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Comparison of digital signal processing, feedback and feedforward compensation technique for dual polarization 128-QAM radio over fiber link

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Abstract

During the last few years, there is an abrupt increase in data transfer rate and the need for a reliable technology to fulfil this requirement. The future technology for the 5G network will be using the radio over fiber (RoF) technology. The nonlinear distortion is a menace degrading radio over fiber link performance and this can be improved by the compensation techniques. In this paper, we have developed and analyzed digital signal processing (DSP), feedback and feedforward compensation technique for dual polarization 128 QAM (DP-128QAM) RoF link (200 km) and observe that the performance parameters get improved significantly. The error vector magnitude (EVM) is ~19% without compensation which is reduced to ~ 7.56 %, ~11.05 % and ~17.64 % for DSP, feedback and feedforward technique respectively. The RoF link has a bit error rate (BER) of 0.45 which is decreased by -0.0002,-0.100 and -0.33 for DSP, feedback and feedforward technique respectively. The gain of an output spectrum of a received signal is also improved with 10 dBm than -30 dBm without compensation. All these simulation and analysis have been carried out on OptiSystem 13.0 Platform.

Keywords—Distortions, Digital Signal Processing, Dual Polarization, 128 QAM, Feedback, Feedforward, Radio over Fiber.

1. Introduction

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