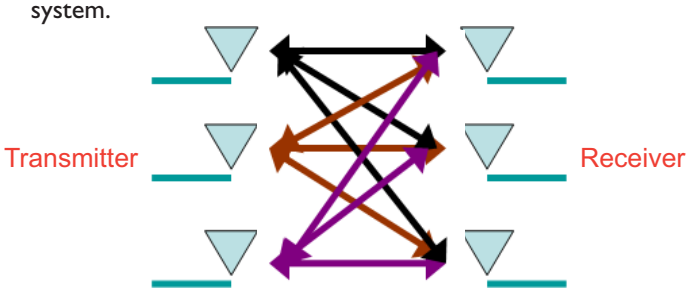
High Speed MIMO - Wireless LAN

Introduction

Multiple-Input Multiple-Output (MIMO) has been considered as one enabling technology to increase the data rate and improve the robustness, the two great challenges in wireless communications. By deploying multiple antenna arrays at both the transmitter and the receiver, a MIMO "matrix" channel is created, leading to diversity and capacity gains for a MIMO system.



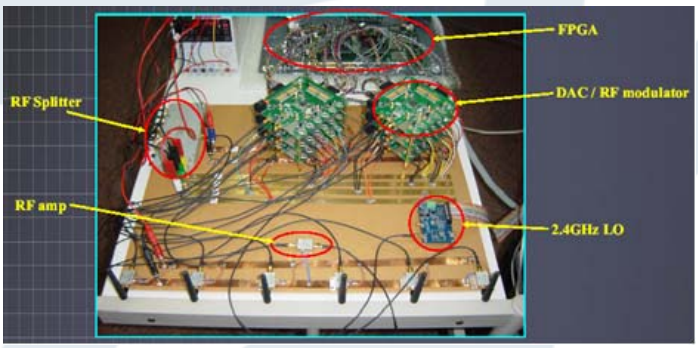
The MIMO Channel

MIMO Orthogonal Frequency Division Multiplexing (OFDM) is being standardized as the next generation high throughput wireless LAN solution in IEEE 802.11n (TGn). The IEEE 802.11n draft standard is planned to be released by end of 2006.

Besides wireless LAN, the WiMAX broadband wireless access networks, the third generation (3G) cellular mobile networks, have also adopted MIMO as optional operation mode for performance enhancement.

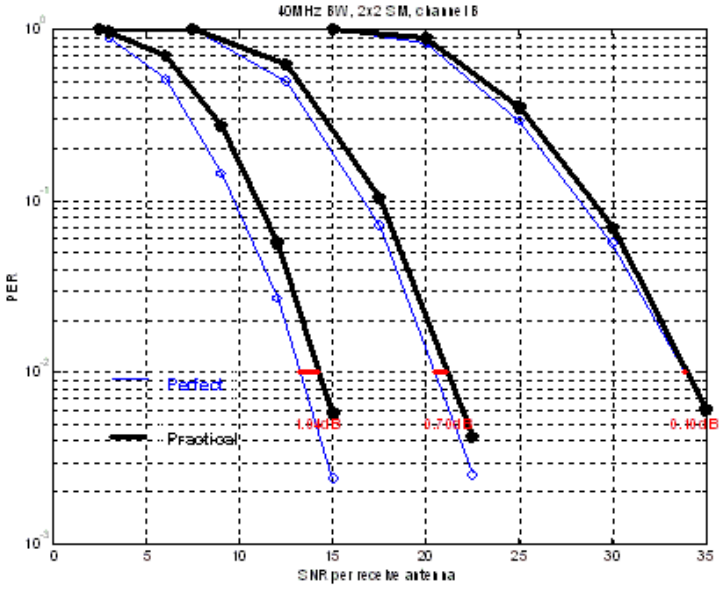
Technologies

We have been working on MIMO-OFDM and actively contributing to the IEEE 802.11n standardization activities. Being the only academic contributor member in the TGn Sync Alliance, we have contributed many proposals, from the STBC structure, long preamble sequence design, LDPC bit to symbol mapping, transmit beamforming, etc.



We have also developed a MIMO-OFDM prototype system with the following features:

- Data rate – three times of IEEE 802.11a/g rate
- Extended Range – approximately 50% range extension over direct mapping MIMO-OFDM systems
- Backward compatibility with IEEE 802.11a/g system
- Reduced complexity in receiver algorithms
- Robust performance in the presence of synchronization and channel estimation errors



Publications and Invention Disclosures

Being a research organization, we endeavor to contribute to the research community by sharing our results in prestigious international conferences and journals. We have more than 80 papers published in IEEE conferences, workshops, and journals. We also have filed 10 patent applications in the area of MIMO and MIMO-OFDM.

Applications

- High throughput wireless LAN
- Beyond 3G
- Broadband wireless access
- Ultra-high data rate UWB

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