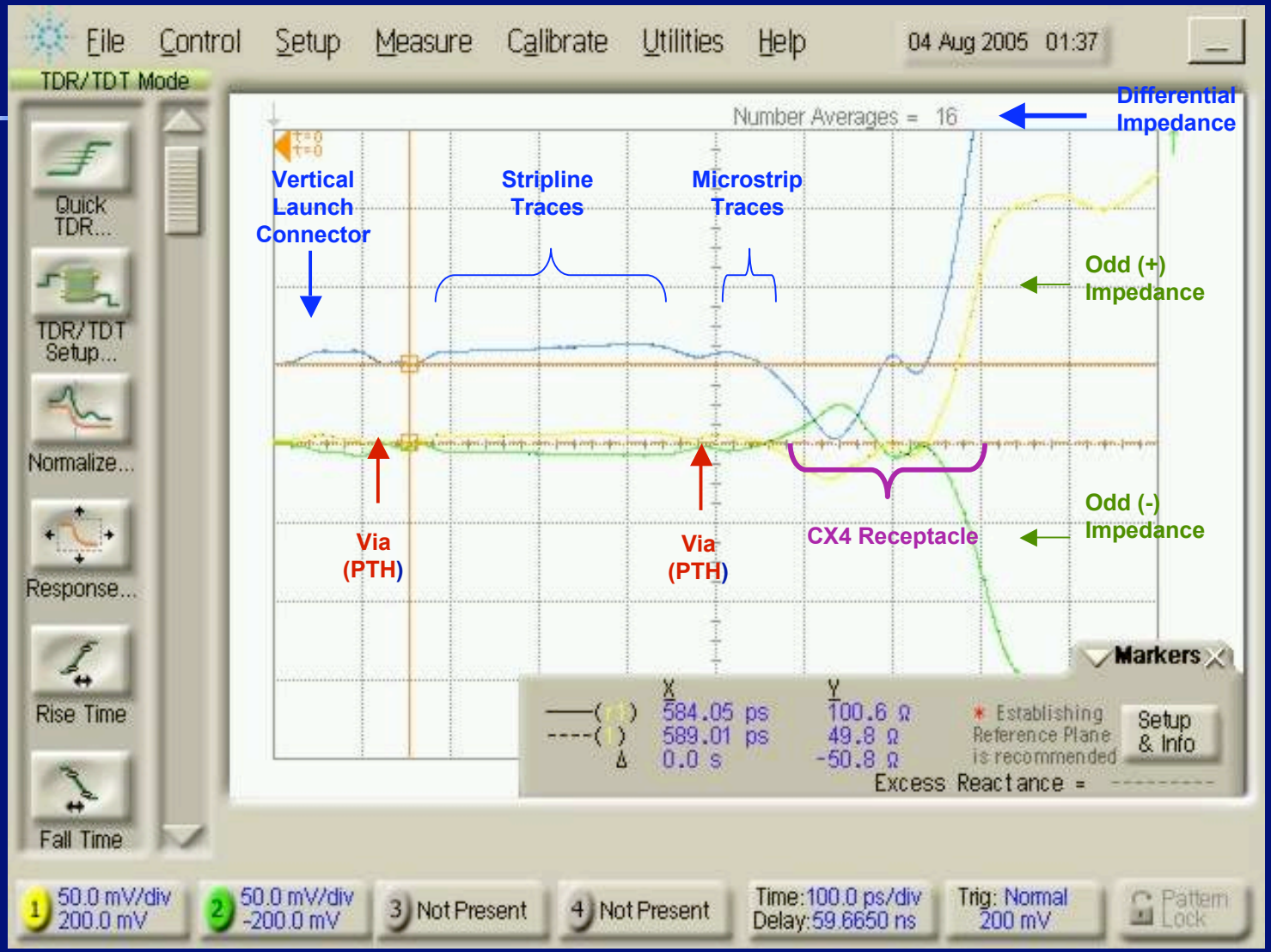
Optimized Differential Impedance



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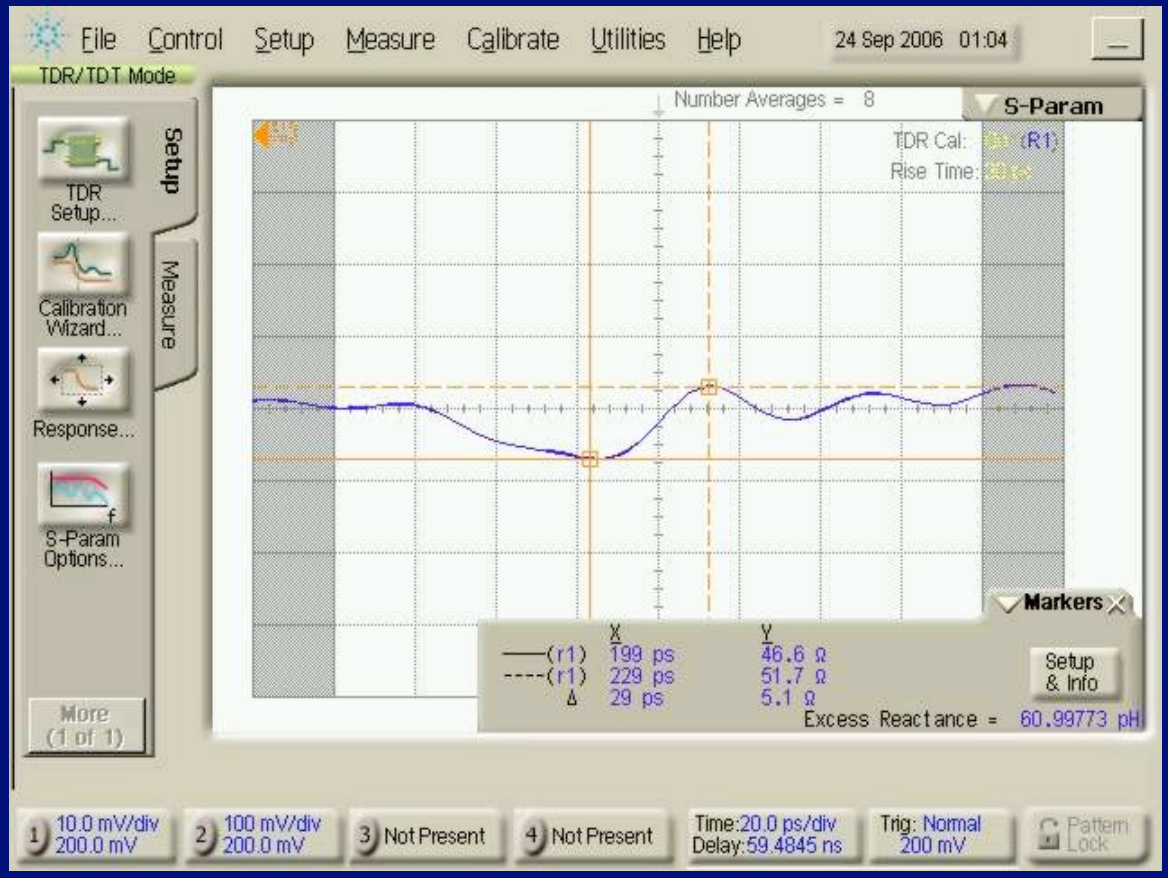
Non-Optimized Via TDR

Efficere non-optimized SMA Launch into via structure and then into stripline trace

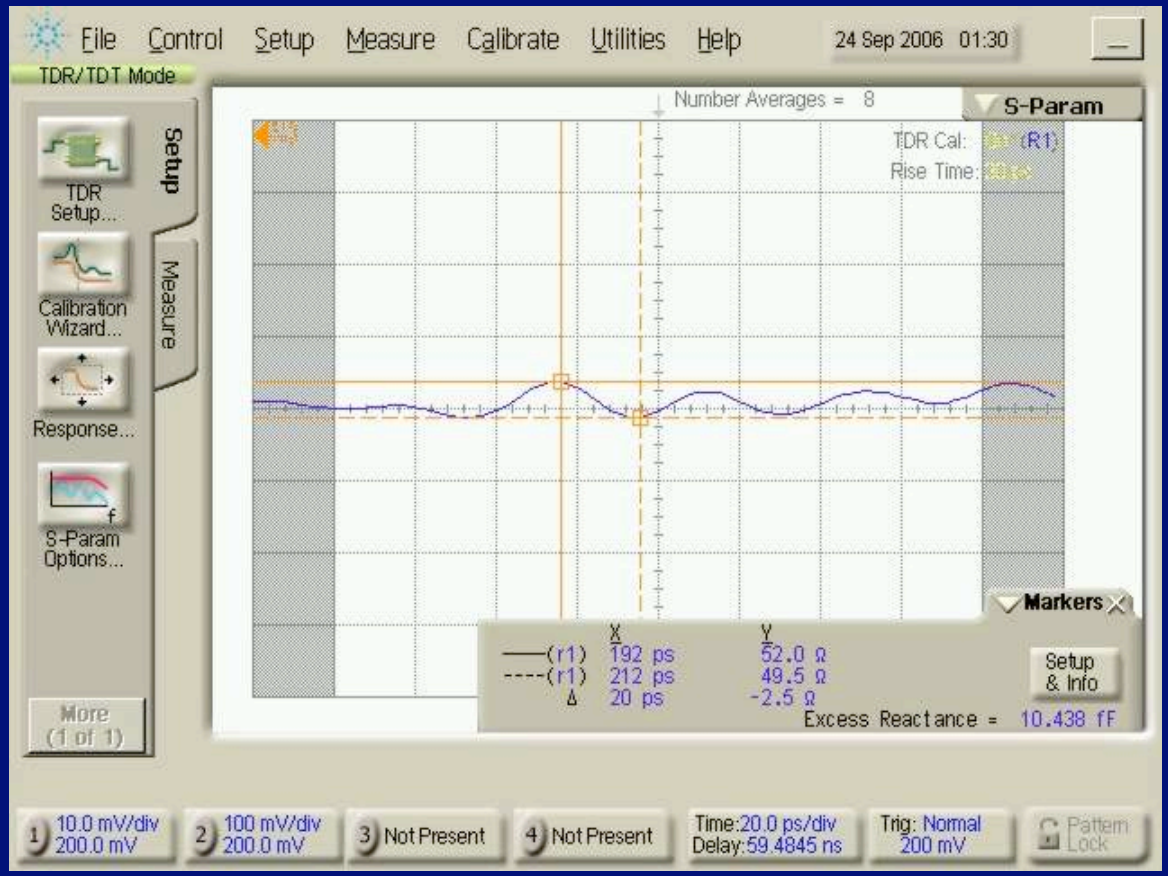
30ps TDR Step Risetime



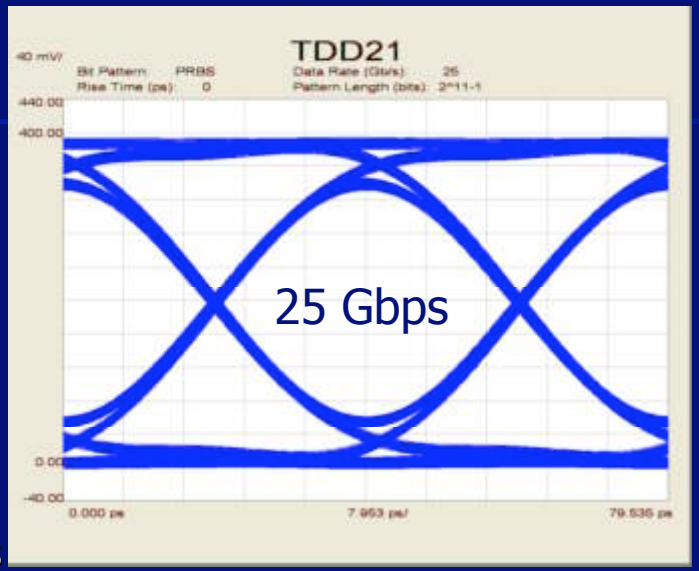
Optimized Via TDR

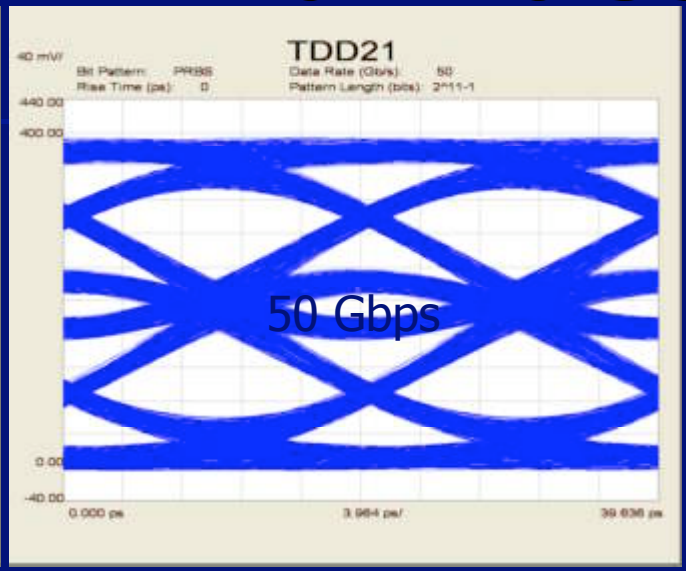
Efficere optimized SMA Launch into via structure and then into stripline trace

30ps TDR Step Risetime



4x-SMA-25Gb… 2x Thru Trace





2x Thru trace includes

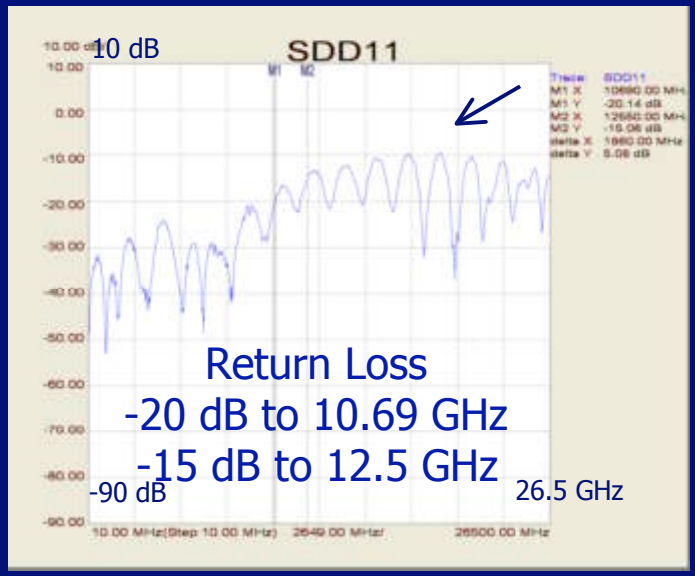
…

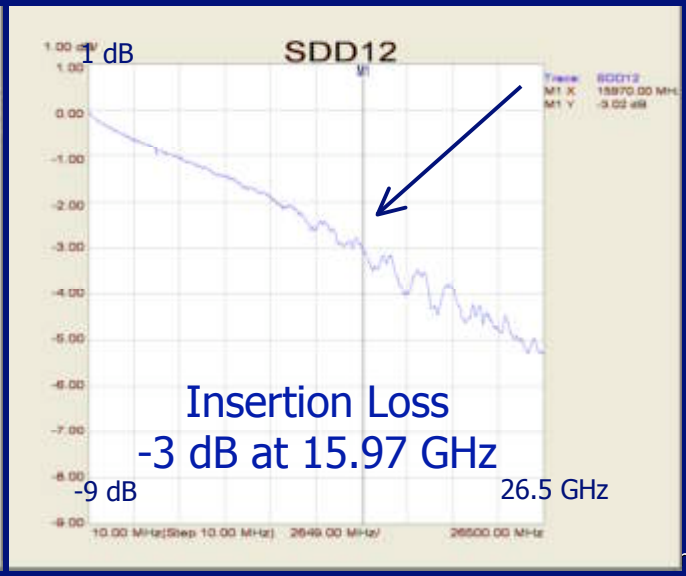
4 vias

2 SMAs

4x pad

excludes the 4X receptacle





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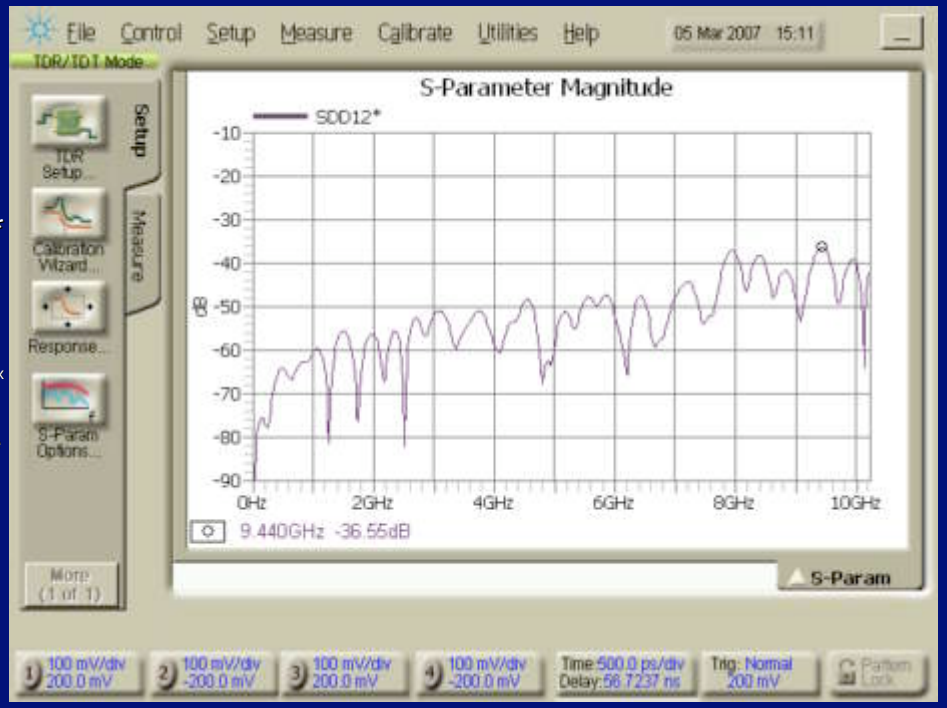
4X-SMA 25Gb Test Adapter

- Insertion loss > -3 dB to 15.9 GHz*
- Return loss better than -20 dB to 10 GHz*
- Crosstalk better than 36.55 dB to 10 GHz**



* All data measured using 2x thru trace: 2x thru path includes 2 SMA, SAM launches, four via structures, 2x thru traces are electrically matched to that of two test traces with the pads for two CX4 receptacles. Data does not include the CX4 receptacle, There is no compensation, smoothing or averaging of the measured data.

** Crosstalk measurements were made using an odd mode differential TDR (aggressor) on one 100 ohm terminated pair and measured the xtalk on the adjacent (victim) 100 ohm terminated pair. The xtalk measurement does not include the receptacle

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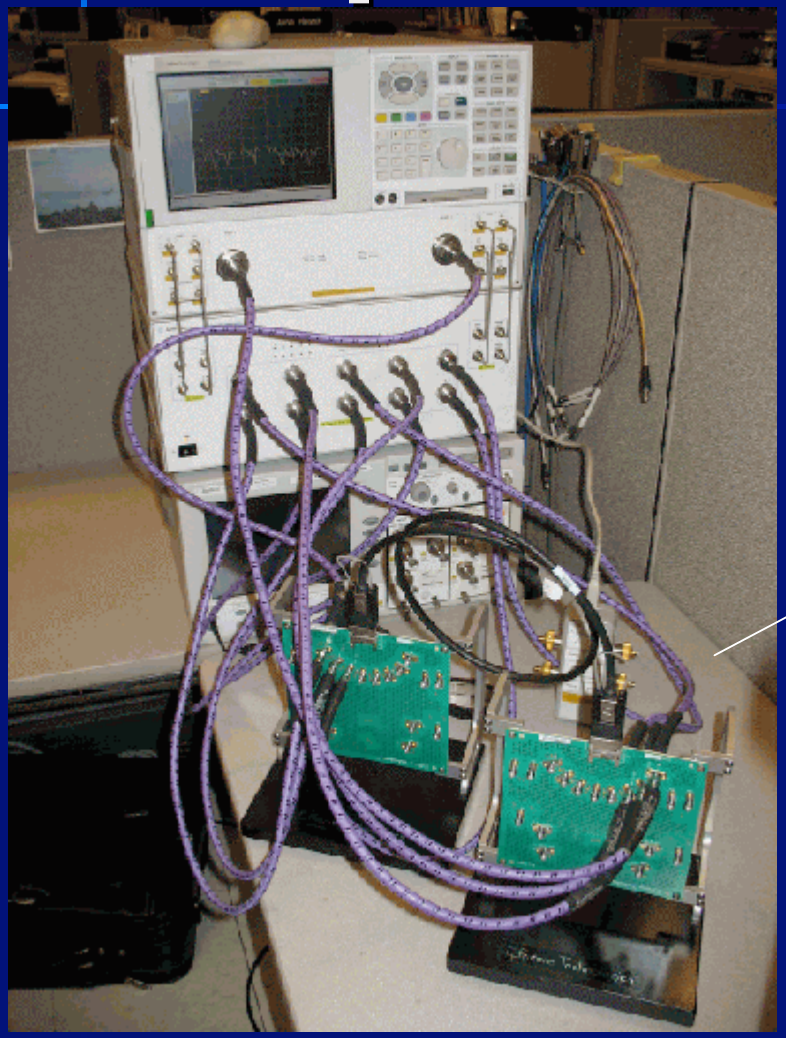
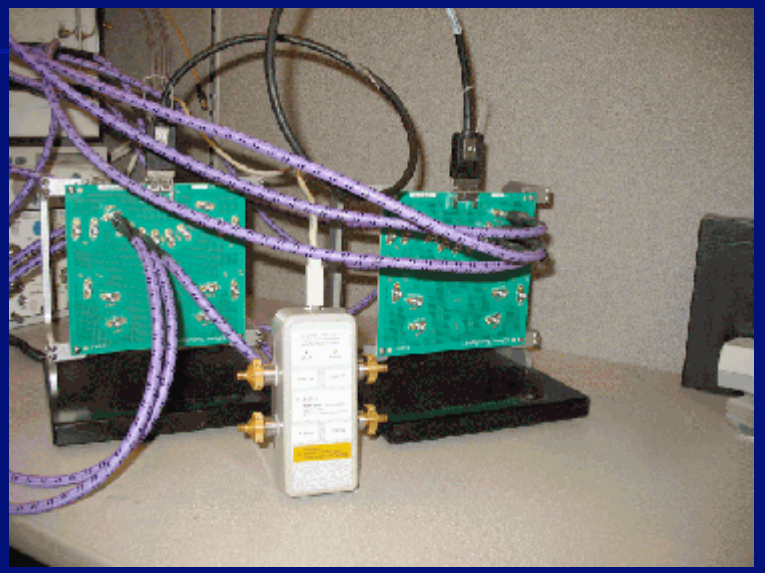
12-port VNA Test Set-up





Note that the 12 port data includes a 1 meter cable. Prior data was board only.

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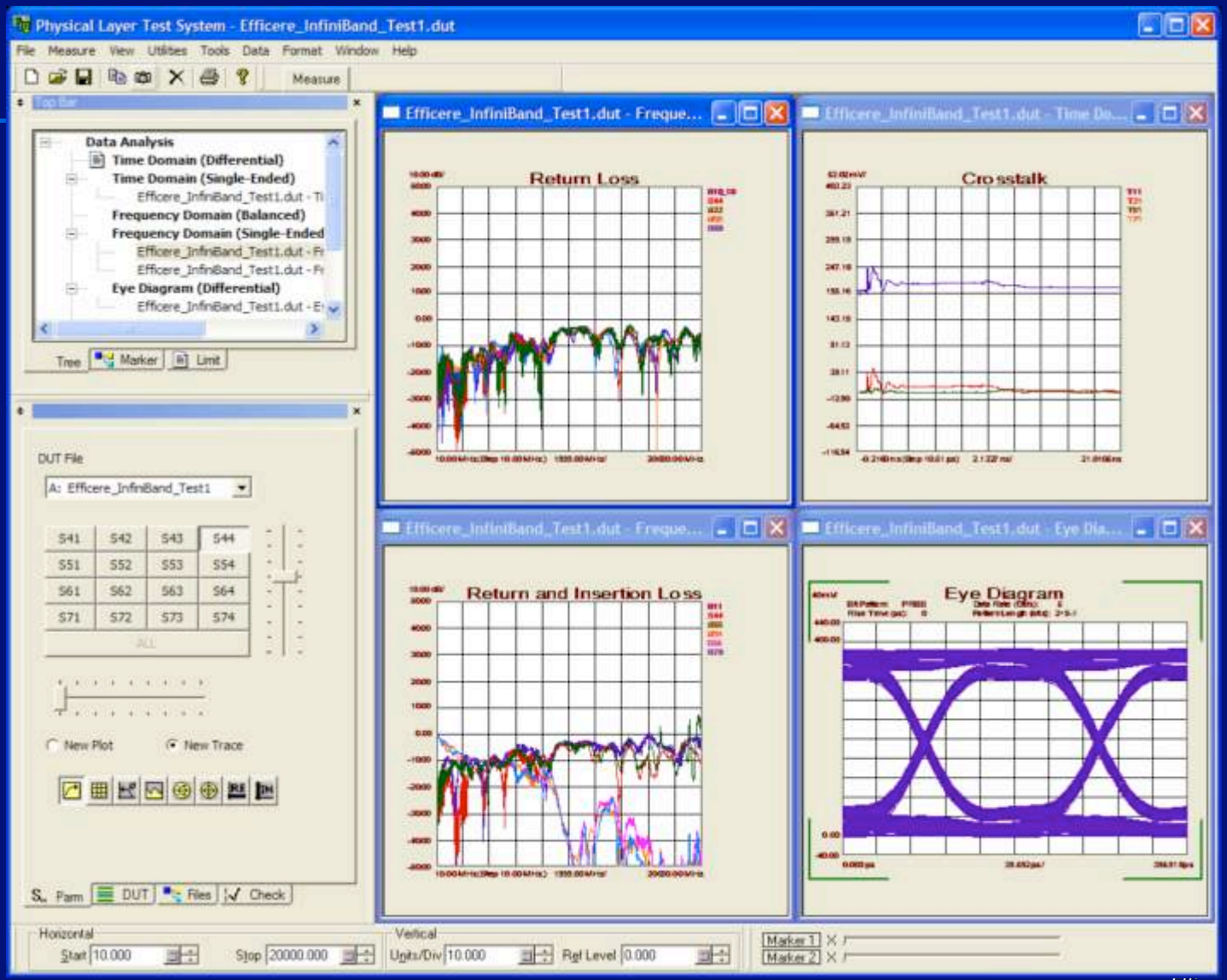
12-port results … 25 Gbps Fixture



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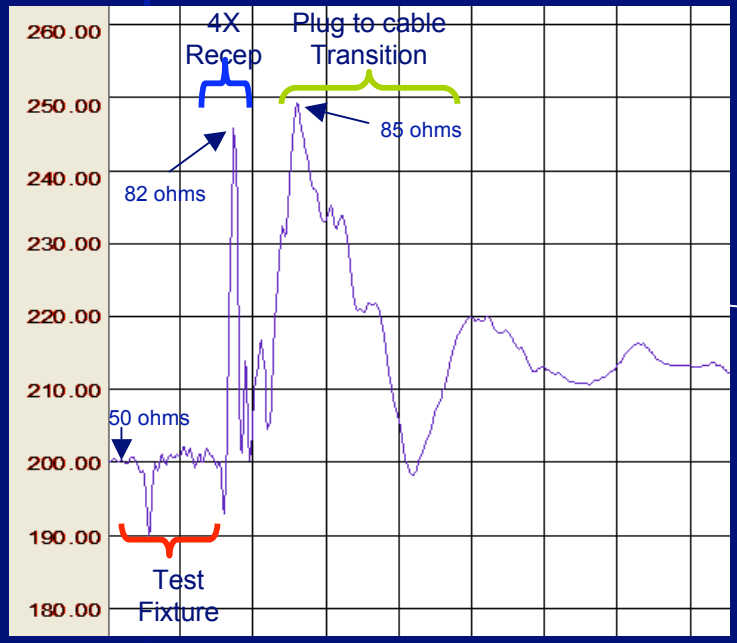
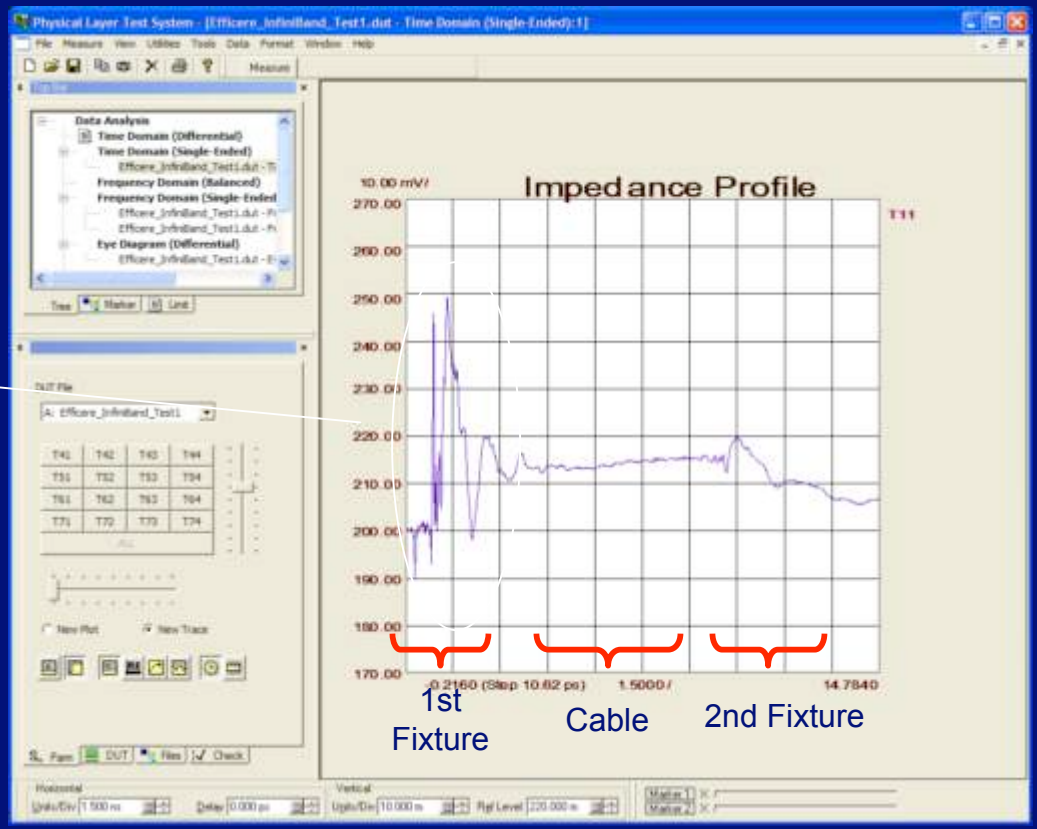
12-port results … 25 Gbps Fixture

- Impedance profile using 12-port VNA





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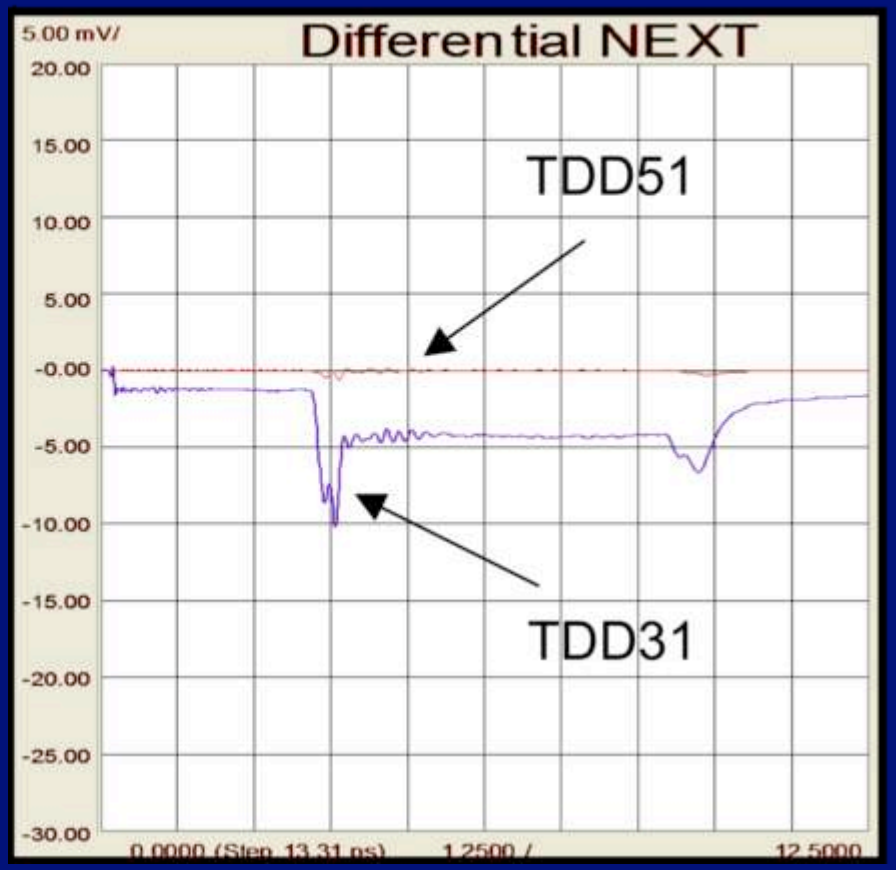
12-port results … 25 Gbps Fixture

- Differential NEXT



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Conclusion

- 25 Gbps 4X test fixture exists today
  - High performance electrically Invisible Via™ structures
  - Tuned signal paths, launches, recep pads, etc.
  - *Higher bandwidth products will come in the future*
- Pursuing cable board for direct evaluation of wire

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