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News Release

FURUKAWA, OFS AND CORNING ACHIEVE MILESTONE FOR OPTICAL INTERCONNECTS

Increased Reach and Distance to Benefit Mega Data Centers

OFC/ NFOEC 2014, Booth 4153, San Francisco, California, March 6, 2014 – Furukawa Electric Co., Ltd. has developed a vertical cavity surface emitting laser (VCSEL) that operates at 25 Gbps and realized transmission of up to 500 meters over prototype multimode fibers developed by OFS and Corning Incorporated (NYSE:GLW).

“This is a significant accomplishment for data communications as both longer reaches and higher speeds are required for warehouse-scale data centers. Our customers are raising expectations as they implement next-generation data centers and we are pleased to be innovating the technology to meet and exceed those expectations,” said Dr. Haruki Ogoshi, senior fellow of Furukawa.

The rapid growth of cloud computing and expansion of “big data” is causing a dramatic increase in the volume of data handled in data centers. This has generated demand for greater throughput in servers, switches and routers in data centers. Increasing the serial speed of transmission of lasers and photo detectors is one approach to that end. In addition, there is a need to increase transmission distances between devices as data centers become larger. In mega data centers, for example, transmission distances of 300 m or longer can be required. At present, VCSELs at a wavelength of 850 nm are widely used for lowest cost optical interconnect. However, it is known that when the transmission speed is changed from 10 Gbps to higher-speed 25 Gbps, the transmission distance is limited to less than 200 m due to the influence of chromatic dispersion in multimode fibers.

In order to solve these issues, Furukawa has developed a VCSEL with a wavelength of 1060 nm that operates at 25 Gbps.

“Increasing the VCSEL wavelength from 850 to 1060 nm reduces chromatic dispersion of fibers by approximately two thirds,” says Dr. Durgesh Vaidya, Senior Manager Research and Development for OFS. “Accordingly, use of a multimode fiber with the modal dispersion minimized at 1060 nm reduces transmission impairments and allows transmission distances to be extended. It is widely expected that it will be easier to increase VCSEL speeds in the future beyond 25 Gbps by moving from 850 to higher wavelengths.”

Furukawa created a prototype optical module integrating the newly developed 1060 nm VCSEL in a small package with a driver integrated circuit and then conducted a transmission experiment close to actual operating conditions. When a multimode fiber from OFS or Corning was used with the modal dispersion optimized for a wavelength of 1060 nm, a long-reach of 300 m was achieved. In a joint experiment, a short length of modal dispersion-compensating fiber developed by Corning was used in conjunction with standard OM4 multimode fiber, and a transmission distance of 500 m was achieved. These results were obtained without the use of electrical compensation technologies such as a clock data recovery or an error correction. In this way, FEC’s new VCSEL technology can allow for an increase in speed and distance without complicating future systems.

“This collaboration shows that long wavelength VCSEL technology can meet the demands of next generation data centers when combined with new, wavelength optimized fiber, or even standard OM4 fiber with new modal dispersion compensation fiber,” said Dr. Alan F. Evans, research director, Optical Physics and Transmission Technology, Corning.

Details of this experiment will be presented at the Optical Fiber Communication Conference and Exposition to be held in San Francisco, March 9-13.

About Furukawa Electric Co., Ltd.

Furukawa Electric Co., Ltd. (www.furukawa.co.jp/english) is an \$11 billion global leader in the design, manufacture and supply of fiber optic products, network products, electronics components, power cables, nonferrous metals, and other advanced technology products. Headquartered in Tokyo, Japan, Furukawa operates production facilities on five continents around the globe, including OFS in the U.S.A., Europe and China.

About OFS

OFS is a world-leading designer, manufacturer and provider of optical fiber, optical fiber cable, connectivity, FTTX and specialty photonics solutions. Our marketing, sales,

manufacturing and research teams provide forward-looking, innovative products and solutions in areas including Telecommunications, Medicine, Industrial Automation, Sensing, Government, Aerospace and Defense applications. We provide reliable, cost effective optical solutions to enable our customers to meet the needs of today's and tomorrow's digital and energy consumers and businesses.

OFS' corporate lineage dates back to 1876 and includes technology powerhouses such as AT&T and Lucent Technologies. Today, OFS is owned by Furukawa Electric, a multi-billion dollar global leader in optical communications.

For more information, please visit www.ofsoptics.com.

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About Corning Incorporated

Corning Incorporated (www.corning.com) is the world leader in specialty glass and ceramics. Drawing on 160 years of materials science and process engineering knowledge, Corning creates and makes keystone components that enable high-technology systems for consumer electronics, mobile emissions control, telecommunications and life sciences. Our products include glass substrates for LCD televisions, computer monitors and laptops; ceramic substrates and filters for mobile emission control systems; optical fiber, cable, hardware & equipment for telecommunications networks; optical biosensors for drug discovery; and other advanced optics and specialty glass solutions for a number of industries including semiconductor, aerospace, defense, astronomy and metrology.

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