



A Novel Low Complexity Faster Than Nyquist Signaling Detector for Ultra High-Order QAM

The challenge	The emergence of applications such as augmented reality and 3-D television and holographic communications in the ICT sector are requiring data transmission rates that are unprecedented. The problem is that, as the data transmission rate on any communication link increases, the occupied bandwidth will also increase, which is currently limited and very expensive.
The solution	Increased data transmission rates can be achieved, without additional bandwidth or increased power, by using higher order quadrature amplitude modulations (QAM) that achieve spectral efficiency (SE) through faster-than-Nyquist (FTN) signaling detection.
Key Benefits	<ul style="list-style-type: none">✓ Ultra-high QAM data transmission without increased bandwidth or transmitting power.✓ Significantly reduced inter-symbol interference (ISI) and bit errors.
Development Stage	Concept validation complete.

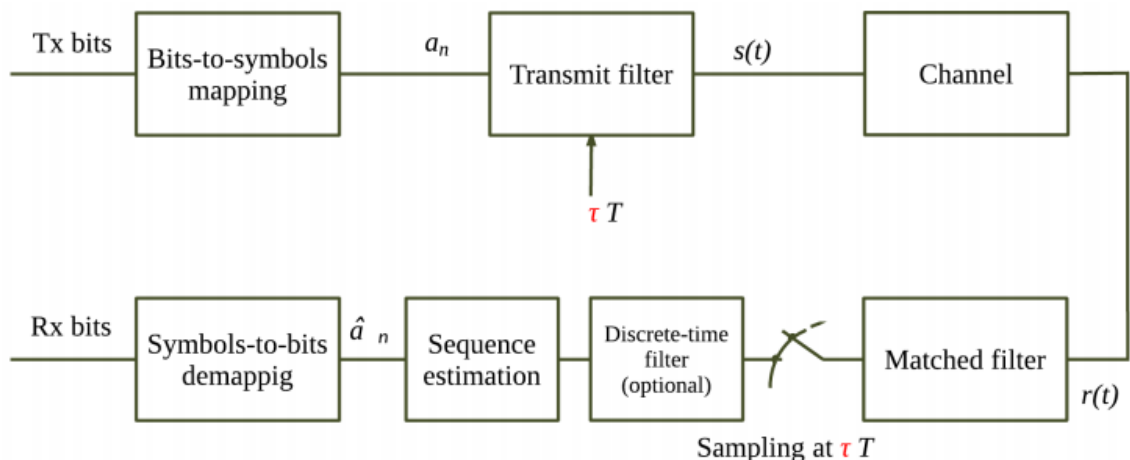


Fig. 1: Block diagram of FTN system



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Details

The Faster Than Nyquist Signalling Detector:

- Achieves excellent performance for ISI removal and reconstruction of the transmitted data symbols with very low computational effort compared to existing detectors.
- Utilizes a variant Alternating Directions Multiplier Method (ADMM) that can solve optimization problems with convex quadratic objective function and non-convex feasible set of solutions.
- Paves the way to support new data-hungry applications such as 3-D television, hologram and cellular communication networks (6G).

Research Team

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Patents

US provisional application 63/150,798,
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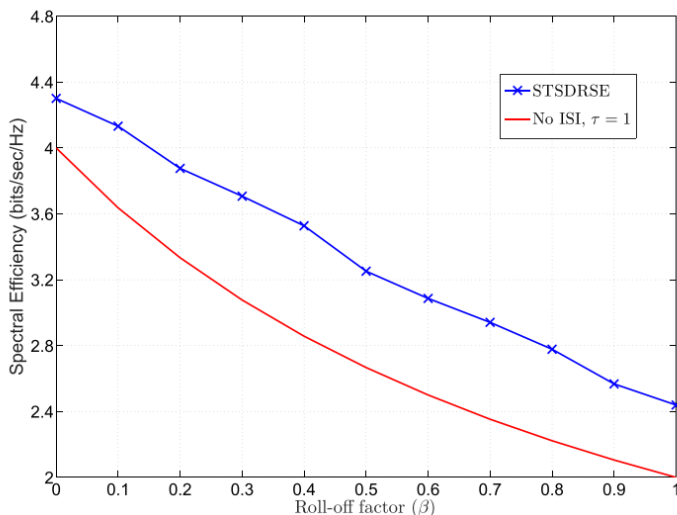


Figure 2: Spectral efficiency of 16-QAM FTN signaling (blue) vs 16-QAM Nyquist signaling (red). FTN signaling is significantly more efficient

For more information about licensing and development opportunities, contact

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