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Abstract

Experimental Characterization of Sigma Delta Radio over Fiber System for 5G CRAN Downlink

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Abstract:

Radio over Fiber (RoF) is an apting technology for the next generation wireless networks including 5G Cloud Radio Access Network (C- RAN). Digital Radio over Fiber (D-RoF) networks are immune to nonlinearities that arise in Analog Radio over Fiber (A-RoF). However, with increase in carrier frequencies and baud rate, the D-RoF cost becomes crucial. There exists a possibility to use Sigma Delta Radio over Fiber (S-DRoF) that combines the advantages of A- RoF and D-RoF by means of Sigma Delta Modulator (SDM) at the transmitter side subsequently replacing the employment of expensive and high-speed digital to analog converters. In this paper, we demonstrate the usage of 2nd order SDM for LTE 20 MHz signal having 256 QAM modulation on a central carrier frequency of 2.475 GHz for the implementation of S-DRoF for 10 Km of Standard Single Mode Fiber with baud rate from 25 to 100 Mbaud. Withal, a comprehensive analysis of the design of SDM is explained followed by the experimental setup. The performance is reported in terms of error vector magnitude, and adjacent channel leakage ratio. The results show that the proposed architecture performance is within the LTE specifications, proving this is a cost and power effective solution for next generation wireless networks.

Biography:

M.U. Hadi received his BS Electrical Engineering from PIEAS, Islamabad in June, 2014. From September 2014-16, he did his MS in Electronic Engineering from University of Bologna, Italy with honors. From October 2016, he is associated with Optics Lab, DEI, University of Bologna and ESYCOM, ESIEE Paris where he is working towards his PhD titled "Digital Signal Processing techniques applied to Radio over Fiber systems". His research interests includes Digital Predistortion, Digital Radio over fiber systems and Sigma Delta Radio over Fiber Systems. He

worked as a researcher in Nokia Bell Labs in 2018 where he worked towards

realization of Sigma Delta Radio over Fiber System. Dr Hadi is a Member IEEE, IEEE Photonics Society and IEEE Communications Society. He serves as a reviewer for IET Optoelectronics, IEEE Communications Letters and ASTES.

Publication of speakers:

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3. Hadi M, Aslam N, Jung H. Performance appraisal of sigma delta modulated radio over fiber system. J Opt Commun. 2019 Jan. DOI:10.1515/joc-2018-0227.
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