

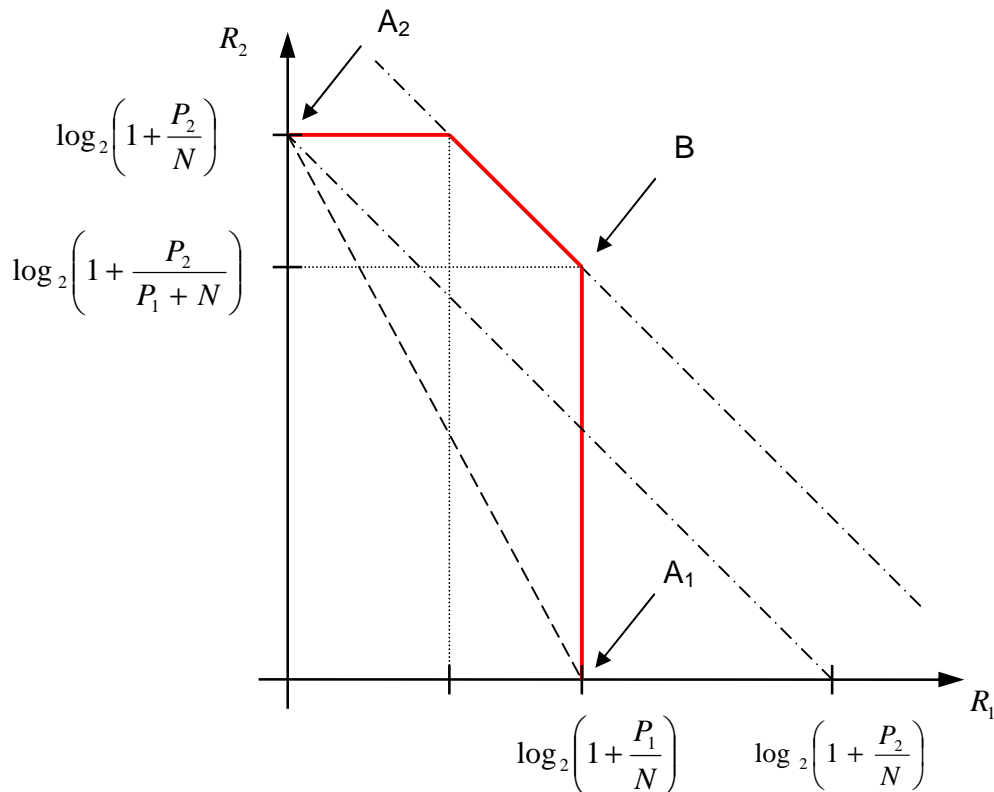
Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Multi-user MIMO using non-orthogonal superposition in uplink	
Date Submitted	2008-09-17	
Source(s)	Joerg Schaepperle, Andreas Rueegg Alcatel-Lucent	Voice: E-mail: Joerg.Schaepperle@alcatel-lucent.com * http://standards.ieee.org/faqs/affiliationFAQ.html >
Re:	SDD Session 56 Cleanup; in response to the TGM Call for Contributions and Comments 802.16m-08/033 for Session 57	
Abstract	SDD text proposal for MU-MIMO using non-orthogonal superposition in uplink	
Purpose	Consider for inclusion into the SDD	
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Multi-User MIMO Using Non-orthogonal Superposition in UL

Joerg Schaepperle, Andreas Rüegg
Alcatel-Lucent

Motivation

From the two-user uplink rate region it can be seen that significant throughput gains can be achieved by non-orthogonal superposition.



Principles

- Signals for different users are not orthogonal; neither in time or frequency nor in the space or code domain
- Receive signal is a weighted sum of the signals from different users
- Signals can be separated by multi-user detection, especially successive interference cancellation
- Typically the signals for different users have significantly different power
- No instantaneous CSI required at transmitter
- Can be used with single or multiple antennas

Practical Implementation

- Superimposed signals can be coded/modulated using conventional modulation coding schemes
- Simple e.g. two-user SIC receiver in the BS is sufficient

Simulation Results

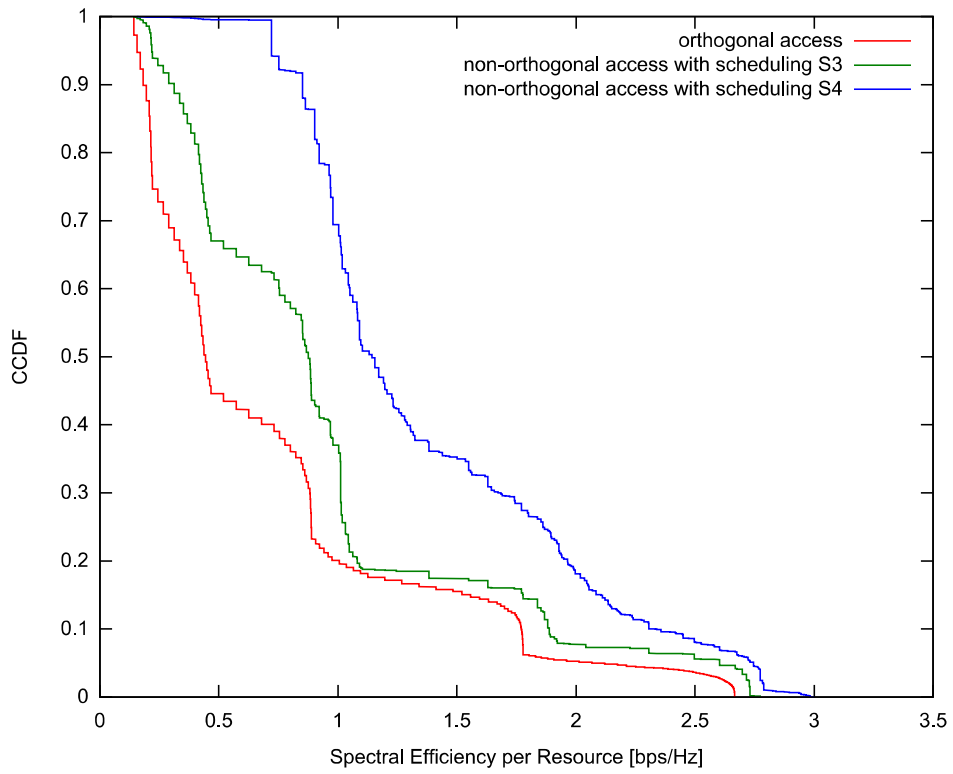


Figure 1: Spectral efficiency per resource (Ped B 3 km/h)

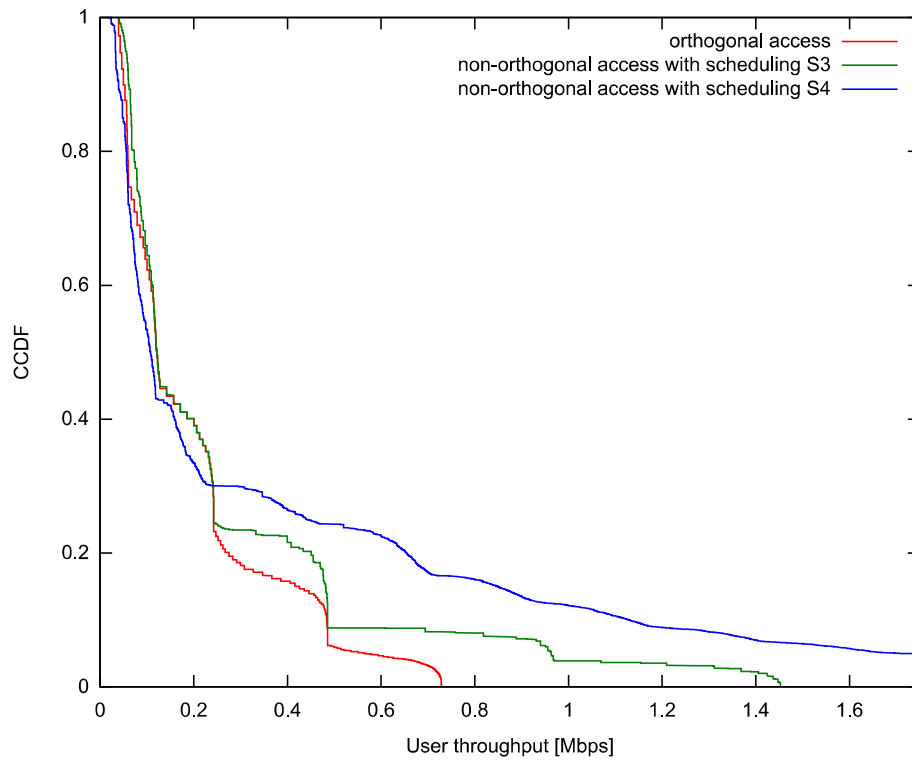


Figure 2: Throughput per user (Ped B 3 km/h)

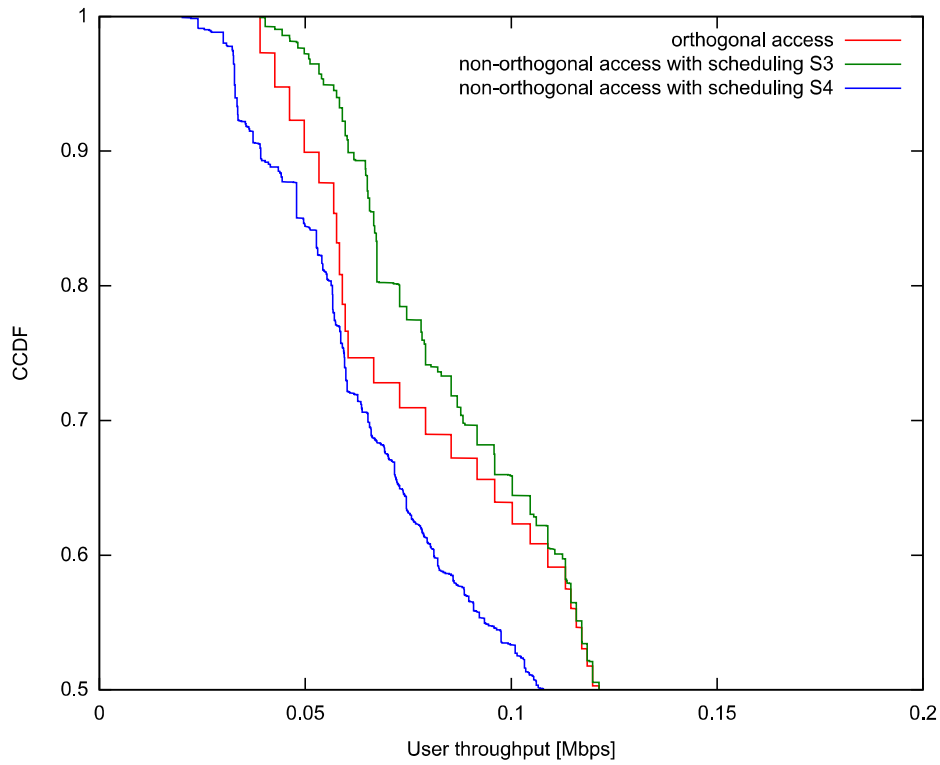


Figure 3: Throughput per user (PedB 3 km/h)

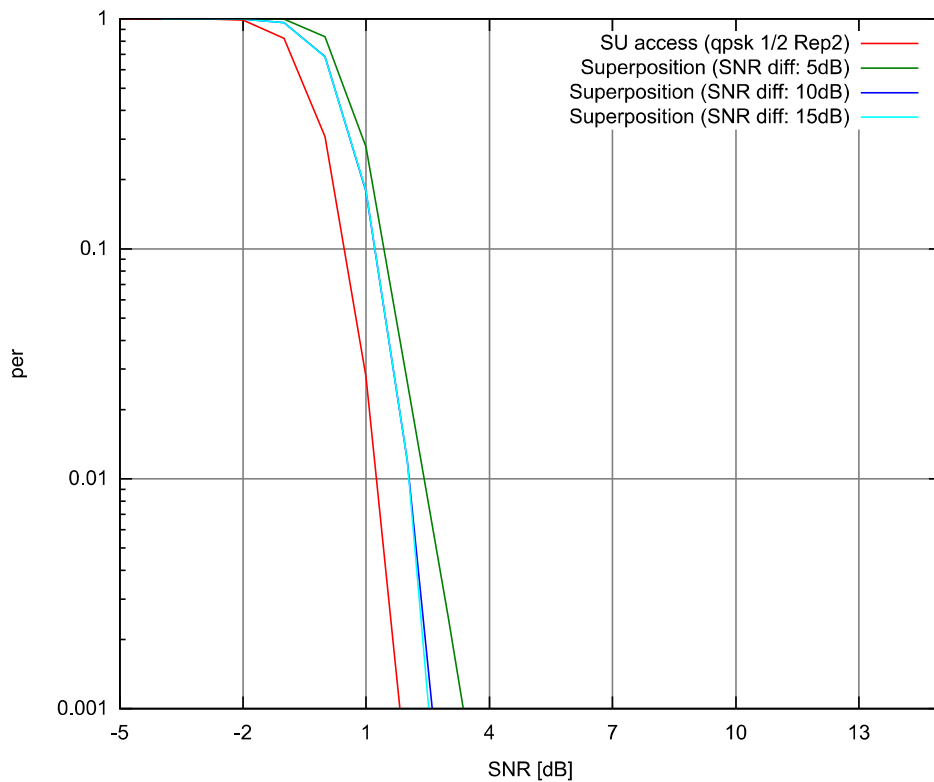


Figure 4: Packet error rate (per) vs. SNR with and without superposition in an AWGN channel

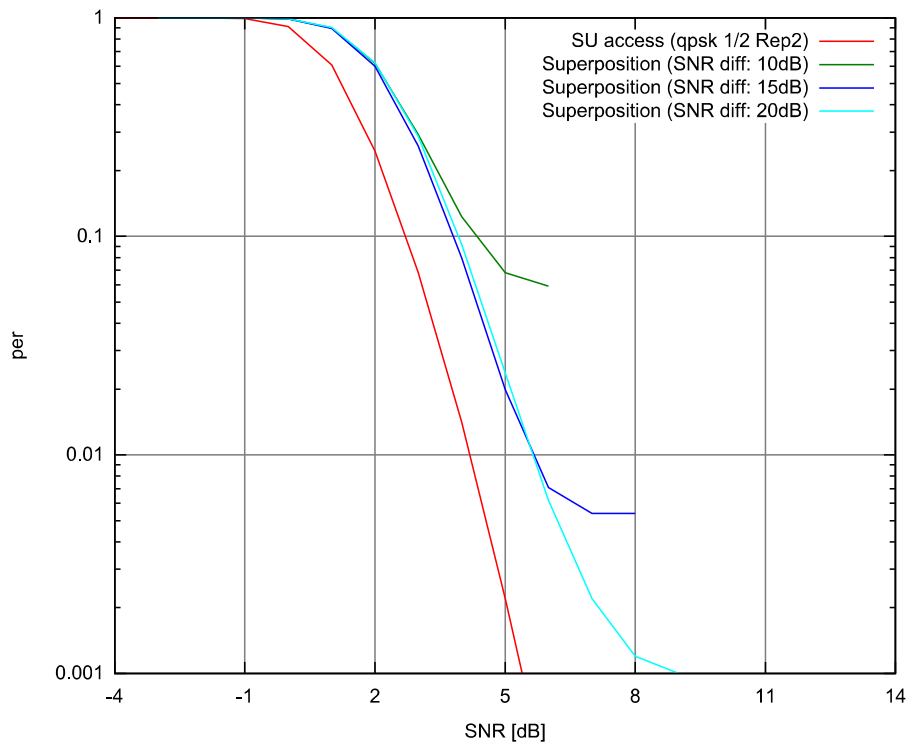


Figure 5: Packet error rate (per) vs. SNR with and without superposition in a frequency selective channel (Ped B 3 km/h)