Return Loss with Mid-Span Insertion

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Thanks to Steve Gorman

May 2000 Interim

TDK SEMICONDUCTOR CORP.

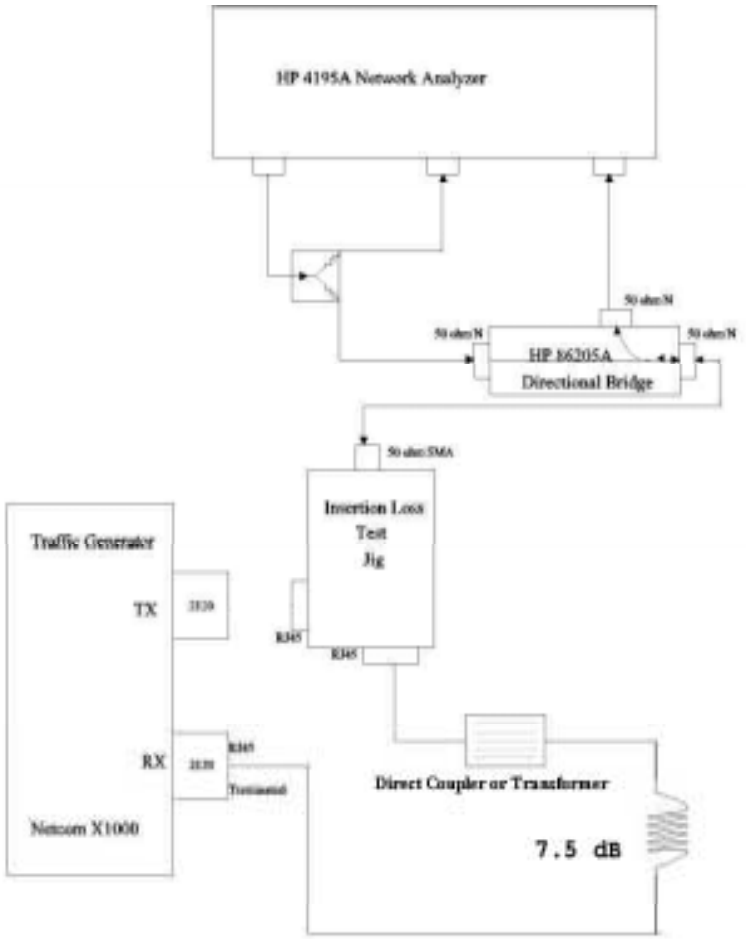
Test Objectives

- Determine the incremental return loss effect of inserting an additional transformer in a cat 5 link. This will help determine the feasibility of mid-span insertion of power on the signal pairs.

Methodology

- Measure the effect on the link without transmitted idle.
- Measure the effect on the link with transmitted idle, as in the Fast Ethernet test suite.
- Measure return loss directly, rather than impedance.
- Place transformer at 1 meter and 99 meters of ~100 meter cable.
- Replace transformer with straight through connector, remeasure and compare.
- Tests run with TDK TLA 6T103 transformer. Some of the tests were repeated with a Halo TG22-3506 transformer.

Test Circuit



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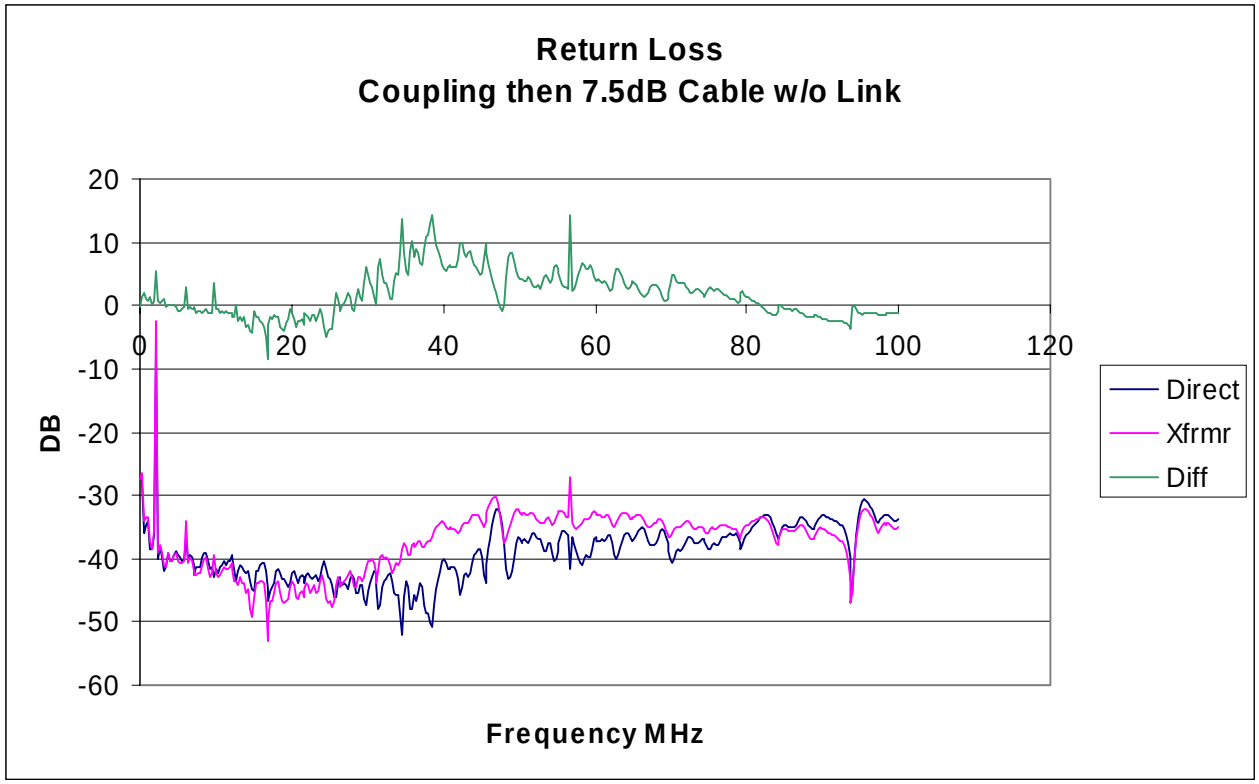
Results
TDK transformer



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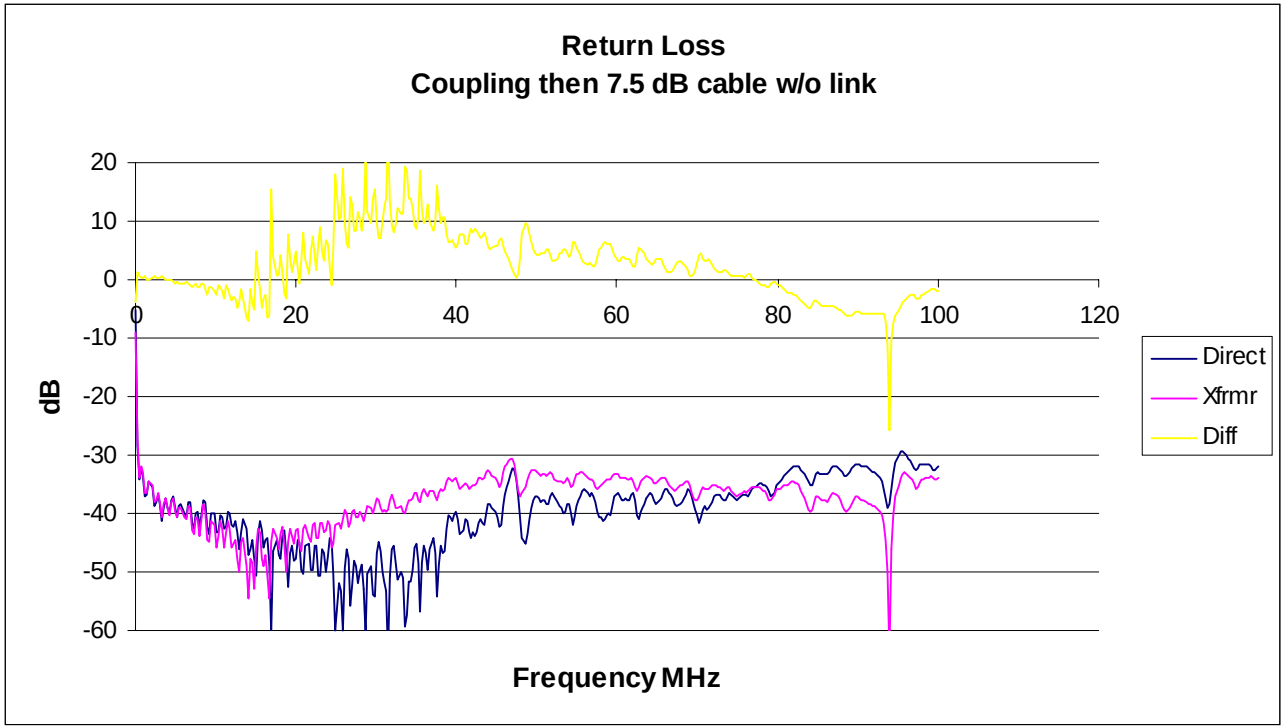
Results
Halo transformer



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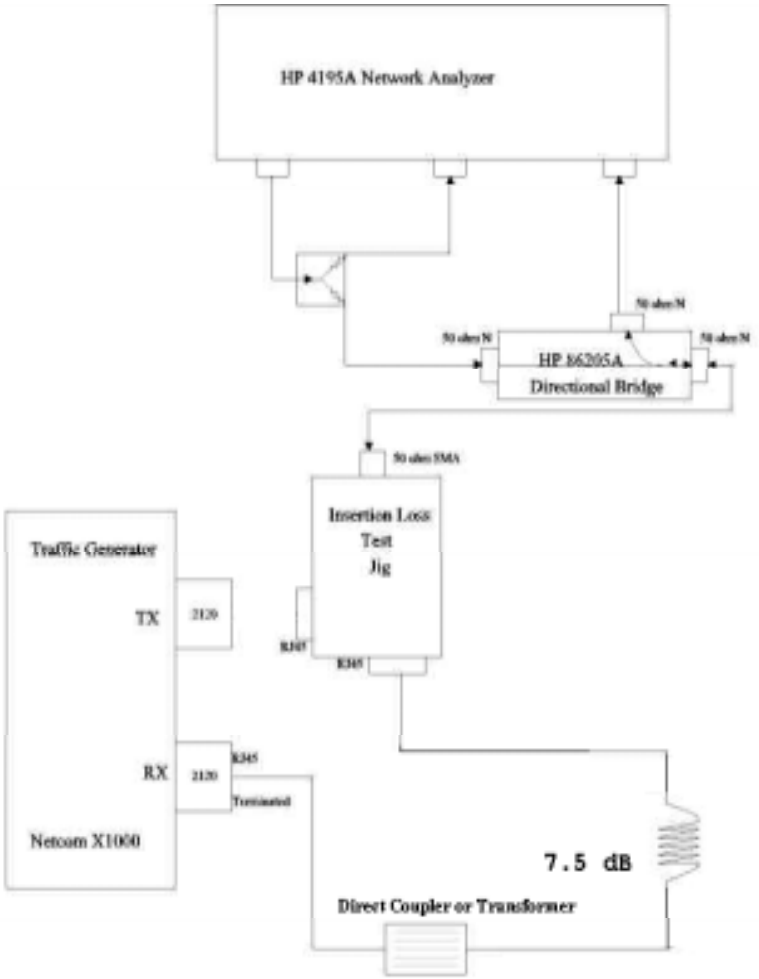
Test Circuit



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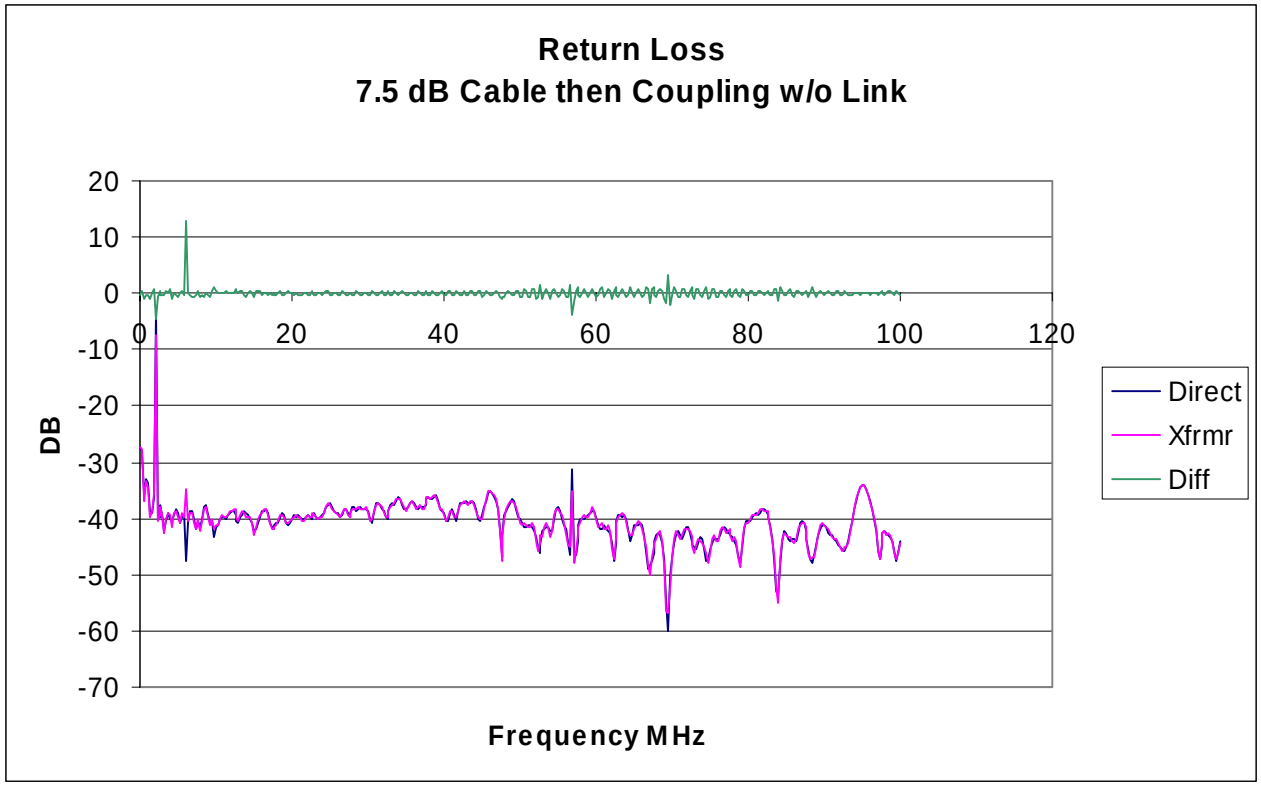
Results
TDK transformer



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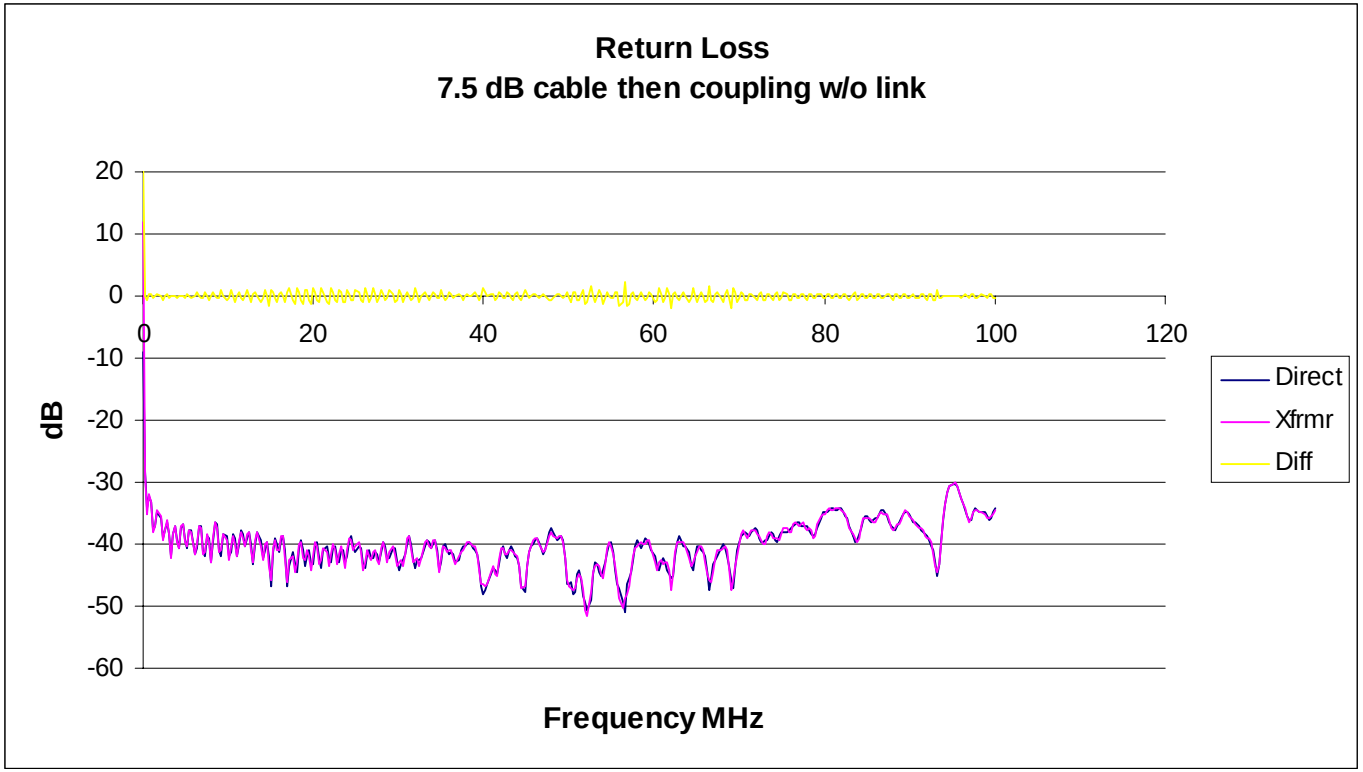
Results
Halo transformer



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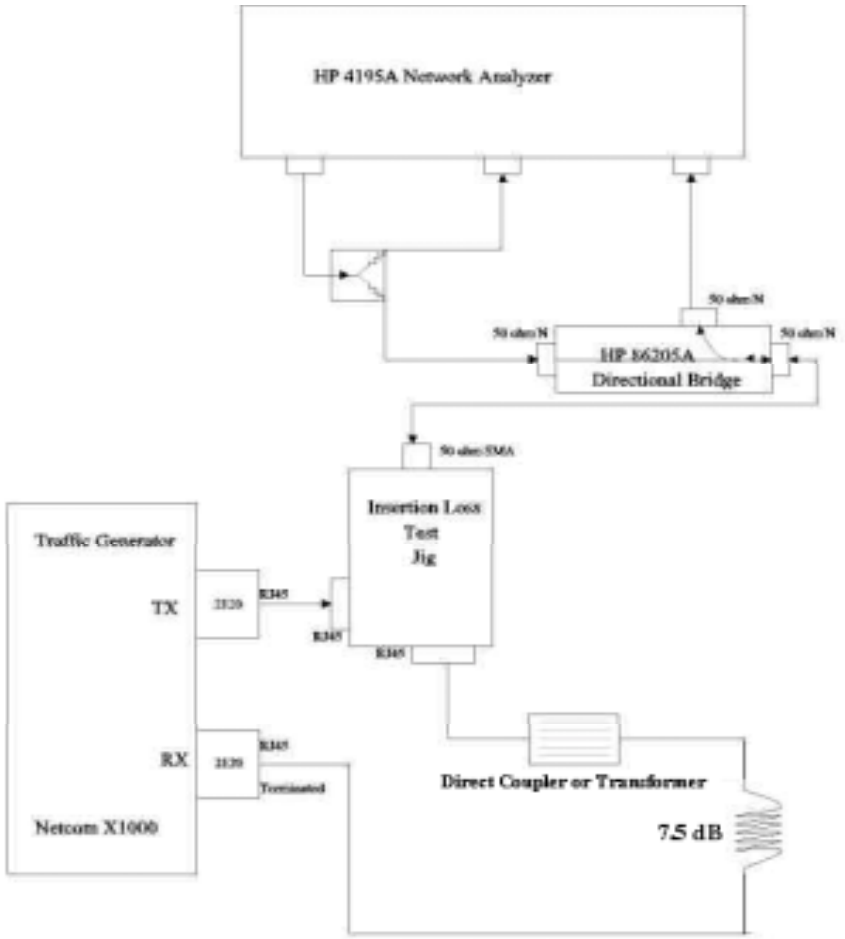
Test Circuit



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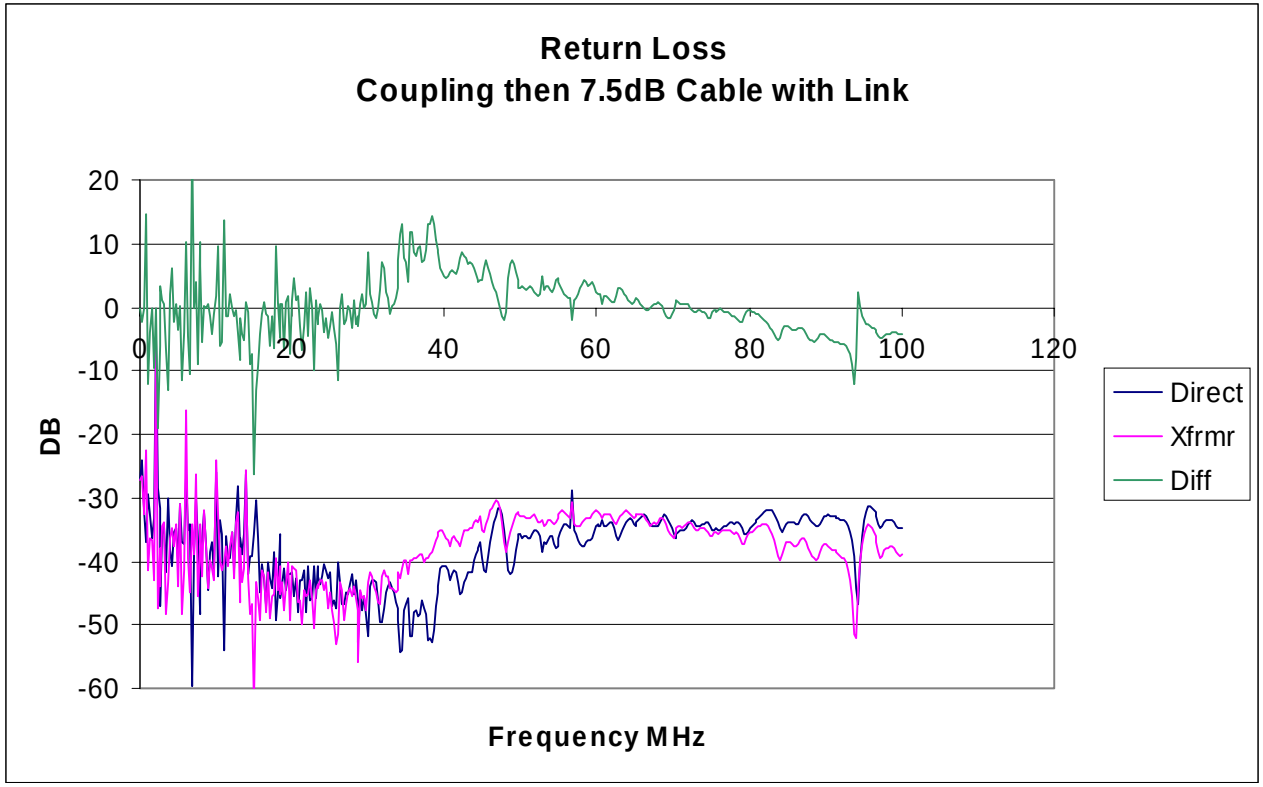
Results



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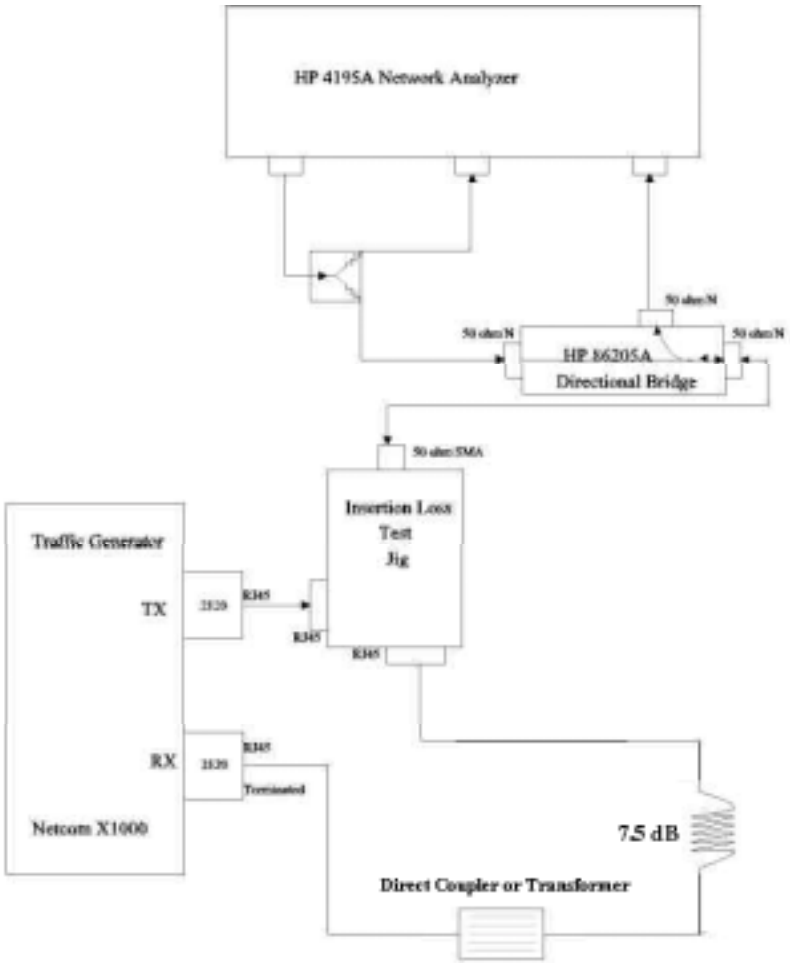
Test Circuit



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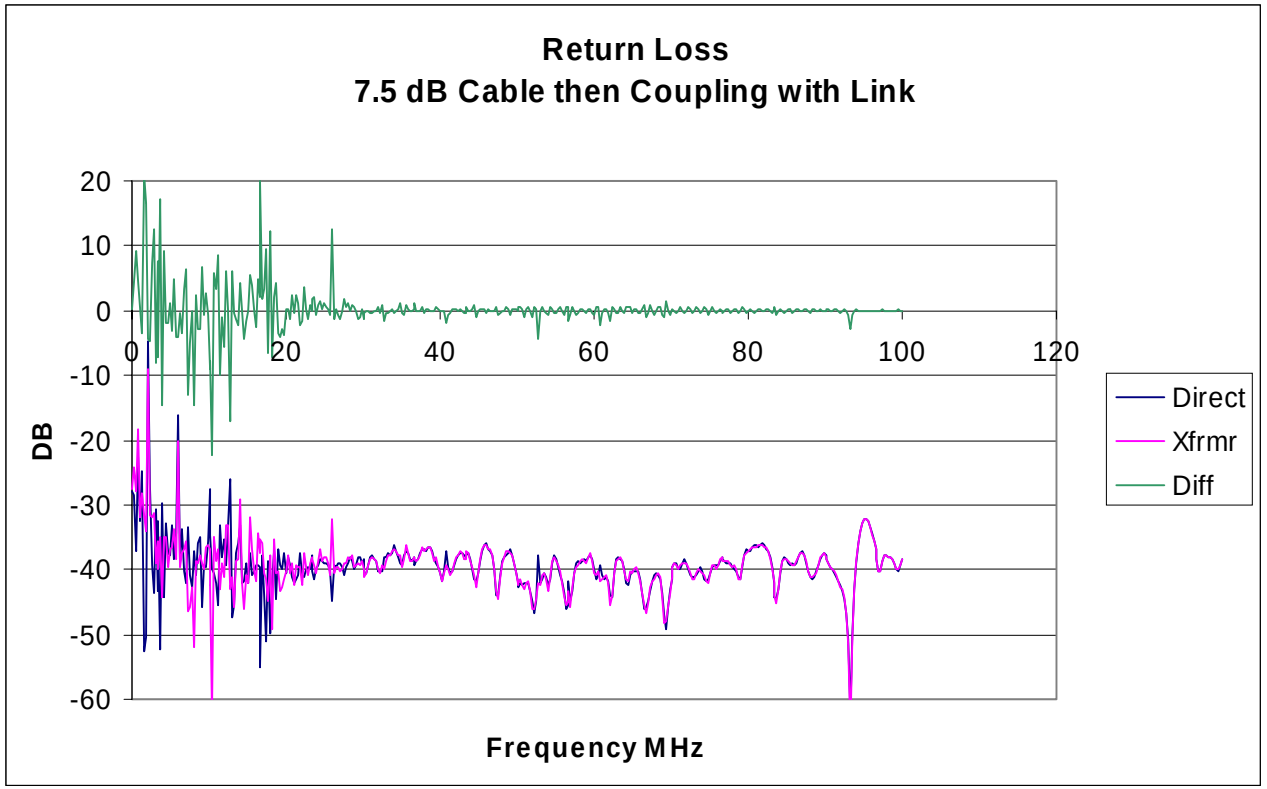
Results



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Summary

- Increase in Return Loss of about 6-10 db in the middle of the frequency range when the mid-span transformer is close to the transmitter.
- This affects the two most likely mid-span insertion scenarios - Closet patch panels close to the switch and wall warts close to the DTE.

Summary

- Increase in Return Loss of about 6-10 db in the middle of the frequency range when the mid-span transformer is close to the transmitter.
- This affects the two most likely mid-span insertion scenarios - Closet patch panels close to the switch and wall warts close to the DTE.
- Don’t do it!