ILX Lightwave FPM-8210 Series

Fiber Optic Power Meter

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TECH NOTE

Determining the Polarization Dependent Response of the FPM-8210 Power Meter

PURPOSE

This ILX Lightwave Technical Note describes the method used to determine the polarization dependent response (PDR) of the FPM-8210 Power Meter.

MEASUREMENT SETUP

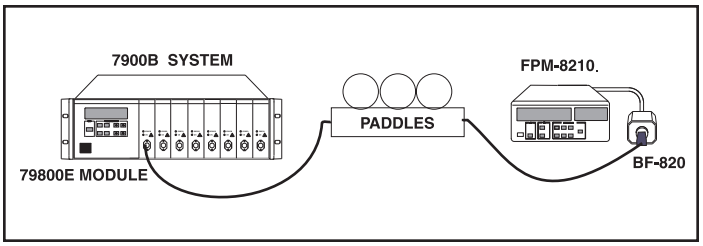

Figure 1. Experimental set-up

PROCEDURE

Connect the equipment as shown in Fig. 1. The light from the narrowband source passes through the polarization paddles. The output fiber of the paddles is cleaved at zero degrees, and is then inserted into the detection head of the FPM-8210 Power Meter, using the Bare Fiber Adapter BF-820.

With the paddles set in an arbitrary state, measure the power (in dBM) using the FPM-8210. Select the SET REF feature on the power meter, which will capture any power changes from that measured reference. Then, either manually or by using a computer, record the power readings as the polarization paddles are rotated. By combining a random rotation pattern and a systematic pattern, higher degrees of coverage of the various polarization states will be insured. Ideally, the paddles will generate a high percentage of every polarization state while making the power measurements.

To best understand the states of polarization being covered a polarimeter can be used. The most useful polarimeter for this purpose would provide a graphical representation of the Poincaré sphere on its screen. Replace the FPM-8210 in the experimental setup with the polarimeter, then vary the paddle positions as before. The polarimeter will display the various states of polarization, and demonstrate how many of the possible states are being achieved by the various paddle positions.

SUMMARY

The test procedure above was repeated several times. Typically, power only varied by ± 0.001 dB when measured with the FPM-8210. Further, the power never varied by more than ± 0.002 dB when using the polarimeter to ensure coverage of nearly all states of polarization. The tests were conducted in a typical laboratory with nominal temperature and humidity regulation.

It is important to note that the ±0.002 dB is a upper limit for PDR on the FPM-8210. Instability in source power, attenuation variations insider the polarization paddles and temperature changes are effectively being measured at the same time, indicating that the PDR specification could be even lower under tightly controlled test conditions.