

Performance Evaluation of SU OL MIMO Schemes Proposed for IEEE 802.16m

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Purpose:

Discussion and approval

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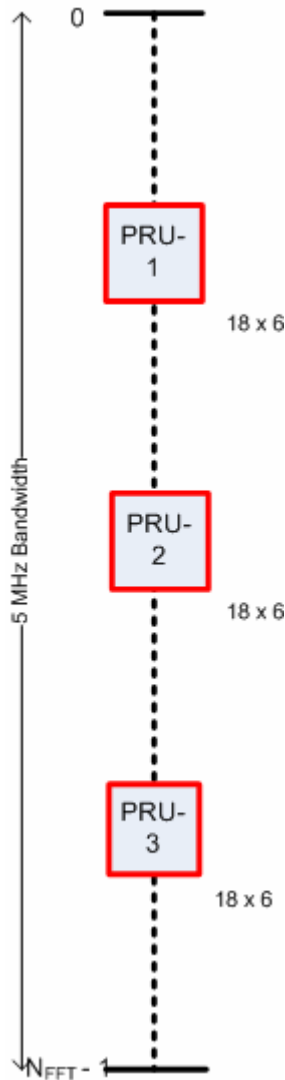
<<http://standards.ieee.org/guides/bylaws/sect6-7.html#6>> and <<http://standards.ieee.org/guides/opman/sect6.html#6.3>>.

Further information is located at <<http://standards.ieee.org/board/pat/pat-material.html>> and <<http://standards.ieee.org/board/pat>>.

Simulation Parameters

Parameter	Value
Modulation	QPSK, 16-QAM,
Coding Rate	1/2
Receiver Function	2-D MMSE Channel Estimator , MMSE receiver
Sub-frame Duration	0.617ms
Transmission BW	5MHz
Usable Subcarriers	54
CP Length	11.4286 μ s
PRU Size	18 tones, 1 sub-frame
Block Size / Subchannelization	FEC Block fills up 3 PRUs PRU based DRU and tone based DRU
Turbo Decoding	Max-Log, 8 iterations
Turbo Code	LTE
Number of OFDM symbols per sub-frame	6
Channel Model	TU-6

PRU Based DRU



54 subcarriers (3 PRUs) in a sub-frame are spread at a PRU level. Each PRU contains 18 subcarriers. Each sub-frame has 6 OFDM symbols

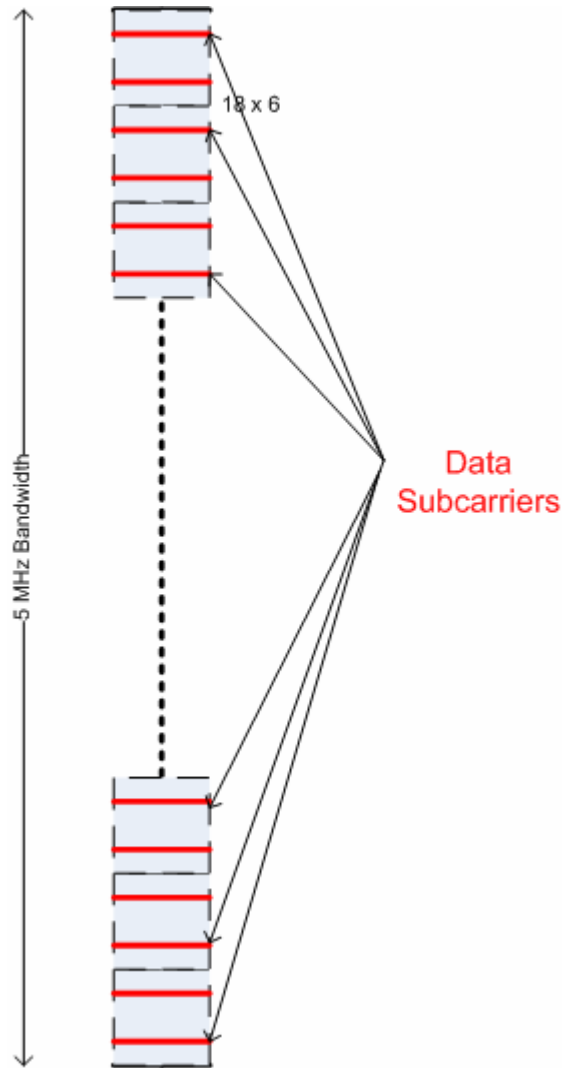
For Precoder cycling (PC)

- The precoders are cycled every PRU
- A subset of 4 codewords out of 16 in the codebook are cycled [C80216m-08_1187]
- Dedicated Pilots are used
- Channel Estimation is based on pilots in one PRU

For Antenna Hopping(AH)

- Antennas are hopped every tone
- Common Pilots are used
- Channel estimation is based on pilots in one PRU

Tone based DRU



54 data subcarriers (3 RUs) spread evenly through the bandwidth. Each MS gets two data subcarriers from a PRU in a 5 MHz BW.

For Precoder Cycling (PC)

- The precoders are cycled on a PRU basis
 - Only 2 data subcarriers are coded by the same precoder
- A subset of 4 codewords out of 16 are cycled
- Dedicated pilots are used.
- Channel estimation is based on 1 PRU.

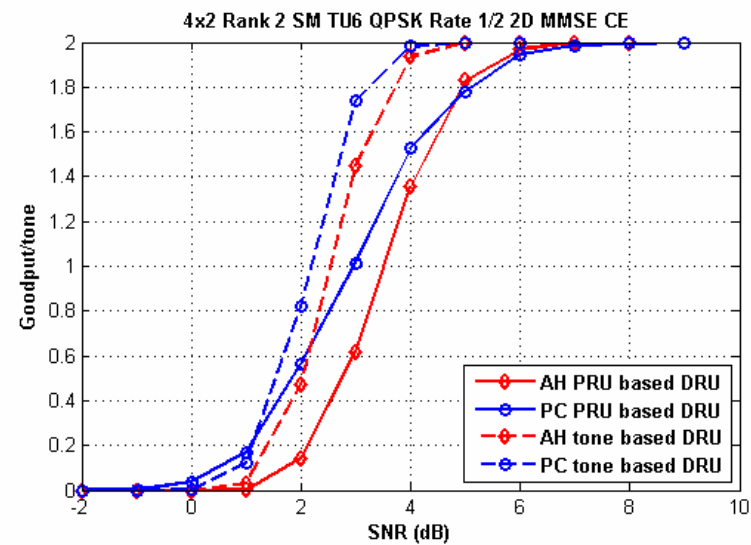
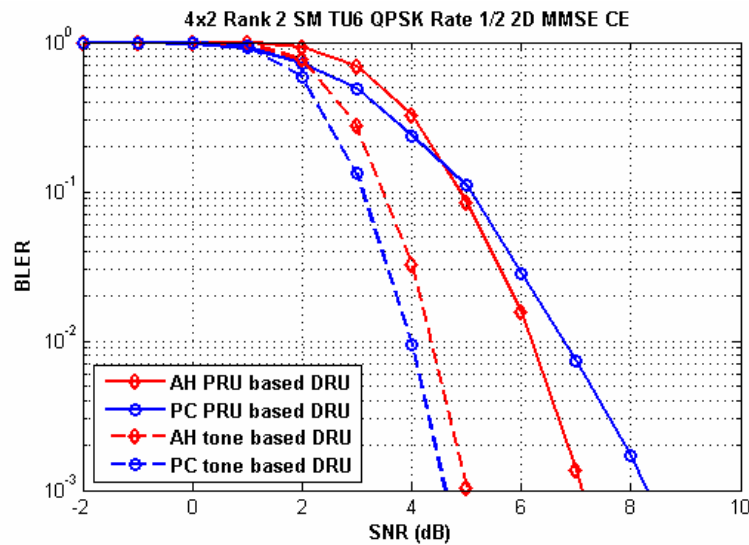
For Antenna Hopping (AH)

- Antennas are hopped every tone
- Common pilots are used
- Channel estimation is based on 1 PRU.

BLER and Goodput for QPSK-1/2, Rank 2

BLER vs SNR with
1. PRU based DRU
2. Tone based DRU

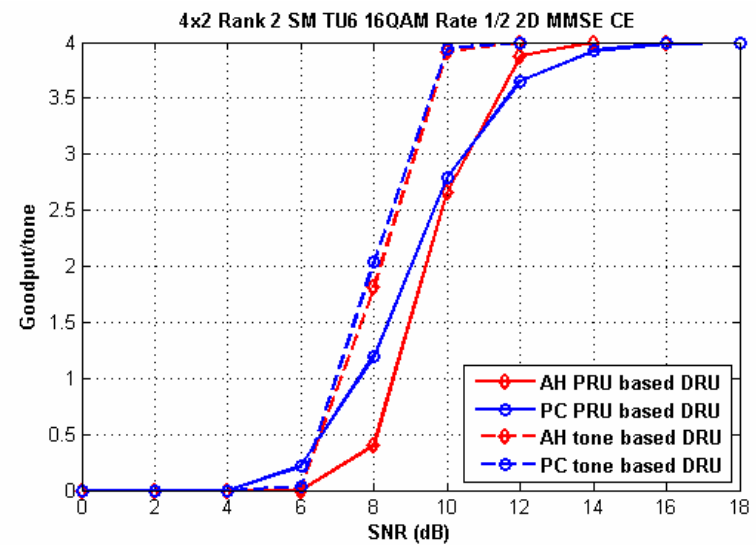
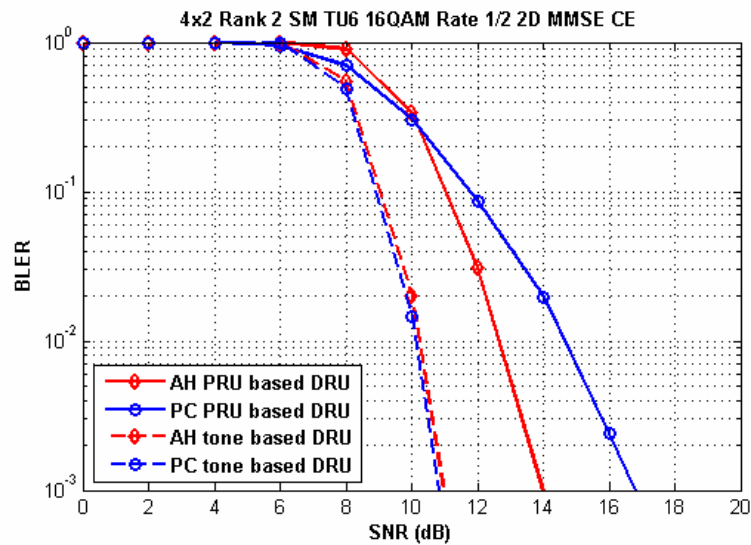
The packet size is kept fixed for all cases.
 $\text{Goodput} = (1 - \text{BLER}) \times \text{Spectral Efficiency}$



BLER and Goodput for 16QAM-1/2, Rank 2

BLER vs SNR with
1. PRU based DRU
2. Tone based DRU

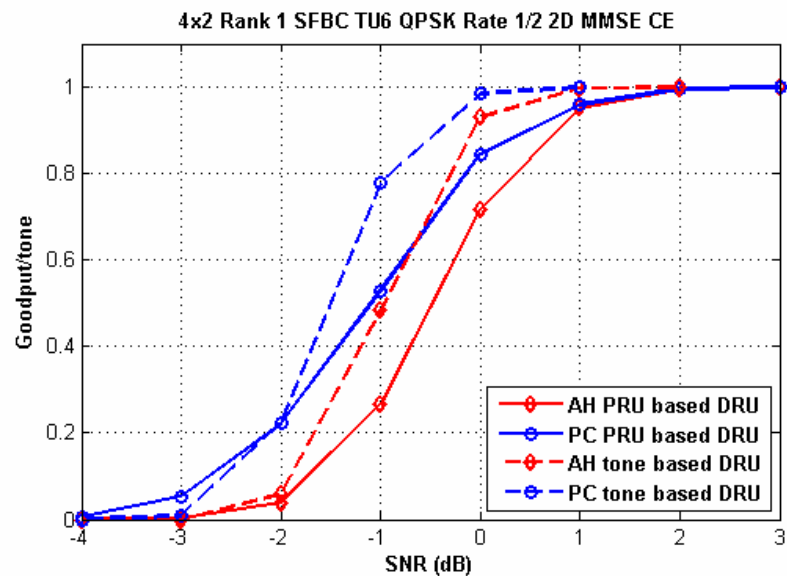
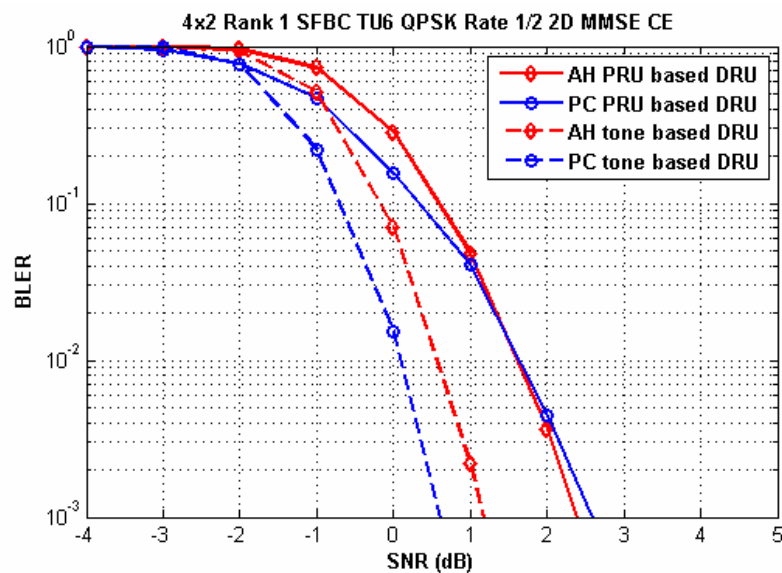
The packet size is kept fixed for all cases.
Goodput = (1-BLER) x Spectral Efficiency



BLER and Goodput for QPSK-1/2, Rank 1

BLER vs SNR with
1. PRU based DRU
2. Tone based DRU

The packet size is kept fixed for all cases.
 $\text{Goodput} = (1 - \text{BLER}) \times \text{Spectral Efficiency}$



Summary

- Precoder cycling offers better Goodput/tonne under all channelization than **Antenna Hopping**.
- For 4x2 – Rank 2
 - Precoder Cycling + SM + Dedicated pilots is preferred to SM + AH + common pilots (CE: 1 PRU)
- For 4x2 – Rank 1
 - Precoder Cycling + Dedicated pilots is preferred to SFBF + AH + common pilots (CE: 1 PRU)

Proposed SDD Text Changes

- Delete the schemes listed as FFS on lines 8 to 10