

# The Performance of Frequency Offset Estimation in DVB-C2 Receiver

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**Abstract**— In this paper, we show the performance of frequency offset (FO) estimation in Digital Video Broadcasting for Cable version 2 (DVB-C2) receiver which uses orthogonal frequency-division multiplexing (OFDM). In OFDM system, inter-carrier interference (ICI) occurs due to FO which is caused by an oscillator of a transmitter and receiver, and degrades the performance of a receiver. Thus, FO should be estimated and compensated to improve the performance of a receiver. FO can be normalized to subcarrier spacing in OFDM system, and consists of fractional frequency offset (FFO) and integer frequency offset (IFO) accordingly. FFO is estimated in time domain using cyclic prefix (CP), and IFO is estimated in frequency domain with unique synchronization sequence (USS) of preamble due to the structure of DVB-C2 frame. Because the estimation of FO is influenced by CP length and echo channels shown in the DVB-C2 specification, we simulate the mean square error (MSE) of FO estimation w.r.t CP length and echo channels. The results of simulation show that MSE is reduced as CP length is longer. In addition, MSE is improved as  $E_b/N_0$  increases. However, MSE of the estimated FO tends to saturate at high  $E_b/N_0$  when echo channels are used. In addition, it increases when the maximum delay spread between echo channels is longer.

**Keyword**— DVB-C2 receiver, Frequency offset, mean square error, unique synchronization sequence



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