Link Synchronization Based on the Burst Detector

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Outline

- There is a focus on utilizing pulse shape link synchronization signaling
- A relevant proposal can be found in Lo_3dm_01_050125.pdf
- Our simulation showed that burst detection achieves a high level of reliability

Pulse shape link synchronization signaling

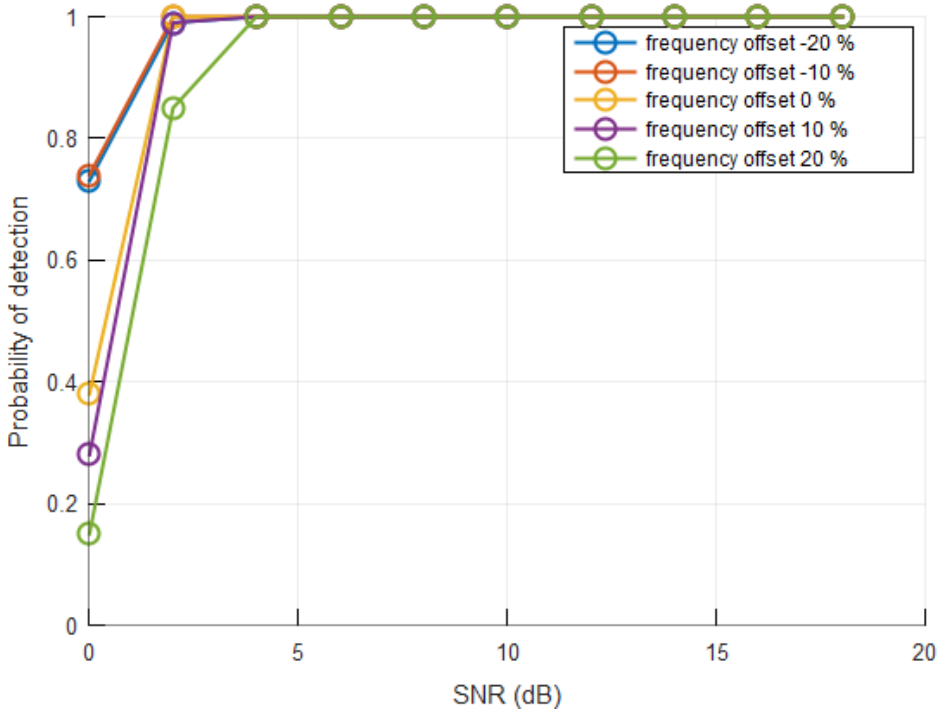
- One of pulse-based link synchronization scheme is described in Lo_3dm_01_050125.pdf
- For the low data rate channel, each pulse consists of 4 symbols (1001) using Differential Manchester Coding (DMC) within a 192-symbol duration.

Simulation parameters

- A 15m STP cable
- Frequency offset of ±10% and 20%

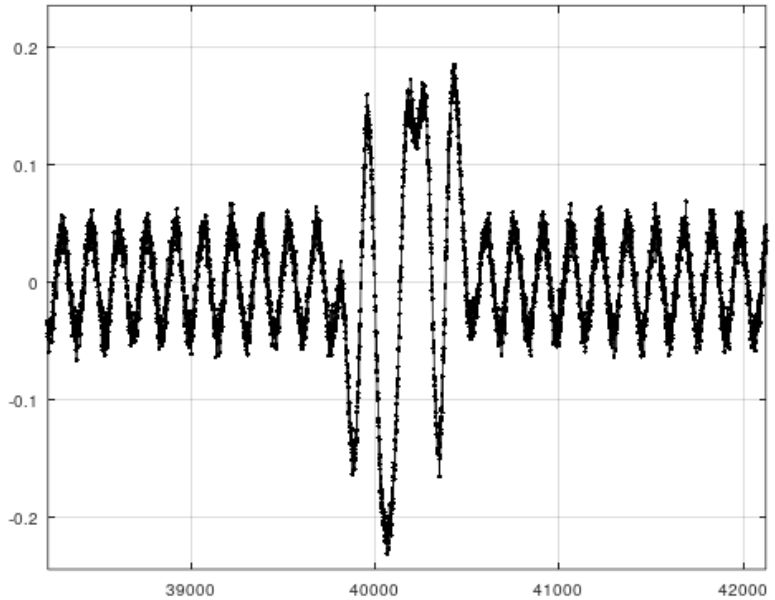
- To evaluate false positives, the following cases are considered:
    - Additive White Gaussian Noise
    - Low data rate SEND_N (Manchester coding)
    - Additive single-tone electromagnetic interference

Detection probability in the crystal-less mode



The signal remains detectable despite a significant frequency offset

No false positives with high-level of in-band EMI



Summary and future work

- Our simulation showed that burst detection achieves a high level of reliability
- In the low data rate direction, a pulse represented by {1001} within the DMC signal serves as an appropriate choice
- For the high data rate direction, a right pulse shape should be introduced

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