

ABSTRACT

Digital Video Broadcasting-Terrestrial (DVB-T) is a television transmission technique that uses the Orthogonal Frequency Division Multiplexing (OFDM) technique. In mobile communication scenarios, when OFDM systems are applied to Vehicle-to-Vehicle (V2V), high Doppler effect due to movement causes Inter-Carrier Interference (ICI) which can break the orthogonality of OFDM. The damaged orthogonality of OFDM causes the received signal to be corrupted and increases the BER. This research examines the effect of the Doppler effect on V2V communication systems applied to DVB-T system and offers a mitigation solution using Minimum Mean Square Error (MMSE) channel estimation. The research method includes V2V channel initiation, DVB-T channel initiation, MMSE mitigation system initiation, and whole system integration. The simulation results of the effect of the Doppler effect in the V2V channel at scatterer speeds of 10 m/s, 50 m/s, and 100 m/s produce Doppler frequencies in the order of 2.91 Hz, 1490.86 Hz, and 3329.70 Hz, respectively. This shows that the scatterer velocity is the parameter that most affects the Doppler effect. The greater the scatterer speed, the greater the resulting Doppler frequency. The simulation results of the DVB-T system on the V2V channel with MMSE mitigation at speeds of 10 m/s, 50 m/s, and 100 m/s at an SNR of 20 dB respectively resulted in BER reductions of 40.63 %, 42.16 %, and 42.83 % compared to the system without mitigation. These results show that the MMSE mitigation system is effective in reducing the BER.

Keywords: BER, DVB-T, ICI, MMSE, OFDM, SNR, V2V