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Attenuation Scale Calibration of an Optical Time Domain Reflectometer Using an External Laser Source

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Abstract: Optical time domain reflectometers (OTDRs) are widely used to measure the attenuation of optical fibers. Accurate measurement of the attenuation requires periodic calibration of OTDRs. In this paper, a system is proposed based on the external source method (ESM) to calibrate of the attenuation scale of an OTDR over a dynamic range of around 15 dB. The ESM method has several advantages over the widely-used standard reference fiber (SRF) since it is fast, can be automated and offers direct traceability to the SI units. In order to estimate the accuracy of the proposed setup, an OTDR has been calibrated using the SRF and the ESM methods. The calibration uncertainty of the ESM method is found to be 0.040 dB, which is similar to that of the SRF method which is found to be 0.038 dB.

Keywords: Optical time domain reflectometer; Fiber attenuation measurement; OTDR calibration; External source method