Narrowly Filtered On-Off Keying Modulation in Communication Links

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TECHNOLOGY DESCRIPTION

The invention extends the dispersion limited reach of fiber optic cable to at least 500 km relying on simple OOK signaling, requiring no additional complexity in the transmitter such as additional amplitude or phase modulators. In addition the invention allows deployment of higher spectral efficiency systems based on OOK signaling and can increase the spectral efficiency of the existing system 2-5 times. The limit of 500 km is set by the currently available technology and it is conceivable that it can be increased with advancement in the realizable integrated circuits.

Dispersion limited reach in uncompensated fiber optic links based on bit-by-bit detection is defined by the intersymbol interference (ISI). The dispersion limited distance for NRZ format is approximately 80-100 km. In 2001 electronic dispersion compensation (EDC) was suggested for extraction of information from ISI corrupted optical links. The dispersion limited reach with EDC is ultimately confined by the amount of spreading of the optical waveforms and in previous work, it has been shown that links operating at 10 Gb/s are limited to approximately 200 km with EDC. The limit is set by the increased complexity of the equalizer that grows exponentially with the span of ISI. With the technology of the present invention, this limit can be extended by up to 250%.

APPLICATIONS

The invention described here can be used to extend the dispersion limited reach such as repeater/transponder spacing in fiber optic communications networks when used in conjunction with electronic equalization or EDC.

This invention can also enable an Increase of the spectral efficiency in Frequency Division Multiplexing (FDM) or Wavelength Division Multiplexing (WDM) systems in optical, RF and Ultra Wide Band communication systems, as well as in , but not exclusively bound to, communication systems not relying on (exact) carrier phase locking.

COMPETITIVE TECHNOLOGIES

Modulation formats extending dispersion limited reach and/or spectral efficiency (with or without EDC)

Duobinary Modulation

Single Sideband Modulation

Duobinary Single Sideband Modulation

QPSK or M-ary PSK, Optical oQPSK

EDC performed on regular OOK systems (NRZ, RZ, CS-RZ, CRZ etc.), or one of the above advanced modulation formats.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,155,530	04/10/2012	2005-208

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OTHER INFORMATION

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics

RELATED CASES

2005-208-0

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