

# Testbed for measuring of the effect of fiber acoustic-band phase noise on the T&F transfer stability

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In several recently published papers on fiber-optic Time and Frequency (T&F) transfer the phenomenon of some low frequency acoustic-band optical phase noise apparently mechanically induced in the fiber has been reported<sup>1,2</sup>. This phenomenon influence the T&F stability, thus an arrangement to do some immunity tests of the applied solutions seems to be needed. The example spectrum of such noise

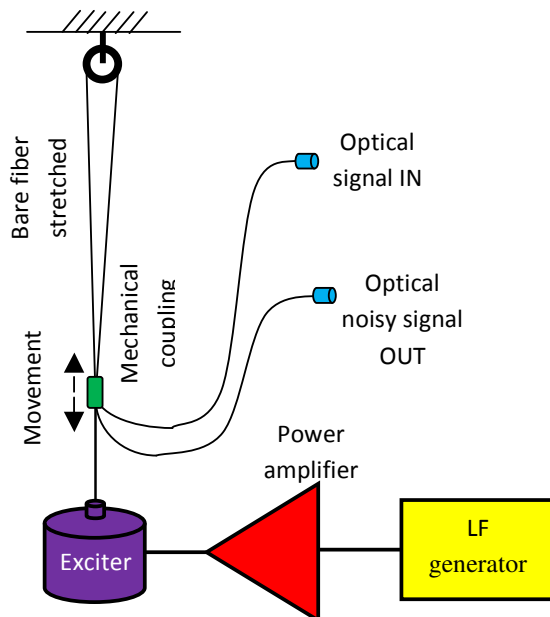


Fig. 2: Block diagram of the fiber stretching optical phase noise generator

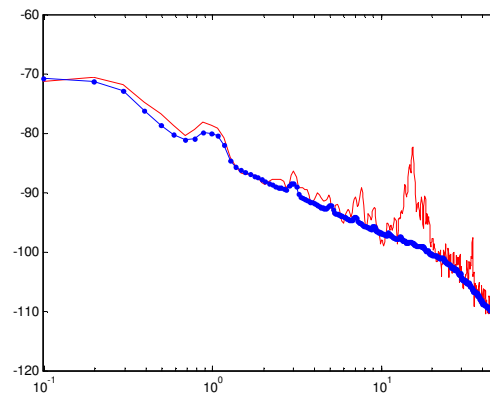


Fig. 1: Example of acoustic-band optical phase noise spectra

observed in our experimental field deployed link is shown in Fig.1.

In the paper we describe and characterize the testbed in which the acoustic phase noise is generated by the specialized Bruel&Kjaer vibration exciter longitudinally stretching the fiber.

In the second part of paper the first experimental research on the effect of acoustic-band noise on T&F transfer stability are presented.

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<sup>1</sup> 1. C. Clivati et al. Distributed Raman Amplification for Long-Haul Optical Frequency Dissemination, 2013 IFCS-EFTF Proceedings, Prague 21-25 July 2013, pp 1007-1009.

<sup>2</sup> 1. O. Terra et al. Phase-Coherent comparison of two optical frequency standards over 146 km using a telecommunication fiber link ; Appl.Phys. B 2009 541-551.