Bandwidth of GI-POF in short length

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Objective of this presentation

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Question about relationship between fiber length and bandwidth was raised in the TF.

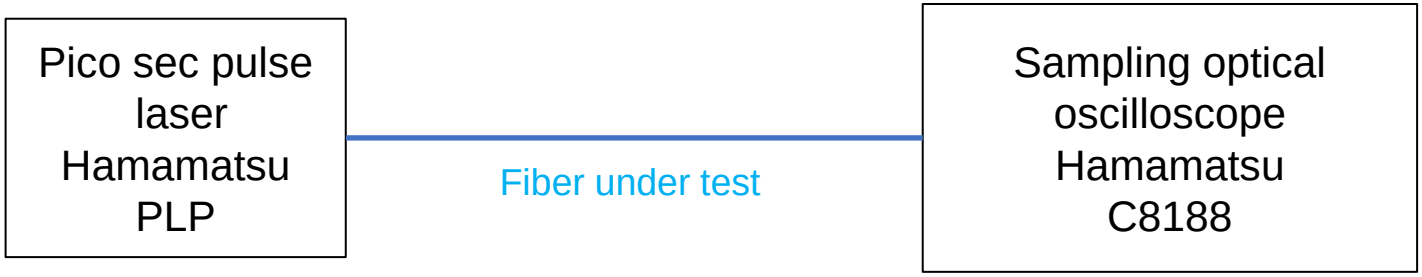
The objective of this presentation is to study bandwidth of GI-POF in short length.

Fiber bandwidth is usually measured by time domain method.
But it is difficult to apply time domain method for short fiber, such as 15m.
Therefore, bandwidth of same GI-POF fiber is measured by two methods, time domain and frequency domain respectively, and the results are compared.

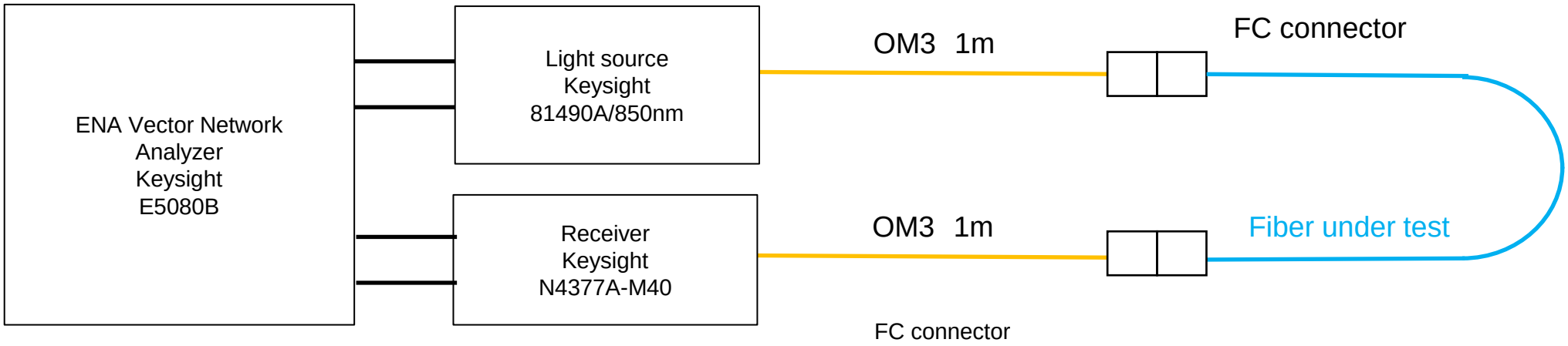
Time domain measurement: ≥ 90 m
Frequency domain measurement: ≤90m.

Experimental set up

Time domain: L = 90 and 240 m

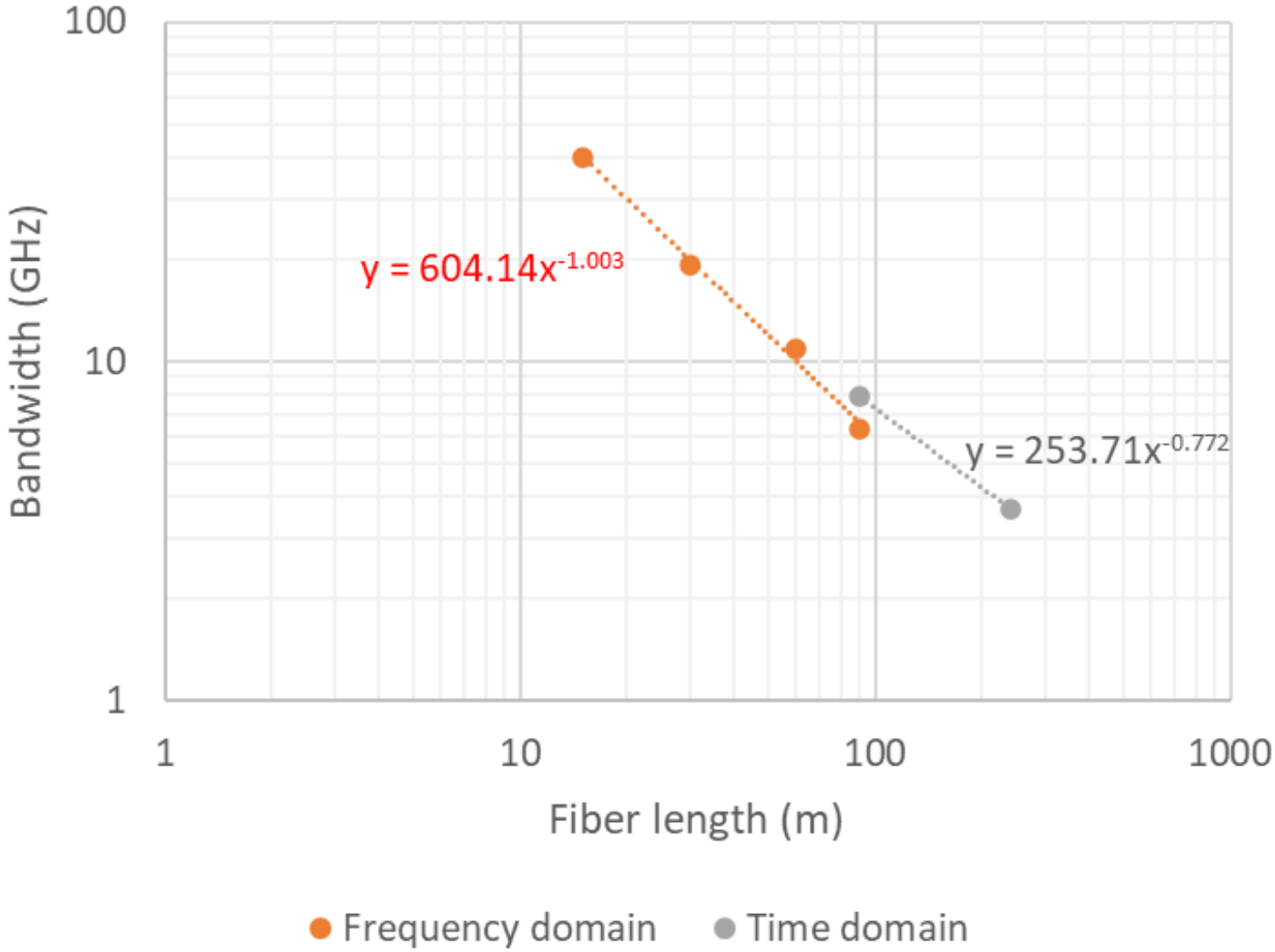


Frequency domain: L = 15, 30, 60, 90 m



Vector network analyzer: Keysight E5080B
Light source: Keysight 81490A (850nm) with built in EF mode conditioner
O/E converter: Keysight N4377A-M40 (40GHz)

Measurement result



Summary

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- Relationship between bandwidth and fiber length was examined for short fiber of GI-POF
- Bandwidth for 15, 30, 60 and 90 m were measured by frequency domain method
- Bandwidth for 90 and 240 m were measured by time domain method
- For fiber ≥ 90 m, exponent coefficient α [in BW=L^(- α)] shows -0.772. It means mode coupling effect is observed.
- For a fiber ≤ 90m, α shows -1.003
- Mode coupling effect is not observed for short fiber less than 90m

Thank you for your attention.