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Performance Evaluation of a Minimum Mean Square Error-Based Physical Sidelink Share Channel Receiver under Fading Channel

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Abstract : Cellular Vehicle to Everything (C-V2X) is considered a promising solution for future autonomous driving. From Release 16 to Release 17, the Third Generation Partnership Project (3GPP) has introduced the definitions and services for 5G New Radio (NR) V2X. Experience from previous generations has shown that establishing a simulator for C-V2X communications is an essential preliminary step to achieve reliable and stable communication links. This paper proposes a complete framework of a link-level simulator based on the 3GPP specifications for the Physical Sidelink Share Channel (PSSCH) of the 5G NR Physical Layer (PHY). In this framework, several algorithms in the receiver part, i.e., sliding window in channel estimation and Minimum Mean Square Error (MMSE)-based equalization, are developed. Finally, the performance of the developed PSSCH receiver is validated through extensive simulations under different assumptions.

Keywords : C-V2X, channel estimation, link-level simulator, sidelink, 3GPP
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