

Impulse noise mitigation for OFDM by time-frequency spreading

Author(s) - Institution(s):

Jiri Blumenstein, BUT DREL
Roman Marsalek, BUT DREL
Ales Prokes, BUT DREL

Corresponding author email: xblume00@phd.feec.vutbr.cz

Corresponding WG group: TWG, WG3, WG2

Abstract:

This paper deals with the impulsive interferences in modern vehicles and assess the suitability of establishing invehicle wireless links replacing standard data cable bundles. According to our experiments, the standard UMTS Long Term Evolution (LTE) is highly affected by the impulse noise. We compare it with a novel 2D signal spreading method exploiting the orthogonal Walsh-Hadamard sequences in order to spread the transmitted signal in time and frequency. This method requires minor modification of the 3GPP LTE standard while no additional bandwidth nor noticeable computational power is required. In presence of impulse noise, the novel 2D spreading method outperforms the standard compliant LTE significantly. As a system model, we used an open source LTE downlink simulator developed at Vienna University of Technology and the Middleton Class A impulse noise model.