Appendix A

Appendix A presents the Mueller method utilised for measuring PDL of any passive optical device. This method was used in 4.4 to determine the PDL versus wavelength in the AWG passband.

A.1 PDL measurement using Mueller method

The Mueller method determines the PDL by exposing the device under test (DUT) to only four SOPs [1]. The Mueller method uses a 4×4 matrix for which the four first-row coefficients M_{00}, M_{01}, M_{02} and M_{03} [1] of the matrix describe the power transmission of the DUT, which is sufficient to obtain its PDL. From these coefficients, the maximum and minimum transmission power levels P_{max} and P_{min} respectively, can be derived, as shown in A.1 and A.2.

$$P_{max} = M_{00} + \sqrt{M_{01}^2 + M_{02}^2 + M_{03}^2} \quad \text{(A.1)}$$

$$P_{min} = M_{00} - \sqrt{M_{01}^2 + M_{02}^2 + M_{03}^2} \quad \text{(A.2)}$$

From which the PDL in dB can be calculated, as shown in A.3

$$PDL = 10 \times \log(P_{max} / P_{min}) \text{ (dB)} \quad \text{(A.3)}$$

In the simulation, the VPI TestSetJonesMatrix module, as shown in Figure A-1, was used to synthesise the four SOPs required for the Mueller matrix.

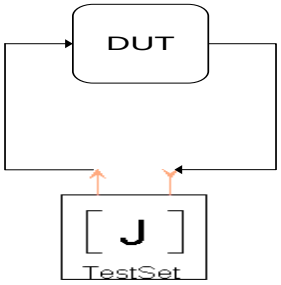

Figure A-1 PDL measurement of device under test

A.2 References

[1] C. Hentschel and S. Schmidt, "PDL Measurements using the Agilent 8169A Polarization Controller," Agilent Technologies, 2002.