

# PMD Test Kits for OSA-155 DWDM System Analyzer



## Application

The PMD (Polarisation Mode Dispersion) Test Kits are options for the OSA-155. They are designed to qualify fibers for high speed transmission (e.g. 10 Gbit/s). A kit consists of analysis software, a broadband light source and a variable polarizer.

The PMD is a basic property of single mode fibers, which causes the energy at a certain wavelength to be split into two orthogonal polarisation states, which travel with different propagation times. This leads to the broadening of the pulses. After signal regeneration bit errors are then detected. If certain limits of PMD are exceeded the bit error ratio increases rapidly. Causes for PMD are tolerances in the fiber manufacturing process and mechanical and climatic stress on the laid fibers.

PMD is the mean value of all differential group delays (DGD) and is measured in ps or  $\text{ps}/\sqrt{\text{km}}$ .

Fibers and cables that network operators installed a number of years ago are now being used to transmit DWDM signals.

The fibers in these cables may have significant PMD values. With bit rates of 10 Gbit/s and higher now employed on optical networks, PMD has become one of the limiting factors for high speed transmission.

The maximum allowed PMD values for various bit rates are shown in the following table.

Bit rate Gbit/s	Max. PMD (ps)	PMD coeff. of fiber for 400 km length ( $\text{ps}/\sqrt{\text{km}}$ )
2.5	40	< 2.0
10	10	< 0.5
40	2.5	< 0.125

Table 1: Maximum allowed PMD values for digital signal transmission

## Product Features

- Measurement capability based on the OSA-155
- Uses "Fixed Analyzer Method" (ANSI/TIA/EIA FOTP-113)
- Upgradeable on any OSA-155
- 2 versions available:  
Kit A (Economic)  
Kit B (Premium)
- Easy to use – rugged design for field applications

## Applications

- Qualifying legacy and new fibers for high speed transmission
- PMD measurements on DWDM components



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# Specifications PMD Test Kits for OSA-155

## OBS-15 or ASE Source

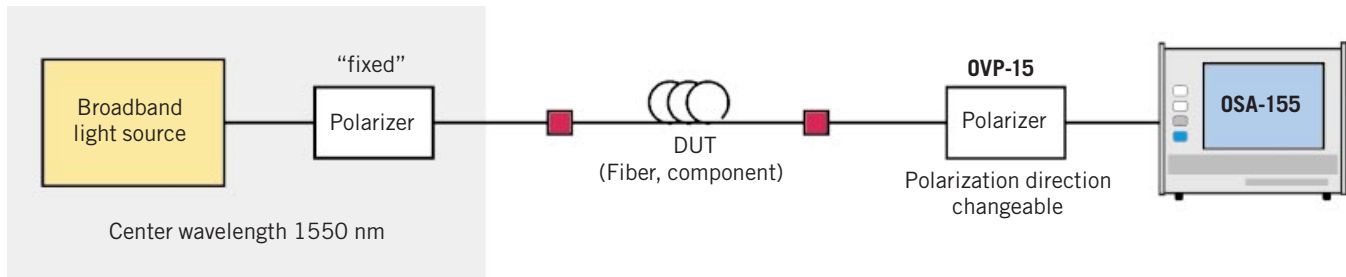


Figure 1: PMD measurement set-up

The Acterna PMD solution which is based on the “Fixed Analyzer Method” (FOTP-113) has been developed specifically for portable field applications. This method is equivalent to the “Interferometric Method” (ANSI/TIA/EIA FOTP-124) and gives comparable results.

To provide the user with the greatest flexibility when testing fiber optic networks, we have developed two PMD test kits. Each kit consists of a polarized light source, a variable polarizer (OVP-15) and PMD evaluation software running on the OSA-155. The kits differ according to the light source used, leading to different dynamic ranges for the PMD measurement. Existing OSA-155 can be upgraded with the PMD evaluation software.

**PMD Kit A (Economic version)** uses a handheld broadband light source (OBS-15), which is battery or AC mains operated and is rugged in design.

### Main specifications:

PMD measurement range	0.2 to 50 ps
Dynamic range	up to 30 dB
Fiber length to be measured	up to 120 km
Selectable settings for mode coupling	strong (for ordinary fibers) weak (for PMF and most PMD standards)
Measurement time	< 10 seconds

**PMD Kit B (Premium version)** uses a broadband ASE light source with high output power (Fiberwhite-SP) to measure long fiber link lengths.

### Main specifications:

PMD measurement range	0.2 to 50 ps
Dynamic range	up to 40 dB
Fiber length to be measured	up to 160 km
Selectable settings for mode coupling	strong (for ordinary fibers) weak (for PMF and most PMD standards)
Measurement time	< 10 seconds

### Optical interfaces on OBS-15 and OVP-15

Applicable fiber	SMF 9/125 μm (PC)
Optical connector	
Interchangeable adapter system	FC, SC, DIN, etc.

### Optical interface on Fiberwhite-SP ASE Source

Applicable fiber	SMF 9/125 μm
Optical connector	FC-APC (fixed)

### General specifications

#### Power supply

OBS-15	
Battery operation	NiMH, type AA (rechargeable, exchangeable, 2 pieces)
Operating time	approx. 2.5 h
AC operation by means of SNT-92 AC/DC Adapter/Charger	
Nominal range of use	100 to 240 V, 50/60 Hz

#### OVP-15

No power supply necessary

#### Fiberwhite-SP ASE Source

AC operation	110/230 V, 50/60 Hz
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#### Operating temperature range

OBS-15	0 °C to +45 °C
OVP-15	-5 °C to +45 °C
Fiberwhite-SP	0 °C to +50 °C

#### Dimensions (w × h × d) in mm

OBS-15, OVP-15	approx. 95 × 49 × 185
Fiberwhite-SP	240 × 180 × 330

#### Weight

OBS-15 (incl. batteries)	550 g
OVP-15	470 g
Fiberwhite-SP	6.8 kg

# Ordering information

## **PMD Test Kit A** (in preparation)

includes:

PMD evaluation software for OSA-155  
(on 3.5" floppy disks or pre-installed on OSA-155 if  
PMD Test Kit and OSA-155 are ordered simultaneously)  
OBS-15 Optical Broadband Source  
(with PC output connector)  
OVP-15 Optical Variable Polarizer  
(with PC output connector)  
NiMH batteries (2 items) for OBS-15  
(Mignon AA-Size)  
SNT-92 AC/DC Adapter/Charger f. OBS-15  
Cleaning tape for optical connectors  
MT-2 Bag  
(for 2 opt. handhelds and measuring accessories)  
Optical measuring adapters  
(1 adapt. for OBS-15, 2 adapt. for OVP-15)

## **Options**

Calibration report for OBS-15

## **BN 2260/90.11**

BN 2260/90.10  
BN 2267/01  
BN 2271/01  
BN 2237/90.02  
BN 2267/90.01  
BN 2229/90.07  
BN 2126/01  
BN 2060/00.xx

## **PMD Test Kit B**

includes

PMD evaluation software for OSA-155  
(on 3.5" floppy disks or pre-installed on OSA-155 if  
PMD Test Kit and OSA-155 are ordered simultaneously)  
OVP-15 Optical Variable Polarizer  
(with PC output connector)  
Optical measuring adapters  
(2 adapters for OVP-15)

## **Important:**

To perform a PMD measurement with PMD Test Kit B  
the following light source needs to be ordered:

## **Fiberwhite-SP Broadband ASE Source**

(with fixed FC-APC optical output)

## **BN 2260/90.12**

BN 2260/90.10  
BN 2271/01  
BN 2060/00.xx

## **PH 1530/01**

## **Ordering information for**

## **OSA-155 DWDM System Analyzer**

see separate data sheet

## **Accessories**

Measuring adapters  
Measuring cables  
Mating sleeves

BN 2260/00.xx  
K 31xx  
S 31xx

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