Three High-Performance Semiconductor Laser Emission Sources Commercialized

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Nippon Telegraph and Telephone Corporation and NTT Electronics Corporation have endeavored to commercialize new laser emission sources that are optimum for next-generation communication systems and applications in non-communication fields such as medicine and the environment.

They intend to launch three new products soon via the sales channels of NEL.

2.5 Gbps direct-modulation laser emission source for long-distance transmission, which is operable without temperature control

- Variable-wavelength laser emission source, for which emission wavelength can be arbitrarily set using only one element in a specific wavelength range

- Laser emission source with oscillation wavelengths in excess of 2.0 _m, which is applicable to measuring instruments in the medical and environmental fields

  These new products are the result of the successful commercialization of NTT Photonics Laboratories' long-accumulated design and manufacturing technologies for the light sources of backbone optical communication systems. Jointly with NEL, NTT has focused on the commercialization of such

systems based on the Comprehensive Commercialization Functions introduced by NTT in July 2003.

Background

To supply high-speed, large-capacity communication services to households of individual subscribers via FTTH (fiber to the house), an optical-fiber communication network to connect the core system with the subscriber (access) systems is indispensable. The required systems for networking must not only ensure high speed and large capacity but also meet the requirement of being economical to supply less expensive communication services. To that end, especially for the light sources of subscriber (access) and metro systems, it is considered necessary to dispense with the temperature adjustment function, which requires a complicated device control and high power consumption.

NTT's 2.5 Gbps direct-modulation laser emission source for long-distance transmission, which is operable without temperature control, was developed to address this need.

Previously, it was necessary to prepare several light sources with different wavelengths for the WDM, an economical networking technology used for communications to effectively connect metro and core systems. NTT's variable-wavelength laser emission source for which emission wavelength can be arbitrarily set to a specified wavelength range was developed to eliminate complexity and increase the number of light source inventories. Meanwhile, these semiconductor lasers for communication have features in non-communication fields such as excellent wavelength controllability, compact size and low cost compared with solid-state lasers. Accordingly, some recent approaches have extended their application to light sources for optical sensors. However, until recently there were no semiconductor lasers that

could oscillate around 2.0 _m wavelength despite strong demand in the medical and environmental fields, therefore expensive and large-scale, solid-state lasers were used instead. NEL showed its presence in these application fields by commercializing a semiconductor laser with oscillation wavelengths at 2.0 _m in 2004.

NEL has also developed a DFB laser with oscillation wavelength in excess of 2.0 _m in response to requests such as the extended lineup of measurable substance types, the extensible optimum absorption wavelength range depending on measured items by each substance and simultaneous measurements for several wavelengths.

NTT and NEL have endeavored to realize higher performance of semiconductor laser emission sources for optical communications and accumulated sophisticated design and manufacturing technologies to meet the stringent requirement of higher capacity for backbone optical communication systems. Applying the accumulated technologies led to the development of these new products.