

Top Down Design of Joint MODEM and CODEC Detection Schemes for DSRC Coded-FSK Systems over High Mobility Fading Channels

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Abstract— The joint detection and verification of frequency shift keying (FSK) modulation and demodulation (MODEM), Manchester coding and decoding (CODEC) schemes are proposed for dedicated short range communication (DSRC) systems over high mobility fading channels. The proposed joint coded-FSK detection scheme with low complexity benefit can outperform the conventional separated coded-FSK detection scheme. It is due to the joint scheme with time diversity gain to enhance the detection performance. Moreover, the proposed joint algorithms with floating-point and fixed-point designs are verified in the software-defined-radio (SDR) platform. Based on the measurement results via SDR equipments, it is confirmed that the implementation of VHDL hardware circuit design of the proposed joint detection scheme can provide robust performance over high mobility Rician multipath fading channel environment.

Keywords— frequency shift keying (FSK) modem, dedicated short range communication (DSRC), coding and decoding (CODEC), software-defined-radio (SDR).



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