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Performance of Coded Multi-Line Copper Wire for G.fast Communications in the Presence of Impulsive Noise

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Abstract : In this paper, we focus on the design of a multi-line copper wire (MLCW) communication system. First, we construct our proposed MLCW channel and verify its characteristics based on the Kolmogorov-Smirnov test. In addition, we apply Middleton class A impulsive noise (IN) to the copper channel for further investigation. Second, the MIMO G.fast system is adopted utilizing the proposed MLCW channel model and is compared to a single line G-fast system. Second, the performance of the coded system is obtained utilizing concatenated interleaved Reed-Solomon (RS) code with four-dimensional trellis-coded modulation (4D TCM), and compared to the single line G-fast system. Simulations are obtained for high quadrature amplitude modulation (QAM) constellations that are commonly used with G-fast communications, the results demonstrate that the bit error rate (BER) performance of the coded MLCW system shows an improvement compared to the single line G-fast systems.

Keywords : G.fast, Middleton Class A impulsive noise, mitigation techniques, Copper channel model
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