Press Release YOKOGAWA

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Yokogawa Meters & Instruments Releases AQ6376 Optical Spectrum Analyzer
- For precisely assessing the properties of 3-μm lasers –

Yokogawa Meters & Instruments Corporation announces that it has developed the AQ6376 optical spectrum analyzer and will release it on February 16. The AQ6376 has a wide dynamic range and can perform precise, high resolution measurements of the optical spectrum of laser light in the 1.5–3.4 μm wavelength range. The AQ6376 is a bench-top analyzer that uses dispersive spectroscopy[*1] and supports the 3-μm band, an industry first.

An optical spectrum analyzer is a measuring instrument that resolves the wavelength components of optical devices such as semiconductor lasers and fiber lasers in order to assess their properties. The AQ6376 will help to improve the efficiency of 3-μm optical devices and accelerate their adoption in fields such as environmental measurement and medicine, where they already are a topic of considerable interest.

Development Background

In recent years, laser absorption spectroscopy[*2] has entered wide use in the environmental measurement field for the detection of gases such as carbon oxides (CO_x), nitrogen oxides (NO_x), and hydrocarbon gas (C_xH_y). Although 2-μm semiconductor lasers have mainly been used as the optical source in such applications, there is an increasing need for 3-μm lasers because these gases absorb more light at longer wavelengths. Optical lasers are also being gradually introduced in the medical field, where the need to analyze substances that contain water is driving demand for 3-μm fiber lasers. Accordingly, there is a growing need for a tool that can precisely measure optical spectra in the 3-μm band.

There are already some devices that can measure optical spectra in the 3-μm band, including interferometer-type measuring instruments and large-scale measuring systems that use spectrometers. However, they have disadvantages such as narrow dynamic range and low wavelength resolution that lessen measurement accuracy. There is thus a strong need for a high-performance optical spectrum

analyzer that has none of these limitations.

Since entering the optical spectrum analyzer market in 1980, Yokogawa has continued to develop and refine its technologies for the precision measurement of the optical spectrum in the visible light and near-infrared ranges. Drawing on its expertise in dispersive spectroscopy, we have developed the AQ6376 to perform 3-μm band mid-infrared measurements.

Product Features

1. Industry-leading measuring range

The AQ6376 has a dynamic range of 80 dB and a close-in dynamic range[*3] of 55 dB, which are 10,000 times and 300 times greater, respectively, than what is possible when using an interferometer-type instrument in the 3-μm band. No other instrument on offer in the market has this range,[*4] and this is sufficient for the performance of side mode measurements with a semiconductor laser.

2. Industry's highest wavelength resolution

The AQ6376 has an industry-best wavelength resolution of 100 pm, three times that of an interferometer-type measuring instrument in the 3-μm band.[*5]

3. Accurate measurement of the optical spectrum of light

The AQ6376 comes with two additional enhancements. One is a function that purges water vapor trapped in a spectroscope that can suppress the absorption of light with a certain wavelength. The other is a function that reduces the effect of high-order diffracted light whose wavelengths are 2–3 times that of incident light, a problem which all spectroscopes have due to their design principle.

Major Target Users

Universities, research institutes, and manufacturers of active and passive optical devices

Main Applications

- Emission spectrum measurement using semiconductor, fiber, and other wide-wavelength lasers
- Measurement of wavelength transmission characteristics for optical filters such as a fiber Bragg grating (FBG)[*6]

*1 A technique whereby light with a wide range of wavelengths is passed through a narrow opening in a diffraction grating to extract a narrow range of wavelengths

*2 The use of a laser to irradiate molecules, which, depending on their type, will absorb light of a particular wavelength. This principle is used to analyze the optical spectrum and quantitatively assess molecules in the gas phase.

*3 An indicator of the ability to resolve a weaker signal that is very close (in wavelength) to a stronger signal

*4 Based on a Yokogawa survey, as of February 2016. The dynamic range is a reference value (typical value), not a guaranteed value.

*5 Based on a Yokogawa survey, as of February 2016. One hundred pm is the highest wavelength resolution that can be set for measuring 3-μm light.

*6 A device that utilizes periodic variations in the refractive index to reflect a certain wavelength in an optical fiber

About Yokogawa

Yokogawa's global network of 88 companies spans 56 countries. Founded in 1915, the US$3.5 billion company engages in cutting-edge research and innovation. Yokogawa is active in the industrial automation and control (IA), test and measurement, and aviation and other businesses segments. The IA segment plays a vital role in a wide range of industries including oil, chemicals, natural gas, power, iron and steel, pulp and paper, pharmaceuticals, and food. For more information about Yokogawa, please visit www.yokogawa.com