Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>
Title	**Multi-user MIMO using non-orthogonal superposition in downlink**
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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 DL
Purpose	Consider for inclusion into the SDD
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Multi-User MIMO Using Non-orthogonal Superposition in Downlink

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Motivation

From the two-user rate region it can be seen that significant throughput gains are possible with non-orthogonal superposition.

Principles

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

Practical Implementation

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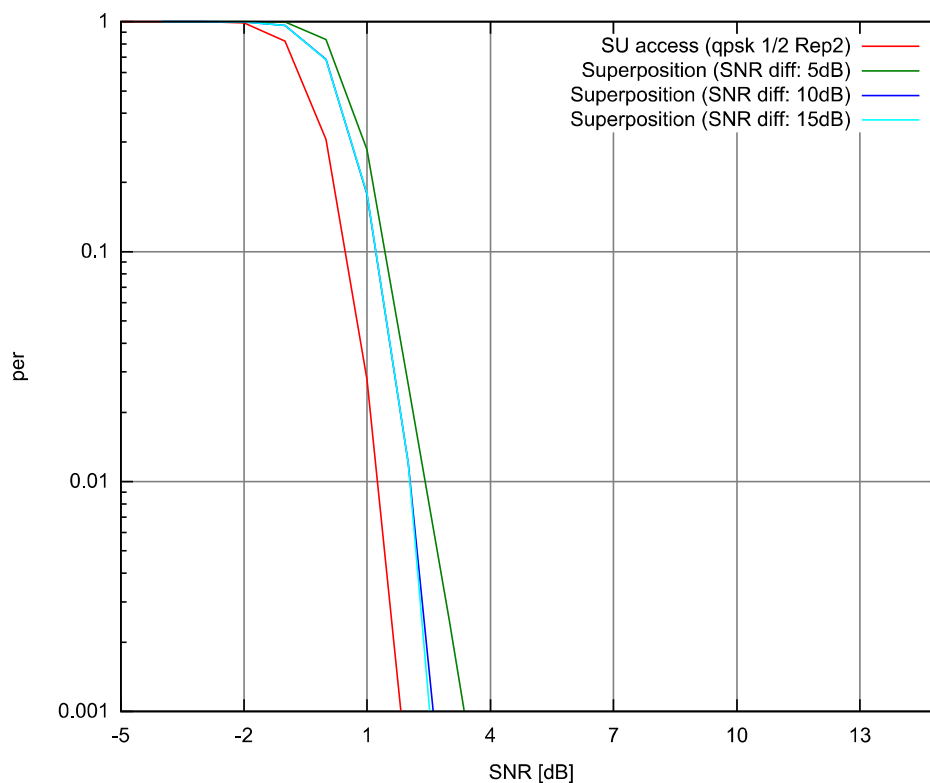
Simulation Results

Figure 1: Packet error rate (per) vs. SNR with and without superposition in an AWGN channel
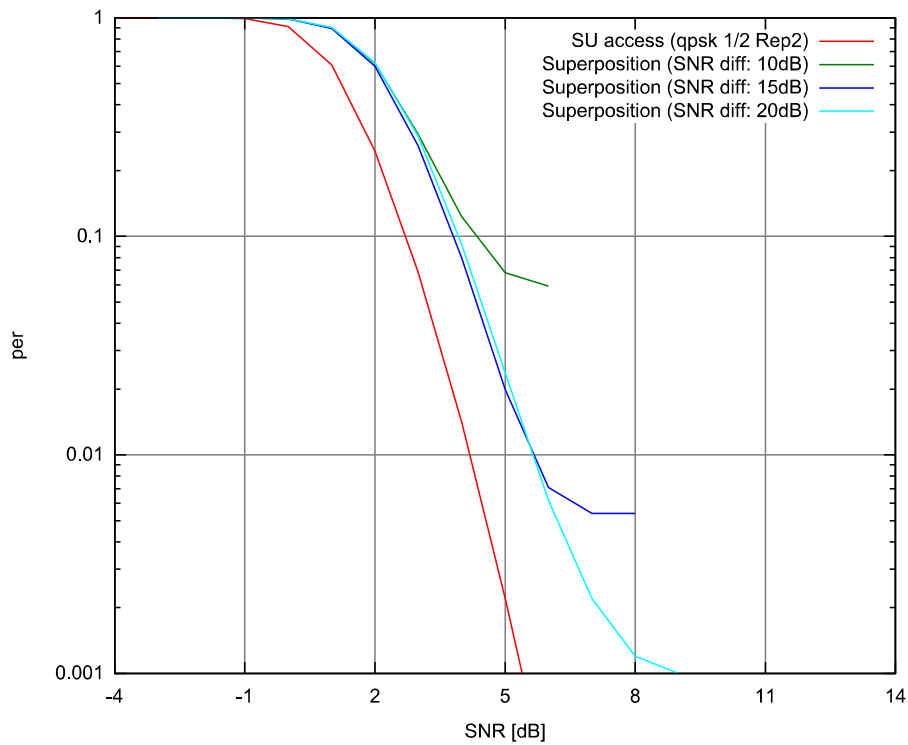
Figure 2: Packet error rate (per) vs. SNR with and without superposition in a frequency selective channel (Ped B 3 km/h)

Proposed SDD Text for Section 11.8.2.2.1

Add at the end of line 11 on page 73:
"Non-orthogonal superposition, which is a special kind of non-unitary precoding, is supported."