HDCA

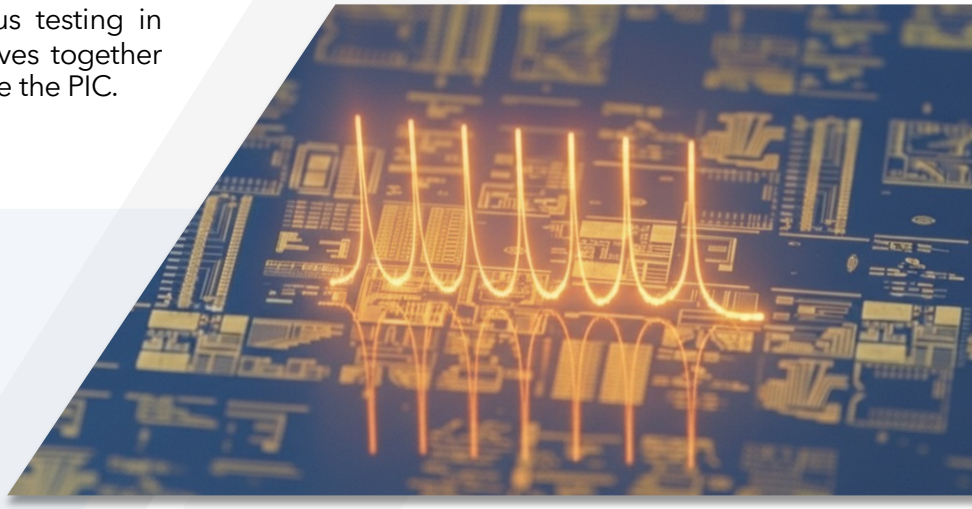
SEE INSIDE THE PIC

ZEPREN Solutions

As photonic chip designs become increasingly complex and the number and types of devices per chip increases, the testing instrumentation takes more and more relevance in the PIC market to ensure performance and reliability, as well as to reduce development costs this constant evolution implies.

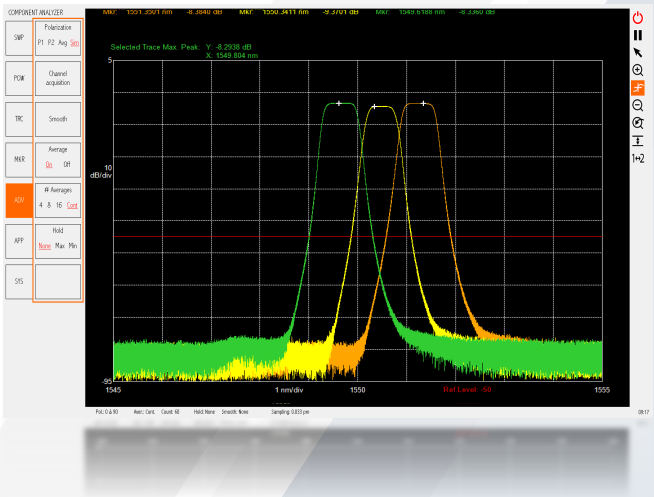
HDCA, our **High-Definition Component Analyzer**, capabilities are top-notch within the market, providing a high-resolution characterization of passive components, especially PICs.

Given the current needs for simultaneous testing in manufacturing processes, the HDCA evolves together with the industry allowing to truly see inside the PIC.



APPLICATIONS

- Characterization of optical fiber components with high resolution
- Silicon Photonics Integrated Circuits Characterization
- Measurement of both spectral response and time delay response
- Fiber optical network links troubleshooting



KEY FEATURES

- Femtometric resolution (2.4 fm) and fully automated
- Real time measurement
- Complete set of available measurements:
  - Insertion Losses (IL)
  - Return Losses (RL)
  - Polarization Dependent Losses (PDL)
  - Polarization Wavelength Dependent Shift (PWDS)
  - Group Delay (GD)
  - Optical Time Domain Response
- Reflectometry option leading to a unique and versatile equipment
- Multiple bands available
- External TLS compatible (100 series)

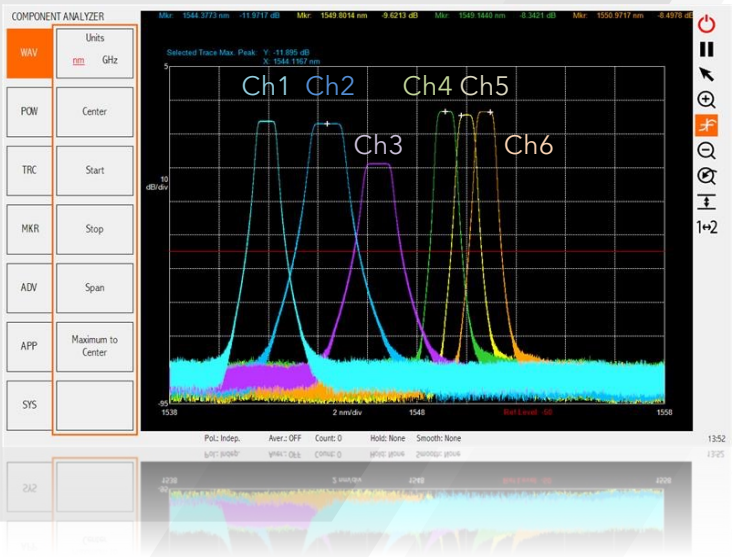
HDCA - OPTIONS

MULTIPLE CHANNELS FOR PASSIVE DEVICES CHARACTERIZATION

The spectra profile of **Insertion Losses (IL)** and **Return Losses (RL)** of passive devices can be measured with femtometric resolution and fully automated for multiple channels.

Considering the current needs, HDCA comes with **up to 4 ports** to measure multiple channels simultaneously, optimizing the characterization time.

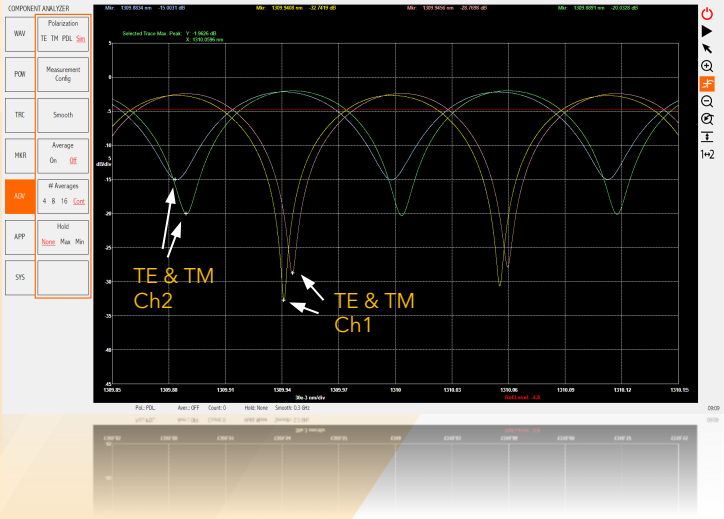
It can also be enhanced by adding **extension boxes** with **up to 6 additional ports each**, so the total number of ports can be increased for optimizing the measuring time.



POLARIZATION ANALYSIS (PDL & PWDS)

Thanks to this option, the HDCA is capable of measuring **Polarization Dependent Losses (PDL)** of passive optical devices, as well as the independent TE and TM spectral responses of wavelength-selective devices, allowing accurate evaluation of **polarization-dependent wavelength shifts (PDWS).**

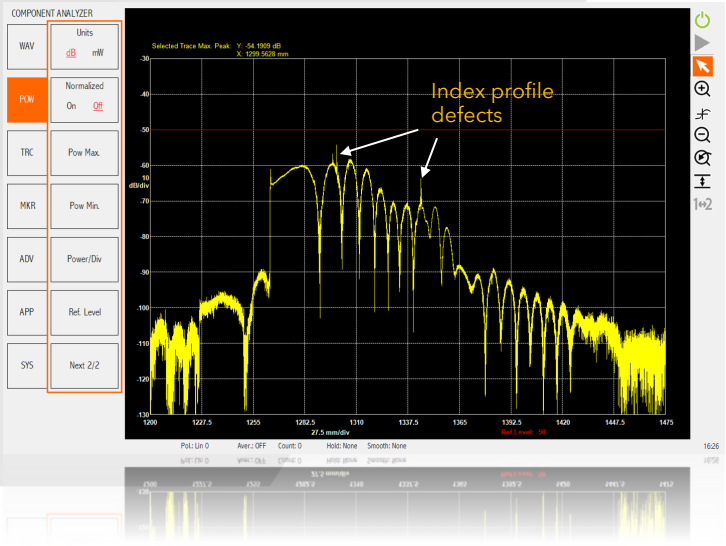
For components exhibiting periodic or filtering behavior, where conventional Mueller-based PDL analysis is not sufficient, an advanced method enables extraction of the spectra along the principal states of polarization, ensuring **precise TE/TM characterization** and a more comprehensive assessment of device performance.



OFDR: HIGH-RESOLUTION REFLECTOMETRY

HDCA is now including **OFDR ("Optical Frequency Domain Reflectometer)** capabilities for spatial profile analysis, enabling fully characterization of photonics devices as well as testing and troubleshooting short optical networks.

With a **femtometric sampling resolution**, **zero dead zone**, and **low noise floor**, HDCA is used for detailed fault analysis, identifying reflections, discontinuities, and propagation losses of fiber optics component or even inspect inside Photonic Integrated Chips.



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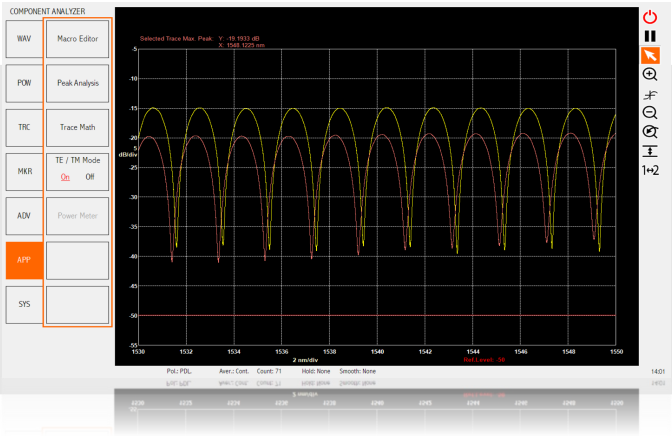
HDCA - APPLICATIONS



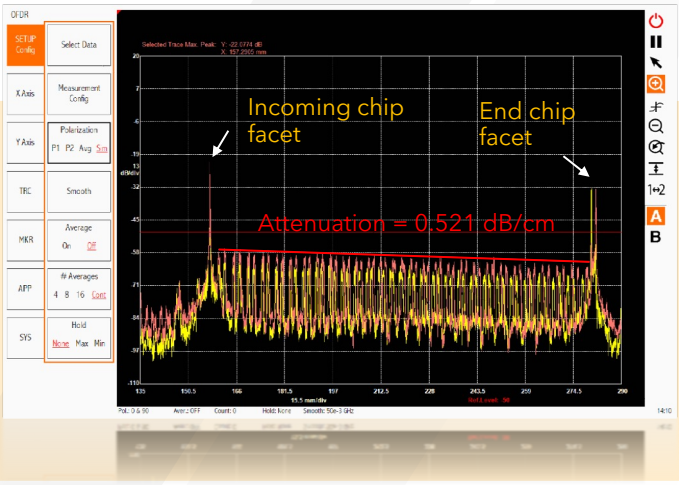
CHARACTERIZE OPTICAL FIBER COMPONENTS

HDCA ("High Definition Component Analyzer") is specifically designed to characterize passive optical devices with **the highest resolution and wavelength accuracy** in the market, coupled with the fastest measurement time and largest dynamic range.

PHOTONICS INTEGRATED CIRCUITS CHARACTERIZATION

Allows deep inspection inside of **Photonic Integrated Circuits (PICs)** to identify and analyze internal loss profiles.

The integration of OFDR systems into the Photonic Integrated Circuits (PIC) testing workflow significantly accelerates R&D cycles and supports the reliable scaling of silicon photonics for mass production



MEASUREMENT OF BOTH SPECTRAL RESPONSE AND TIME DELAY RESPONSE

Thanks to the measurement of both **spectral and time delay response** the characterization of elements as Fiber Bragg Gratings is key to analyze the refractive index profile, detect defects and measure the group delay.

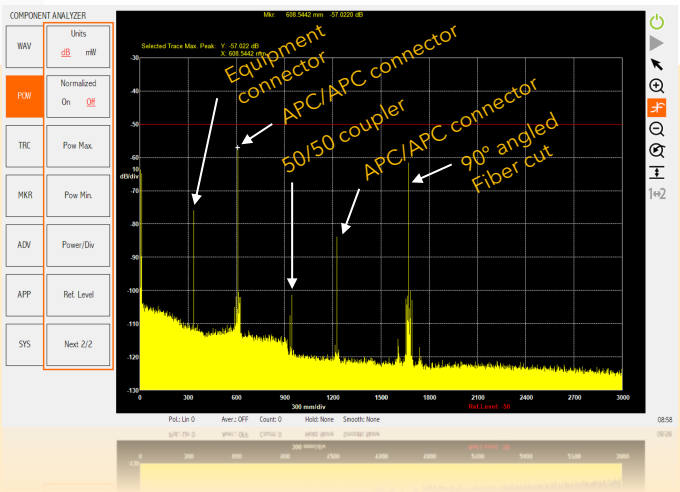
An example of its usefulness is the case for dispersion compensation in communication links.

FIBER OPTICAL NETWORK LINKS

Identification of fine-scale optical fiber defects, including micro-bends, splices, and faults.

High-resolution **troubleshooting of short high-performance optical links** (~250m):

- Data-center network environment
- Fiber-to-the-premise (FTTP) deployments.
- Onboard optical networks in aircraft & ships.

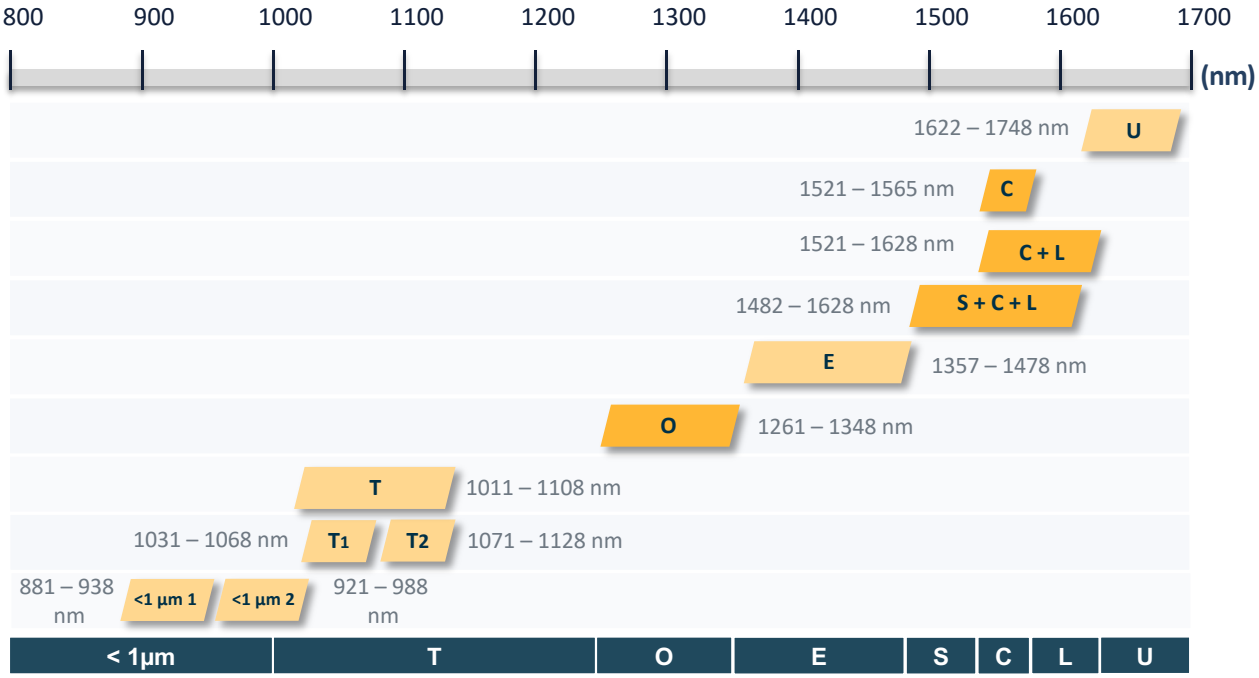


HDCA – TECHNICAL SPECIFICATIONS

Optical		
Resolution		0.3 MHz (0.0024 pm) (Min.) / 1 MHz (Typ.)
Number of channels		1 included, up to 4 optional Additional channels upon request
Calibrated Input Power Range		+10 to -90 dBm
Output power		0 dBm (Min.)
Polarization Measurement		Two orthogonal polarizations PDL & PWDS measurement as option
Sweep speed		10, 20, 40 or 100 nm/s
Wavelength reference		Linearization + absolute reference
Performance		
Wavelength accuracy		±0.5 pm (Typ.)
Dynamic range	IL	>85 dB @ 100 nm/s
	RL	> 55 dB
Power accuracy	IL	±0.1 dB (Typ.)
	RL	±0.5 dB (Typ.)
Power resolution		0.001 dB
PDL accuracy		±0.04 dB
PDL repeatability		±0.02 dB
OFDR option		
Sampling resolution		6 µm S,C&L bands / 7 µm O band
Measurement range reflection mode		14 / 36 / 73 / 147 m (*)
Measurement range transmission mode		28 / 72 / 146 / 294 m (*)
Repeatability fiber length		±50 µm
Sensitivity		-120 dB

For additional specifications, please request further information using the contact details below.

(*) ng=1.48 @1550nm



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