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W-band signal propagation in a WDM-over-OCDMA system

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In the past few years, because of the introduction of new bandwidth-demanding services and applications through mobile phone communication, demands for a higher capacity that can support execution of such services has increased substantially. An effective method to increase the capacity is to move to the higher working frequency bands (to the millimeter wave region (>30 GHz)). This region has an inherently higher capacity, plus is more secure and less occupied. However, millimeter waves when transmitted over the air are prone to atmospheric losses and are severely attenuated at a relatively short propagation distances. Thus, transmission of such signals through an optical fiber link will simultaneously preserve the security, augmented capacity and yet the propagation distance without the signals being distorted and with relatively much longer than over-the-air propagation. To add to the capacity even further, two of the well-established methods of increasing the capacity were merged in this work. First, was to increase an optical network's capacity by employing several wavelength channels to transmit optical signals in parallel. Depending on the number of wavelength channels, the capacity of the system will be multiplied. The other was optical encoding that can help to further increase the capacity of the system and accommodate more channels to be transmitted simultaneously. This method assigns different optical codes to each channel that is identical and can only be decoded individually. This work, utilizes above methods to increase the capacity of a W-band radio-over-fiber WDM-over-OCDMA system to accommodate more users per channel.

Biography

Morad Khosravi Eghbal is currently a Graduate Research Assistant and a PhD Candidate at the Photonics Research Lab at the University of Texas at San Antonio. His research focus is on the millimeter wave radio-over-fiber communication, optical coding and multi-wavelength transmission methods for 5G architecture.

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