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Optical power meters go wireless

By Oliver Graydon

The ability to use a mobile phone to make remote measurements of optical power over the airwaves at distances of up to 1 km is now a reality, thanks to an innovative idea from Oz Optics. The Canadian company has launched a range of sensors that exploit wireless technology, which will enable cable-free measurements of signals in optical fibres.

Oz Optics' "Wireless Fiber" sensor head consists of a strand of optical fibre, a photodiode detector and a radio transmitter, all integrated into a package the size of a matchbox. A Bragg grating written into the fibre deflects a tiny portion (about 1%) of the light out of the fibre and onto an InGaAs photodiode, where it is measured and then broadcast by a radio transmitter. The user simply equips their PDA, laptop or mobile-phone with a plug-in USB/SDIO wireless receiver to display the power measurement.

The company offers a communication range from 10 m to 1 km or more by using Bluetooth, WiFi or a high-frequency radio signal. The specification sheets also quote an insertion loss of less than 0.2 dB and the ability to handle optical powers of up to 1 W.

No strings attached: a smart phone and a laptop displaying the power reading from a "Wireless Fiber" installed in an optical link. This demonstration took place at the Oz Optics stand at LASER 2005, which was held in Munich, Germany, in June.

According to the firm, by adding optical filters or multiple gratings into the sensor head, it is possible to make more complex measurements, such as checking a signal's polarization and wavelength, as well as its power.

"The next-generation service equipment will allow wireless measurements of power, wavelength or temperature, and other parameters," explained Oz Optics' CEO Omur Sezerman at the LASER 2005 show in Germany, where the Wireless Fiber was being demonstrated. "You could have easily hundreds or perhaps even thousands of measurement locations, each of which is individually addressable."

The attraction of the system is that the Wireless Fibers can be left permanently in a network to allow remote automated monitoring. In principle, this means that engineers wishing to monitor a fibre-to-the-home network could simply drive around a neighbourhood checking the power at various nodes where the Wireless Fiber has been installed. Alternatively, the data could be logged at a central location and an alarm sounded if any of the measurements were to fall below a threshold value.

Oz Optics says that the data can be encoded to prevent unauthorized reading. Its long-range system operates over a frequency band that does not interfere with other communications and does not require a licence.