PHYTREX
Innovative Transmission Tech

MN 4720 series

STD Light Source & Photonics Receiver

Wide Bandwidth (Up to 10GHz) absolute accuracy turn key solution

Apply on Photonics Component Analyzer (PCA)

Technical Data Sheet

September, 2007

General Information

MN4720A is standard light source/receiver and NIST traceable turn-key solution. It can characterized photodiode and laser source domain-transfer devices such as optical modulators, direct modulated lasers, integrated optical transmitters, photodiodes, and photo-receivers. The Photonics Component Analyzer (PCA) is integrated the Vector Network Analyzer with frequency coverage up to 20GHz, enables the configuration to accurately analyze devices used in 2.5 Gb/s, 10 Gb/s transmission systems, making the solution extremely flexible in addition to affordable.

Features

- Absolute accurate measurement improving the yield condition on development or production process
- NIST traceable reference Photodetector or light source (option)
- Relative frequency response uncertainty < ± 1dB
- Temperature control to eliminate the drift issue over temperature
- Compatible to Agilent or Anritsu Vector Network Analyzer

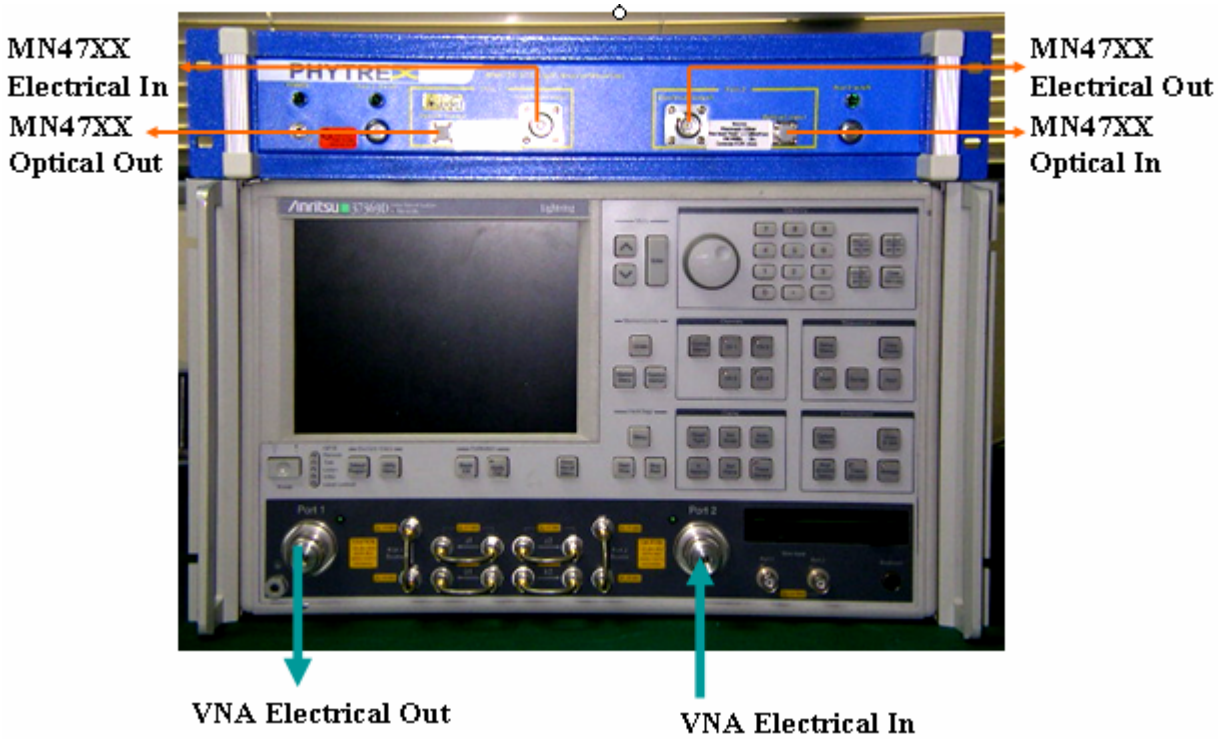

Figure 1: Photonics Component Analyzer (PCA) System

Light Source and Detector Specifications

Parameter	Symbol	Value			Unit	Remark
		Min	Typ.	Max		
Transmitter						
Wavelength	λ	-	1550	-	nm	1550±20nm
Ave. Power	Pf	-2	-	+3	dBm	
Bandwidth	fc	1			GHz	
Modulation Index	OMI	5			%	@1GHz mod. Freq.
Relative Intensity noise	RIN			-120		
RF Connector	N Type (50Ω or 75Ω) , AC-Couple					
Optical Connector	FC/PC					
Receiver						
Detect Range	λ	1100		1600	nm	
Responsivity	R	-	0.7	-	A/W	@1550nm
Max. input power	P(max)	-	-	+3	dBm	
Min. input power	P(min)	-10	-	-	dBm	
Detect Bandwidth	fc	1			GHz	depend on option
Optical Return Loss	RL		-20		dB	
RF Connector	N Type (50Ω or 75Ω) , AC-Couple					
Optical Connector	FC/PC					

Table 1: Technical Specification

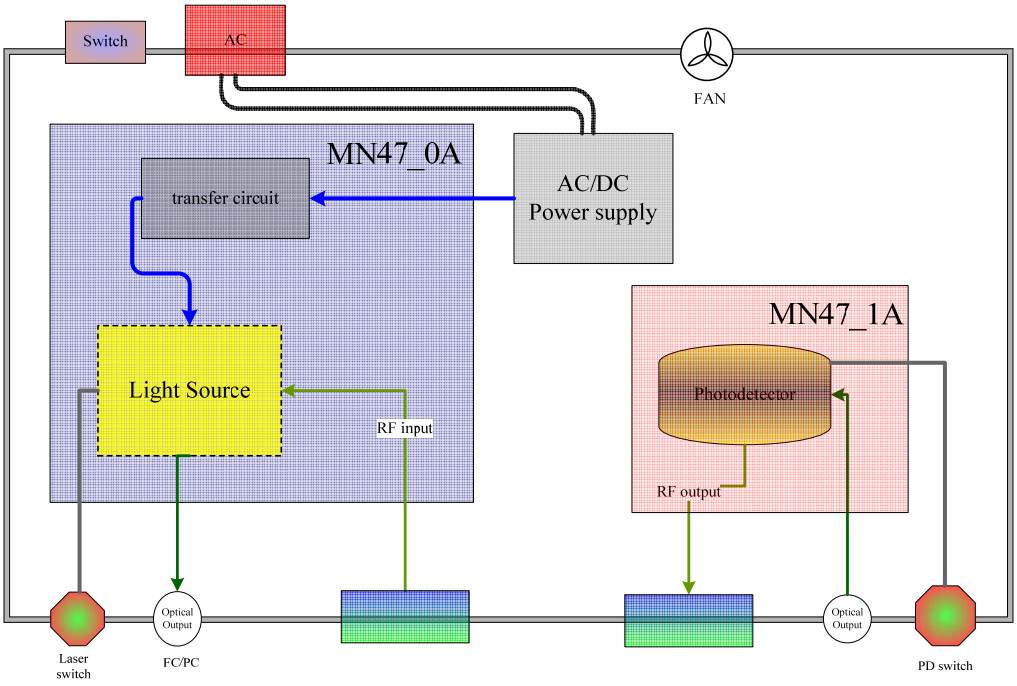

Figure 2: System Block diagram

E/O Measurements

E/O converters modulate an electrical signal onto light to be sent over fiber links. The transmission curve of a modulator is shown in figure 2. The performance of modulators and optical transmitters is key to determining the maximum data rate achievable in an optical communication link. These devices are generally characterized modulation bandwidth (transfer function or responsivity)
For making E/O measurements.
The optical stimulus to the modulator is provided by an internal or external laser source. The VNA supplies a swept microwave signal over the frequency range of interest to the modulator. A photodiode transfer standard then converts the modulated optical signal back to an electrical signal which is measured by the VNA.

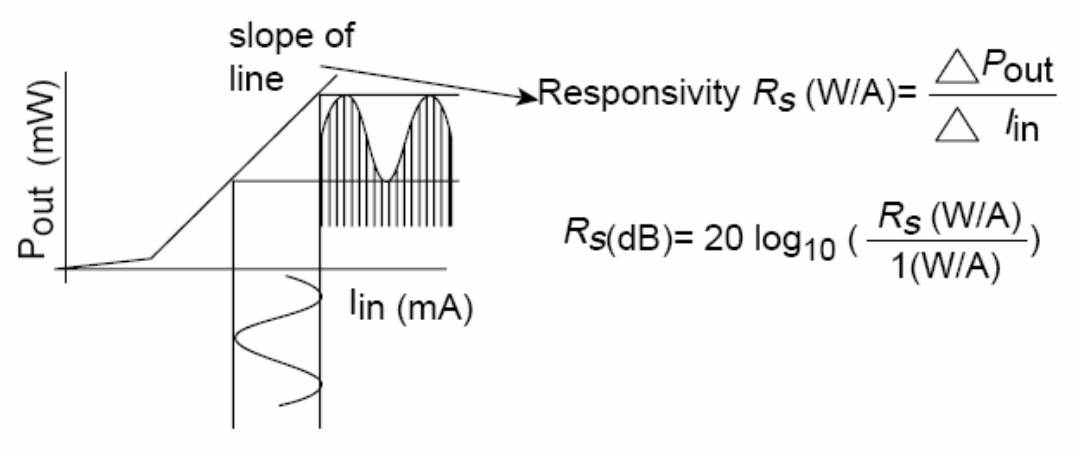

Figure 3: Modulation Slope Efficiency

O/E Measurements

The system can also be applied to O/E measurements of a photodiode or photoreceiver DUT. Photodiodes demodulate the electrical signal from the optical modulated light in a fiber optic transmission network. An external laser source, used with a characterized modulator, provides the input to the O/E DUT. The response of the characterized modulator is de-embedded from the setup using the O/E application menu. The characterization file for the modulator used can be generated using a characterized photodiode standard. Once the response of the modulator lightsource is removed, the S21 parameter displays the ratio of the output electrical signal to the input optical modulated signal and this is the DUT's transfer function

The PCA measurement technique is built upon concepts used in characterizing RF and microwave devices. “S-parameter” or scattering matrix techniques have proven to be convenient ways to characterize device performance.
The following section will discuss how similar techniques are used in characterizing devices in the photonics domain. This is intended to show the basis on E/O slope efficiency and O/E responsivity measurements are defined. PCA system provides input and output signals in terms of terminal voltages, input and output currents, and optical modulation power. S-parameters are used to describe the transmitted and reflected signal flow within a device or network.

Model	MN4720A	MN4720B	MN4721	MN4722
Wavelength Range	1530nm to 1570nm	1530nm to 1570nm	1290nm to 1330nm	850nm (Typ.)
Impedance	75 Ohm	50 Ohm	50 Ohm	50ohm
Bandwidth	10M~1GHz	10M~3GHz/ 10GHz	10M~3GHz/10GHz	10M~3G/10GHz
VNA	ENA MS4622/23	ENA/PNA MS4622/23	ENA/PNA MS4622/23	ENA/PNA MS4622/23

Table 2: Selection Guide

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