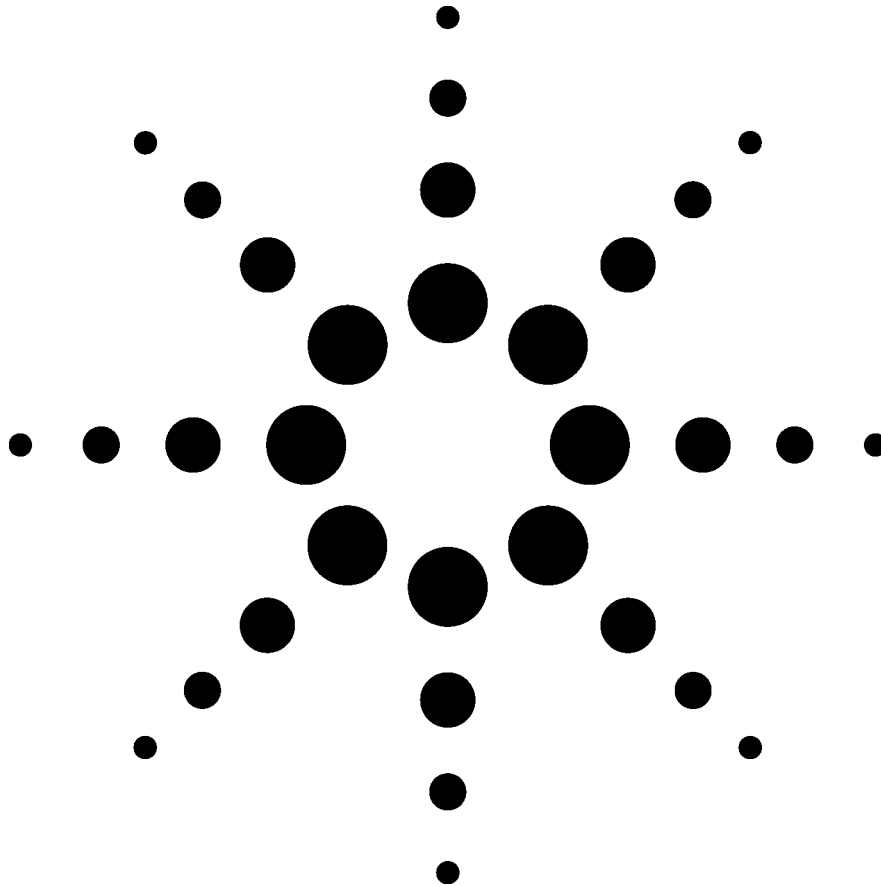


# Agilent N4373B Lightwave Component Analyzer

Testing advanced 40Gb/s components  
with highest relative and absolute accuracy

Technical Data Sheet  
April 2007



The N4373B offers high accuracy determination of absolute and relative responsivity in a NIST-traceable turn-key solution for testing advanced 40 Gb/s electro-optical components. Productivity is significantly increased by a unique, easy user calibration process.



Agilent Technologies

## General Information

Agilent's N4373B Lightwave Component Analyzer (LCA) is the instrument of choice to test the most advanced 40 Gb/s electro-optical components, with up to 67 GHz modulation bandwidth.

Modern optical transmission systems require fast, accurate and repeatable characterization of the core electro-optical components, the transmitter, receiver, and their subcomponents (lasers, modulators and detectors), to guarantee performance with respect to modulation bandwidth, jitter, gain, and distortion.

The N4373B achieves fast measurements by including the E8361A Performance Network Analyzer. A unique new calibration concept significantly reduces setup time to a maximum of several minutes, depending on the selected measurement parameters. This results in increased productivity in R&D or on the manufacturing floor.

The fully integrated "turn-key" N4373B helps reduce time to market, compared to the time-consuming development of a self-made setup.

By optimizing the electrical and the optical design of the N4373B for lowest noise and ripple, the accuracy has been improved by better than a factor of 2, compared to its predecessor, the 86030A 50GHz LCA. This increased accuracy improves the yield from tests performed with the N4373B by narrowing margins needed to pass the tested devices.

This advanced design together with temperature-stabilized transmitter and receiver ensures repeatable measurements over hours without recalibration.

Using the advanced measurement capabilities of the network analyzer, all S-parameter related characteristics of the device under test, like responsivity and 3dB-cutoff frequency, can be qualified with the new N4373B Lightwave Component Analyzer from 10 MHz to 67 GHz.

## Key benefits

- **High absolute and relative accuracy measurements improve the yield of development and production processes. With the excellent accuracy and reproducibility, measurement results can be compared among test locations world wide.**

- **High confidence and fast time-to-market with a NIST-traceable turn-key solution.**

- **Significantly increased productivity using the fast and easy measurement setup with a unique new calibration process leads to lower cost of ownership.**

### Relative frequency response uncertainty:

± 0.5 dB @ 50GHz (typ)

± 1.0 dB @ 67GHz (typ)

### Absolute frequency response uncertainty:

± 0.9 dB @ 50GHz (typ)

± 1.3 dB @ 67GHz (typ)

### Typical noise floor:

-60(55) dB<sub>A/W</sub> for O/E measurements @ 50(67) GHz

-64(59) dB<sub>W/A</sub> for E/O measurements @ 50(67) GHz

**Typical phase uncertainty:** ±2.7°

### Transmitter wavelength:

1550nm ± 20 nm

### Polarization maintaining fiber output:

Optimizes repeatability, especially for modulator characterization.

### Powerful remote control:

State of the art COM programming interface based on Microsoft .NET® makes remote control fast and easy.

### USB connector on front panel:

Allows easy data transfer to other computers, even if no LAN is used.

### 1 year warranty:

1 year warranty is standard for N4373B Lightwave Component Analyzer; extension to 3 years is available.

## Agilent N4373B Applications

In digital photonic transmission systems, the performance is ultimately determined by Bit Error Ratio Test (BERT). As this parameter describes the performance of the whole system, it is necessary to design and qualify subcomponents like modulators and PIN detectors, which are analog by nature, with different parameters that reflect their individual performance.

These components significantly influence the overall performance of the transmission system with the following parameters:

- 3dB bandwidth of the electro- optical transmission
- Relative frequency response, quantifying how the signal is transformed between optical and electrical or input and output vs. modulation frequency.
- Absolute frequency response, relating the conversion efficiency of signals from the input to the output.
- Electrical reflection at the RF port
- Group delay of the opto-electronic component

Only a careful design of these electro-optical components over a wide modulation signal bandwidth guarantees successful operation in the transmission system.

## Electro-optical components

The frequency response of detector diodes, modulators and directly modulated lasers typically depends on various parameters, like bias voltages, optical input power, operating current and ambient temperature. To determine the optimum operating point of these devices, an LCA helps by making a fast characterization of the electro-optic transfer function while optimizing these operating conditions.

In manufacturing it is important to be able to monitor the processes in regular time slots to keep up the throughput and yield. In this case the LCA is the tool of choice to monitor transmission characteristic and absolute responsivity of the manufactured device.

## Electrical components

Electrical components such as amplifiers, filters and transmission lines are used in modern transmission systems and require characterization to ensure optimal performance. Typical measurements are bandwidth, insertion loss or gain, impedance match and group delay.

## Agilent N4373B Features

### Turn-key solution

In today's highly competitive environment, short time-to-market with high quality is essential for new products. Instead of developing a time consuming home-grown measurement solution that might be limited in transferability and support, a fully specified and supported solution, helps to focus resources on faster development and on optimizing the manufacturing process.

In the N4373B, all optical and electrical components are carefully selected and matched to each other, to minimize noise and ripple in the measurement traces. Together with the temperature stabilization of the core components, this improves the repeatability and the accuracy of the overall system. Extensive factory calibration data ensures accurate and reliable measurements that can only be achieved with an integrated solution like the N4373B.

### Easy calibration

An LCA measures the modulation relation between optical and electrical signals. This is why user calibration of such systems can evolve into a time consuming task. With the new calibration process implemented in the N4373B the tasks that have to be done by the user are reduced to one electrical calibration. Even this can be automated with an ECAL kit, taking only several minutes depending on the LCA settings, without manual interaction.

### Built-in performance test

Sometimes it is necessary to make a quick verification of the validity of the calibration and the performance of the system. The N4373B's unique calibration process allows the user to perform a self-test without external reference devices. This gives full confidence that the system performance is within the required uncertainty bands.

## **State-of-the-art remote control**

Testing the frequency response of electro-optical components under a wide range of parameters, which is often necessary in qualification cycles, is very time consuming and repetitive.

Therefore all functions of the LCA could be controlled remotely via LAN over a state-of-the-art Microsoft .NET or COM interface.

Based on example programs it is very easy for every user to build applications for their requirements.

These examples are covering applications like integration of complete LCA measurement sequences into a Microsoft Excel® document.

## **Integrated optical average power meter**

In cases where an unexpectedly low responsivity is measured from the device under test, it is very helpful to get a fast indication of the CW optical power that is launched into the LCA receiver. The reason might be caused by a bad connection or a bent fiber in the setup. For this reason a measurement of the average optical power at the LCA receiver is very helpful for fast debugging of the test setup.

This average power meter can be also used to set the exact average output power of the LCA transmitter by shorting the connection between the LCA optical transmitter output and the LCA optical receiver input. By adjusting the transmitter output power in the LCA user interface, the desired transmitter optical average power can be set.

## **PMF output and power setting of the transmitter**

In applications like LiNbO<sub>3</sub> modulator characterization, it is necessary to launch stably polarized CW light into the optical modulator input. The N4373B LCA offers just this, as an additional feature for the E/O measurement. This saves the need for an additional DFB laser source, decreasing test cost and simplifying the setup.

## **Selectable average output power of the transmitter**

Most PIN diodes and receiver optical subassemblies (ROSA's) need to be characterized at various average optical power levels. In this case it is necessary to set the average input power of the device under test to the desired value. The variable average optical output power of the LCA transmitter offers this feature. Together with an external optical attenuator, this range can be extended to all desired optical power levels..

## Definitions

Generally, all specifications are valid at the stated operating and measurement conditions and settings, with uninterrupted line voltage.

## Specifications (guaranteed)

Describes warranted product performance that is valid under the specified conditions.

Specifications include guard bands to account for the expected statistical performance distribution, measurement uncertainties changes in performance due to environmental changes and aging of components.

## Typical values (characteristics)

Characteristics describe the product performance that is usually met but not guaranteed. Typical values are based on data from a representative set of instruments.

## General characteristics

Give additional information for using the instrument. These are general descriptive terms that do not imply a level of performance.

## Explanation of terms

### Responsivity

For electro-optical devices (e.g. modulators) this describes the ratio of the optical modulated output signal amplitude compared to the RF input amplitude of the device.

For opto-electrical devices (e.g. photodiodes) this describes the ratio of at the RF amplitude at the device output to the amplitude of the modulated optical signal input. .

### Relative frequency response uncertainty

Describes the maximum deviation of the shape of a measured trace from the (unknown) real trace. This specification has strong influence on the accuracy of the 3-dB cut-off frequency determined for the device under test.

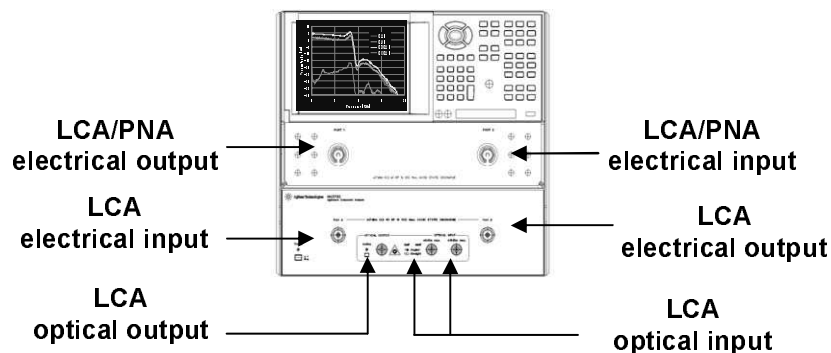
### Absolute frequency response uncertainty

Describes the maximum difference between any amplitude point of the measured trace and the (unknown) real value. This specification is useful to determine the absolute responsivity of the device versus modulation frequency.

### Minimum measurable responsivity

Describes the average measured responsivity when no modulation signal is present at the device under test (i.e. the noise level).

## Definition of LCA input and output names



## Measurement capabilities

3dB cut-off frequency (S21),  
Responsivity (S21),  
Electrical reflection (S11 or S22),  
Group Delay vs. frequency,  
Insertion Loss (IL),  
Transmission bandwidth (optical),  
Transmission bandwidth (electro-optical),  
all electrical S-parameter measurements.

## Target test devices

### Transmitter (E/O)

- Mach-Zehnder modulators
- Electro-absorption modulators (EAM)
- Directly modulated lasers
- Transmitter optical subassemblies (TOSA)

### Receiver (O/E)

- PIN diodes
- Avalanche photodiodes (APD)
- Receiver optical subassemblies (ROSA)

### Passive optical components (O/O)

- Optical fibers and filters

### Optical transmission systems (O/O)

- Fiber optic links

## Agilent N4373A Specifications

### Measurement conditions

- Network analyzer set to -8 dBm electrical output power
- 100 Hz IFBW ("Reduce IF bandwidth at low frequency" enabled) with modulation frequency step size 10 MHz and measurement points on a 10 MHz raster (if not differently stated).
- Network analyzer set to "stepped sweep – sweep moves in discrete steps"
- Port 2 of network analyzer configured in reverse coupler configuration ("RCVB B in" to "CPLR THRU", "SOURCE OUT" to "CPLR ARM")
- After full two-port electrical calibration using an Electronic Calibration Module, Agilent N4694A, at constant temperature ( $\pm 1^\circ \text{C}$ ).
- Auto-bias switched on (automatic modulator bias optimization turned on)
- Using the supplied flexible test port cables 1.85mm f-m (Part Number N4697-60200).
- Measurement frequency grid equals electrical calibration grid.
- Tested from Port 1 to Port 2.
- DUT signal delay  $\leq 0.1/\text{IF-BW}$ .
- Specified temperature range:  $+20^\circ \text{C}$  to  $+26^\circ \text{C}$ .
- After warm-up time of 90 minutes.
- Using high quality electrical and optical connectors in perfect condition.
-

## Transmitter and Receiver Specifications

### LCA optical test set

Frequency range	10 MHz to 67 GHz
Connector type	Optical input: SM angled with Agilent versatile connector interface Optical output: PMF angled with Agilent versatile connector interface Electrical (RF): 1.85 mm female (with port protector Agilent PN 85058-60121)
<b>LCA optical input</b>	
Operating input wavelength range	1280 nm to 1625 nm
Maximum linear average input power [f1]	Optical input 1: +5 dBm Optical input 2: +15 dBm
Maximum safe average input power	Optical input 1: +7 dBm Optical input 2: +17 dBm
Optical return loss (typ.) [f1]	>27 dBo
Average power measurement range [f1]	Optical input 1: -20 dBm to +5 dBm on optical input 1 Optical input 2: -10 dBm to +15 dBm on optical input 2
Average power measurement uncertainty (typ.) [f1]	±0.5 dBo
<b>LCA optical output</b>	
Optical modulation index (OMI)	> 5 % typ. at 1 GHz modulation frequency and -8 dBm RF power
Output wavelength	( 1550 ± 20 ) nm
Average output power range	-1 dBm to +5 dBm
Average output power uncertainty (typ.)	±0.5 dBo
Average output power stability, 15 minutes (typ.)	±0.5 dBo

[f1] Wavelength within range as specified for LCA optical output

## Specifications for electrical to electrical tests (E/E)

All specifications of the E8361A-014, -010 Network Analyzer apply.  
Please see the corresponding Network Analyzer data sheet and User's Guide

# Specifications for electrical to optical measurements (E/O)

N4373B system with PNA E8361A-014 Network Analyzer

**Specifications are valid under the stated measurement conditions.**

- At optical input 1 (" +7 dBm max"). At optical input 2 (" +17 dBm max"), specifications are typically the same for 10 dB higher incident average and modulated optical power.
- For wavelength (1550 ±20) nm

System performance		0.05 GHz to 0.2 GHz	0.2 GHz to 0.7 GHz	0.7 GHz to 20 GHz	20 GHz to 50 GHz	50 GHz to 67 GHz
Relative frequency response uncertainty	DUT response					
	≥ -26 dB(W/A) [f1]	±2.0 dBe typ.	±0.8 dBe (±0.5 dBe typ.)	±0.8 dBe (±0.5 dBe typ.)	±0.8 dBe (±0.5 dBe typ.)	±2.3 dBe (±1.3 dBe typ.)
	≥ -36 dB(W/A)	±2.0 dBe typ.	±0.5 dBe typ.	±0.5 dBe typ.	±0.7 dBe typ.	±1.3 dBe typ.
	≥ -46 dB(W/A)	±2.0 dBe typ.	±0.5 dBe typ.	±0.6 dBe typ.	±1.2 dBe typ.	±1.9 dBe typ.
Absolute frequency response uncertainty	DUT response					
	≥ -26 dB(W/A) [f1]	±2.5 dBe typ.	±1.8 dBe (±0.9 dBe typ.)	±1.8 dBe (±0.9 dBe typ.)	±1.8 dBe (±0.9 dBe typ.)	±2.8 dBe (±1.3 dBe typ.)
Frequency response repeatability (typ.)	DUT response					
	≥ -26 dB(W/A) [f1]	±0.02 dBe	±0.02 dBe	±0.02 dBe	±0.1 dBe	±0.2 dBe
	≥ -36 dB(W/A)	±0.02 dBe	±0.02 dBe	±0.02 dBe	±0.3 dBe	±0.8 dBe
	≥ -46 dB(W/A)	±0.02 dBe	±0.02 dBe	±0.6 dBe	±1 dBe	±2.2 dBe
Minimum measurable frequency (response (noise floor) [f2])		-64 dB(W/A) typ.	-64 dB(W/A)	-64 dB(W/A)	-64 dB(W/A)	-59 dB(W/A)
Phase uncertainty (typ.) [f3]	DUT response					
	≥ -26 dB(W/A) [f1]	-	-	±2.0°	±2.7°	±8.0°
	≥ -36 dB(W/A)	-	-	±2.0°	±3.0°	±8.7°
Group delay uncertainty		Derived from phase uncertainty, see section "Group delay uncertainty". Example: ±2.0° → ±8 ps (1 GHz aperture)				

[f1] For DUT response max. -13 dB(W/A).

[f2] IFBW = 10 Hz.

[f3] Except phase wrap aliasing (example: a DUT group delay of 5 ns (1 m cable length) requires a wavelength step size of ≤ 0.2 GHz to avoid phase wraps). Excluding a constant group delay offset of <±0.3 ns typ. (cable length uncertainty < ±0.06 m). A constant group delay offset leads to a phase offset  $\Delta\phi = 360^\circ \times \Delta GD \times f_{\text{mod}}$ . (in deg).

# Specifications for optical to electrical measurements (O/E)

N4373B system with PNA E8361A-014 Network analyzer

Specifications are valid under the stated measurement conditions.

System performance		0.05 GHz to 0.2 GHz	0.2 GHz to 0.7 GHz	0.7 GHz to 20 GHz	20 GHz to 50 GHz	50 GHz to 67 GHz
Relative frequency response uncertainty [f2]	DUT response					
	≥ -15 dB(A/W) [f1]	±2.0 dBe typ.	±0.8 dBe (±0.5 dBe typ.)	±0.8 dBe (±0.5 dBe typ.)	±0.8 dBe (±0.5 dBe typ.)	±2.3 dBe (±1.3 dBe typ.)
	≥ -25 dB(A/W)	±2.0 dBe typ.	±0.8 dBe (±0.5 dBe typ.)	±0.8 dBe (±0.5 dBe typ.)	±0.8 dBe (±0.5 dBe typ.)	±2.3 dBe (±1.3 dBe typ.)
	≥ -35 dB(A/W)	±2.0 dBe typ.	±0.5 dBe typ.	±0.6 dBe typ.	±1.0 dBe typ.	±1.7 dBe typ.
Absolute frequency response uncertainty [f2]	DUT response					
	≥ -25 dB(A/W) [f1]	±2.5 dBe typ.	±1.8 dBe (±0.9 dBe typ.)	±1.8 dBe (±0.9 dBe typ.)	±1.8 dBe (±0.9 dBe typ.)	±2.8 dBe (±1.3 dBe typ.)
Frequency response repeatability (typ.) [f2]	DUT response					
	≥ -15 dB(A/W) [f1]	±0.02 dBe	±0.02 dBe	±0.02 dBe	±0.2 dBe	±0.5 dBe
	≥ -25 dB(A/W)	±0.02 dBe	±0.02 dBe	±0.02 dBe	±0.2 dBe	±0.5 dBe
	≥ -35 dB(A/W)	±0.02 dBe	±0.02 dBe	±0.6 dBe	±0.9 dBe	±1.9 dBe
Minimum measurable frequency response (noise floor) [f2][f3]		-60 dB(A/W) typ.	-60 dB(A/W)	-60 dB(A/W)	-60 dB(A/W)	-55 dB(A/W)
Phase uncertainty (typ.) [f2, f4]	DUT response					
	≥ -15 dB(A/W) [f1]	±2.0°	±2.0°	±2.0°	±2.7°	±8.0°
	≥ -25 dB(A/W)	±2.0°	±2.0°	±2.0°	±3.0°	±8.7°
Group delay uncertainty		Derived from phase uncertainty, see section "Group delay uncertainty". Example: ±2.7° → ±11 ps (1 GHz aperture)				

[f1] For DUT response max. -10 dB(A/W).

[f2] Average power from LCA optical output set to +5 dBm.

[f3] IFBW = 10 Hz.

[f4] Except phase wrap aliasing (example: a DUT group delay of 5 ns (1 m cable length) requires a wavelength step size of ≤0.2 GHz to avoid phase wraps). Excluding a constant group delay offset of ≤±0.3 ns typ. (cable length uncertainty <±0.06 m). A constant group delay offset leads to a phase offset  $\Delta\varphi = 360^\circ \times \Delta\text{GD} \times f_{\text{mod}}$  (in deg).

## Specifications for optical to optical measurements (0/0)

N4373B system with PNA E8361A-014 Network analyzer

**Specifications are valid under the stated measurement conditions and after user calibration with LCA optical output set to maximum average output power (+5 dBm).**

- At optical input 1 (“+7 dBm max”). At optical input 2 (“+17 dBm max”), specifications are typically the same for 10 dB higher incident average and modulated optical power.
- For wavelength (1550 ±20) nm

System performance		0.05 GHz to 0.2 GHz	0.2 GHz to 0.7 GHz	0.7 GHz to 20 GHz	20 GHz to 50 GHz	50 GHz to 67 GHz
Relative frequency response uncertainty [f3]	DUT response					
	≥-3 dBe (≥-1.5 dBo) [f4]	±1.0 dBe typ. (±0.5 dBo typ.)	±0.5 dBe (±0.25 dBo)	±0.5 dBe (±0.25 dBo)	±0.5 dBe (±0.25 dBo)	±1.3 dBe (±0.65 dBo)
	≥-13 dBe (typ.) (≥-6.5 dBo) (typ.)	±1.0 dBe (±0.5 dBo)	±0.5 dBe (±0.25 dBo)	±0.5 dBe (±0.25 dBo)	±0.6 dBe (±0.3 dBo)	±1.3 dBe (±0.65 dBo)
	≥-23 dBe (typ.) (≥-11.5 dBo) (typ.)	±1.0 dBe (±0.5 dBo)	±0.5 dBe (±0.25 dBo)	±0.5 dBe (±0.25 dBo)	±1.1 dBe (±0.55 dBo)	±1.6 dBe (±0.8 dBo)
Absolute frequency response uncertainty [f3]	DUT response					
	≥-3 dBe (≥-1.5 dBo) [f4]	±1.0 dBe typ. (±0.5 dBo typ.)	±0.7 dBe (±0.35 dBo)	±0.7 dBe (±0.35 dBo)	±0.7 dBe (±0.35 dBo)	±1.6 dBe (±0.8 dBo)
Frequency response repeatability (typ.) [f3]	DUT response					
	≥-3 dBe (≥-1.5 dBo) [f4]	±0.02 dBe	±0.02 dBe	±0.02 dBe	±0.1 dBe	±0.2 dBe
	≥-13 dBe (≥-6.5 dBo)	±0.02 dBe	±0.02 dBe	±0.02 dBe	±0.3 dBe	±0.8 dBe
	≥-23 dBe (≥-11.5 dBo)	±0.02 dBe	±0.02 dBe	±0.6 dBe	±1 dBe	±2.2 dBe
Minimum measurable frequency response (noise floor) [f1][f3]		-55 dBe typ. (-27.5 dBo typ.)	-42 dBe (-21 dBo)	-42 dBe (-21 dBo)	-42 dBe (-21 dBo)	-36 dBe (-18 dBo)
Phase uncertainty (typ.) [f2,f3]	DUT response					
	≥-3 dBe (≥-1.5 dBo) [f4]	-	-	±2.0°	±2.0°	±2.5°
	≥-13 dBe (≥-6.5 dBo)	-	-	±2.0°	±2.3°	±3.2°
Group delay uncertainty		Derived from phase uncertainty, see section “Group delay uncertainty”. Example: ±2.0° → ±8 ps (1 GHz aperture)				

[f1] IFBW = 10 Hz.

[f2] Except phase wrap aliasing (example: a DUT group delay of 5 ns (1 m cable length) requires a wavelength step size of ≤ 0.2 GHz to avoid phase wraps).

[f3] For +5 dBm average output power from LCA optical output.

[f4] For DUT response max. +6 dBe (max. +3 dBo optical gain).

## Group delay uncertainty

For more details see specifications of the E8361A.

### **Group delay**

Group delay is computed by measuring the phase change within a specified *aperture* (for aperture see below):

$$\text{GD [s]} = \frac{\text{Phase change [deg]}}{\text{Aperture [Hz]} * 360} \quad (\text{Equation 1})$$

### **Group delay uncertainty**

Is calculated from the specified phase uncertainty and from the aperture (for aperture see below):

$$\Delta\text{GD} [\pm\text{s}] = \frac{\text{Phase uncertainty} [\pm\text{deg}]}{\text{Aperture [Hz]} * 360} * \text{sqrt}(2) \quad (\text{Equation 2})$$

### **Aperture**

Determined by the frequency span and the number of points per sweep

Aperture: (frequency span) / (number of points-1)

### **GD Range**

The maximum group delay is limited to measuring no more than  $\pm 180$  degrees of phase change within the selected aperture (see Equation 1).

## General Characteristics

### Assembled dimensions: (H x W x D)

41.3 cm x 43.8 cm x 47.3 cm  
(16.3 in x 17.3 in x 18.7 in)

### Weight

Product net weight: 38 kg (83.6 lbs)  
Packaged product: 58 kg (127.6 lbs)

### Power Requirements

100 – 240 V~, 50 – 60 Hz

2 power cables

E8361A max. 350 VA

Optical test set: max. 40 VA

### Network analyzer (-301)

Network analyzer (NWA): PNA E8361A -014, -010

For detailed specifications of PNA see datasheet of PNA

System bandwidth: 10 MHz to 67 GHz

### Storage temperature range:

40° C to +70° C

### Operating temperature range:

+5° C to +35° C

### Humidity:

15 % to 80 % relative humidity, non-condensing

### Altitude (non-operating):

0 ... 2000 m

### Recommended re-calibration period:

1 year

### LCA related shipping contents

1x N4373B

2x N4697-60200 f-m flexible test port MW cable

2x 85058-60121 test port adapter

1x N5520B f-f 1.85 mm, DC – 67GHz

3x 81000NI optical adaptor

2x N4373-87906/7 (-022 / -021)

1x 1005-1027/0256 (- 022 / -021)

1x 8121-1242 USB cable

1x 4373B-90CD1 Support CD

1x E5525-10285 UK 6 report

1x 4373B-90A01 Getting started

1x Local power cord

## LCA connector types:

### Outputs

#### LCA/PNA electrical output:

1.85 mm (m)

#### LCA optical test set electrical input:

1.85 mm (f)

#### LCA optical output:

9µm polarization maintaining single-mode angled<sup>[1]</sup>,  
with Agilent universal adapter

### Inputs

#### LCA/PNA electrical input

1.85mm (m)

#### LCA optical test set electrical output

1.85mm (f)

#### LCA optical inputs

9µm single-mode angled<sup>[1]</sup>,  
with Agilent universal adapter

<sup>[1]</sup> The optical test set always has angled connectors.

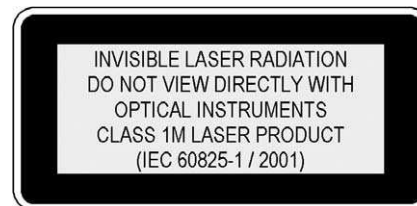
Depending on the selected option (-021 straight, -022 angled),  
the appropriate adapter jumper cable will be delivered.

This jumper cable must always be used in front of the optical  
test set to protect the connectors at the optical test set.

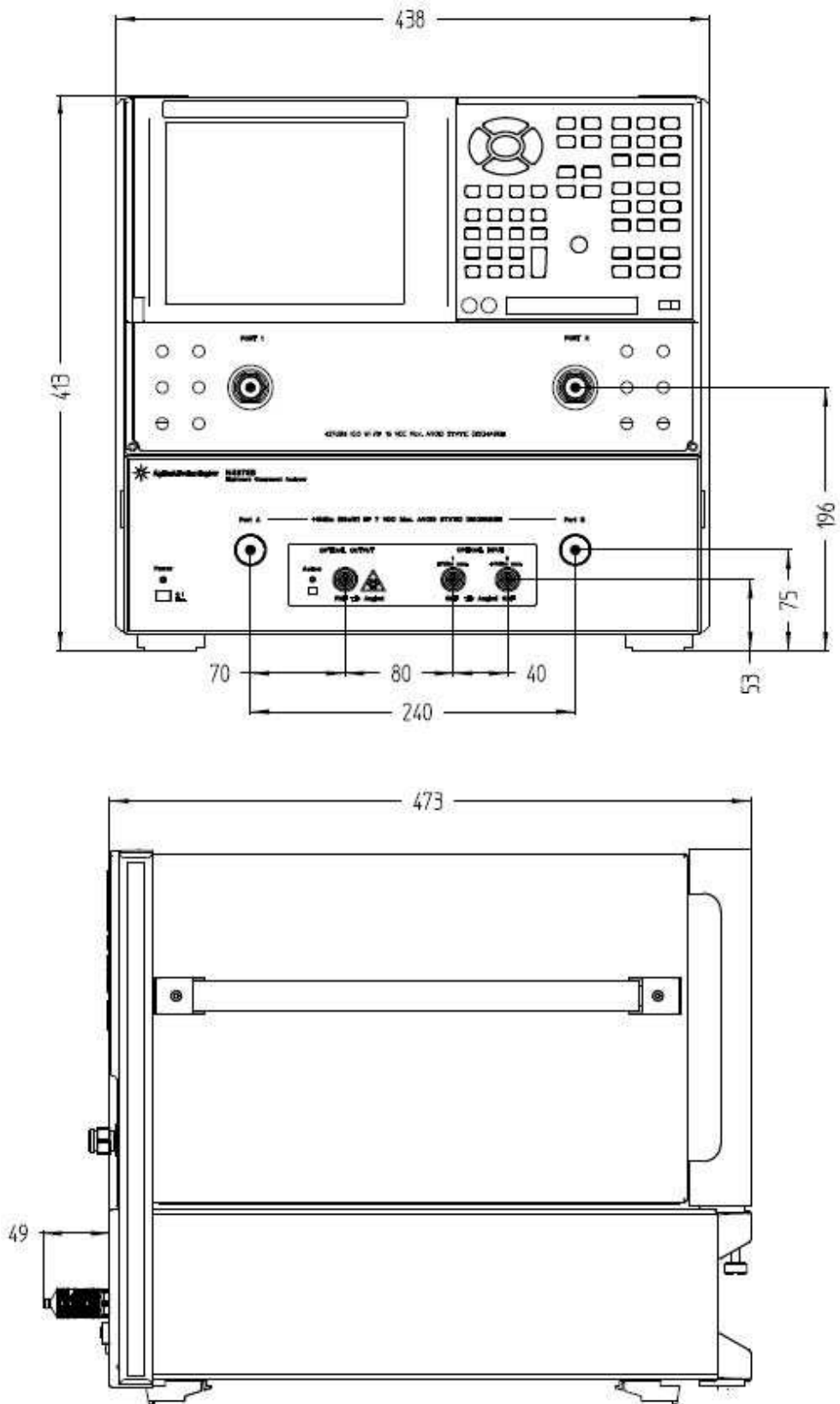
## Laser Safety Information

All laser sources listed above are classified as Class 1M  
according to IEC 60825-1 (2001).

All laser sources comply with 21 CFR 1040.10 except for  
deviations pursuant to Laser Notice No. 50,  
dated 2001-July-26.



**Mechanical Outline Drawings (dimensions in mm)**



## Ordering Information

The N4373B consists of an N4373B-014, -010 67 GHz PNA and an optical test set which is mechanically connected to the PNA.

To protect your network analyzer investment, Agilent offers the integration of an already owned E8361A PNA with the optical test set.

### Agilent N4373B ordering options

LCA Options , warranty	N4373B-301	67 GHz LCA based on E8361A-014, -010 (time domain) PNA and 1550 nm optical test set - 1 year warranty
	N4373B-399 <sup>[1]</sup>	67 GHz, 1550 nm optical test set with integration of - E8361A-014 customer supplied PNA, - E8361A-UNL customer supplied PNA <sup>[2]</sup>  Includes: - recalibration and performance verification of PNA <sup>[3]</sup> - 1 year warranty for complete system including PNA
	- 021	straight connector
	- 022	angled connector (recommended)

### Recommended accessory

	N4694A-00F	2 port microwave electronic calibration kit f-f (required for specified performance)
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### Accessories<sup>[4]</sup>

	N4373-87906	FC/APC to FC/APC optical patch cord (0.5 m)
	N4373-87907	FC/APC to FC/PC optical patch cord (0.5 m)
	81000NI	FC/APC optical adaptor
	N5520B	Adapter, 1.85 mm (f) to 1.85 (f), DC to 67 GHz
	85058-60121	1.85mm Test port adapter f-m
	N4697-60200	f-m 1.85 mm flexible test port cable

### Service parts

	1005-1027	FC/APC to FC/APC feed-through narrow key
	1005-0256	FC/PC to FC/PC feed-through wide key
	R1280A	1 year Return-to-Agilent warranty extended to 3 years
	R1282A	Agilent Calibration Upfront Support Plan 3 year coverage

<sup>[1]</sup> Customer supplied PNA other than the mentioned models will need additional technical effort. In this case call your local Agilent sales representative.

<sup>[2]</sup> Option -UNL decreases receiver sensitivity of PNA with impact to overall system specifications.

<sup>[3]</sup> Possible repair effort needed due to failure in recalibration and verification is not included.

<sup>[4]</sup> These accessories are included in the LCA shipment, and can be ordered separately for replacement.

## Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

### Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

### Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

### By Internet, phone, or fax, get assistance with all your test & measurement needs

#### Phone or Fax

##### United States:

(tel) 1 800 829 4444  
(fax) 1 800 829 4433

##### Canada:

(tel) 1 877 894 4414  
(fax) 1 800 746 4866

##### Europe:

(tel) +31 (0) 20 547 2111  
(fax) +31 (0) 20 547 2190

##### Japan:

(tel) 120 421 345  
(fax) 120 421 678

##### Latin America:

(tel) +55 11 4197 3600  
(fax) +55 11 4197 3800

##### Australia:

(tel) 1 800 629 485  
(fax) 1 800 142 134

##### Asia Pacific:

(tel) +852 800 930 871  
(fax) +852 800 908 476

#### Agilent online information's:

<http://www.agilent.com/find/LCA>

#### Agilent photonic discussion forum

[http://www.agilent.com/photonic\\_forum](http://www.agilent.com/photonic_forum)

#### For Network analyzer related literature, please visit:

##### Agilent Network Analyzers:

[www.agilent.com/find/na](http://www.agilent.com/find/na)

##### Mechanical and Electronic Calibration Kits:

[www.agilent.com/find/ecal](http://www.agilent.com/find/ecal)

##### RF Test Accessories, Cabinets, Cables:

[www.agilent.com/find/accessories](http://www.agilent.com/find/accessories)

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