PS Application note 1

1-1 Measurement of Isolator

FIBERPRO

PS Application note 1

1. Purpose

This note is for explanation of the application of PS to measure the accurate optical characterization of passive elements.

2. Application of PS

PS can be used for the reduction of unnecessary polarization dependence of devices. This enables an accurate PDL measurement of DUT (Device Under Test).

3. Structure of Measuring System

The following set-up is recommended can measure IL, PDL, and Isolation of the Isolator(DUT) in succession.

1) Optical Switch : It has two input and output ports (PDL ~ 0.02dB). When it is connected as the blue solid lines shown in the above figure, we can measure IL and PDL of the DUT. When we use optical isolator for DUT, we can also measure the isolation of isolator if the switch is connected as the red dot lines.
2) Polarization Controller (Input PC) : It generates all the polarization states for measuring PDL.
3) Isolator (DUT) : It is a passive component which transmits a light in only one direction and isolates a light in the opposite direction. An isolation is typically more than 20dB.
4) Polarization Scrambler (PS) : It is used to remove the polarization dependence of the optical switch and receiver.
5) Output PC : It is used to control the output polarization state after DUT.
6) Fusion splicing : To minimize the unwanted influences of optical connector pairs on the PDL and IL measurement, all of the elements - Polarization Controller, Isolator, Polarization Scrambler and Output PC - must be

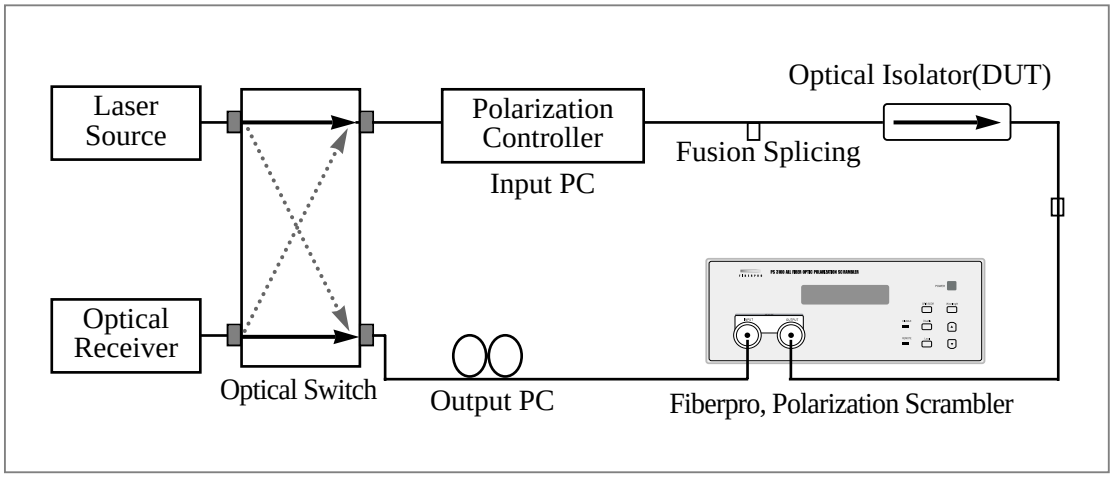

Figure 1. Measurement system of the lsolator

4. Comparison of the PDL measurement results when PS is enabled / disabled.

1) When the PS is enabled, the average PDL of the isolator measured for 60 different conditions of output PC was 0.076dB. And this value was identical to that of PDL measured without an optical switch within the error range (the maximum error of measurement system is °æ5% of PDL).
The difference between maximum and minimum measured PDL was 0.003dB, almost near the systematic error of the measurement.

2) When the PS was disabled, the measured PDL of Isolator was ranged from 0.062 to 0.093dB for 60 output PC conditions. The maximum difference of measured PDLs was 0.031dB. This is mainly due to the polarization dependence of optical switch. The PDL measurement uncertainty in creased up to 0.031dB, which is quite larger than the uncertainty of 0.003dB when the PS was enabled.

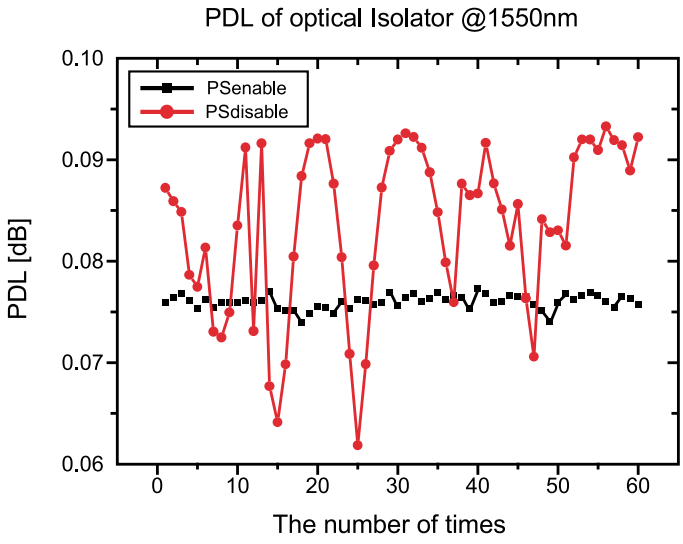

Figure 2. The PDL measurement result for 60 different conditions of output PC when the PS is enabled and disabled.

5. Conclusion

As the result of chapter 4 shows, FiberPro's Polarization Scrambler can be used to reduce the PDL errors induced by the unwanted polarization dependences of components and measurement equipment after DUT.