

Attenuation Scale Calibration of an Optical Time Domain Reflectometer

Authors : Osama Terra, Hatem Hussein

Abstract : Calibration of Optical Time Domain Reflectometer (OTDR) is crucial for the accurate determination of loss budget for long optical fiber links. In this paper, the calibration of the attenuation scale of an OTDR using two different techniques is discussed and implemented. The first technique is the external modulation method (EM). A setup is proposed to calibrate an OTDR over a dynamic range of around 15 dB based on the EM method. Afterwards, the OTDR is calibrated using two standard reference fibers (SRF). Both SRF are calibrated using cut-back technique; one of them is calibrated at our home institute (the National Institute of Standards - NIS) while the other at the National Physical Laboratory (NPL) of the United Kingdom to confirm our results. In addition, the parameters contributing the calibration uncertainty are thoroughly investigated. Although the EM method has several advantages over the SRF method, the uncertainties in the SRF method is found to surpass that of the EM method.

Keywords : optical time domain reflectometer, fiber attenuation measurement, OTDR calibration, external source method

Conference Title : ICOMA 2016 : International Conference on Optical Metrology and Applications

Conference Location : Sydney, Australia

Conference Dates : December 15-16, 2016