Trinity College Dublin

Unique Optical Signal to Noise Ratio Measurement Device

Available for license

Basic overview

Optical noise from erbium-doped fiber amplifiers is a major impairment to optical network functioning in telecommunications. When the network becomes more complex with more complicated signal routes and more densely spaced communication channels, in-band OSNR monitoring becomes an absolute necessity.

Globally, there are various methods being proposed to address the in-band OSNR monitoring issue. They generally involve complex and expensive polarization controller units or optical spectrum analyzer devices. This OSNR provides a **cost-effective and robust solution to the in-band OSNR monitoring problem.** Any impairments to the signal incurred from the network such as chromatic dispersion, polarization mode dispersion, additional filtering, etc, will not influence the function of the module. In particular, the polarization of the noise will not influence the module function compared to competing modules whereas in current fault testing equipment single interferometer based schemes the noise must be turned off to determine the signal autocorrelation.

The opportunity

This is a fast expanding area in a growing, high value market. Our prototype monitor is available for testing under network conditions. The technology is available for license to telecommunications equipment suppliers or is also available as a standalone device suitable for tech start up.

Technology and patent status

An international patent was filed in 2010.

Advantages

Our dual interferometer OSNR scheme overcomes limitations of its competitors:

- The fiberized scheme uses dual interferometers to measure OSNR **without the need to turn off the noise**
- Measurements have been made on 10G NRZ OOK signals, 5G and 2G with no change in performance at the lower modulation rates. This can be easily extended to 40 G and 100 G through simple changes to the delays in the two interferometers
- Scheme has been shown to be **immune to signal polarization, noise polarization and signal dispersion**
- Measurement range from below 10 to 30 dB and accuracy of +/- 0.5 dB
- Initial studies show that the scheme can work for phase modulated signals. However the range is less than for amplitude modulation and further studies are now required

Picture of the prototype OSNR monitor built in TCD.

Applications

OSNR is a key measure of the health of optical networks; particularly those used for optical telecommunications, and is a key parameter for future high speed and transparent optical networks.

- Our dual interferometer OSNR scheme will be useful for monitoring optical signals in telecommunications systems operating at 10 G, 40 G and 100 G.
- It can be used to both monitor amplitude and phase modulated formats.

Inventors: Prof. John F Donegan, CRANN (PI), CTVR (PI), School of Physics, Trinity College Dublin
Contacts: Brendan Ring, Commercialisation Manager-CRANN ✉ brendan.ring@tcd.ie
www.crann.tcd.ie/Industry-Commercialisation/Available-Technologies.aspx

CTVR CRANN