Frequency and Timing Offset Analysis in OFDM using GNU Radio

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Abstract

To enhance the performance and reduce the Inter Symbol Interference (ISI) at enhanced data rates in wireless communications, Orthogonal Frequency Division Multiplexing (OFDM) is being used. The performance of OFDM is degraded due to frequency and timing offsets which increase the Bit Error Rate (BER) in the wireless communication. Frequency offsets are caused due to difference between transmitter / receiver oscillators and Doppler shift. Timing offsets are due to symbol timing and sampling clock drift. This is estimated and compensated in the receiver.

In this paper packet based data transmission test bed has been implemented for OFDM to analyze frequency and time deviation. The effect of frequency offset and timing offset in packet reception over different modulation techniques like BPSK, QPSK is evaluated. By incorporating the noise voltage, normalized frequency and sample timing offset the channel model is simulated in the noisy environment and effect of these parameters considered to maximize the throughput.
The OFDM packet based data transmission with offset correction is simulated by using GNU Radio which is free & open-source software tool that provides signal processing blocks with a facility of modifying codes in these blocks.

References

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Index Terms

Computer Science  Signal Processing

Keywords
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