

Pseudo Random Precoding Matrix Allocation for OL MIMO

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Abstract:

Provide technical justification/details for DL MIMO text proposal for the IEEE 802.16m amendment C802.16m-09/236.

Purpose:

Provide technical justification/details for DL MIMO text proposal for the IEEE 802.16m amendment C802.16m-09/236

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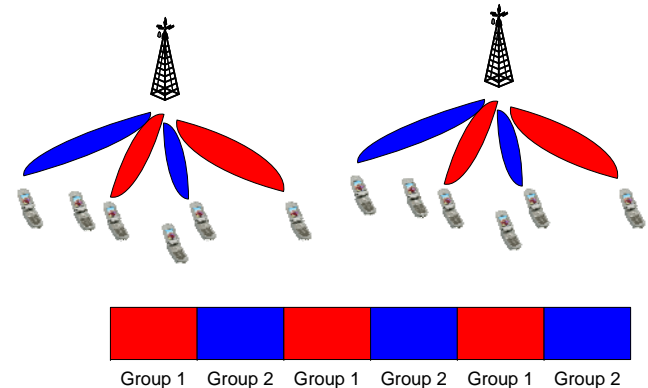
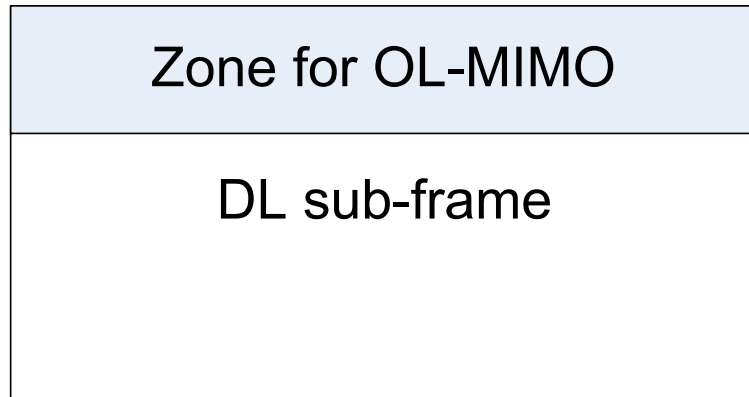
16m DL OL MIMO

- 16m SDD DL OL MIMO supports:
 - One precoding matrix (PM) is allocated over a resource block (u subcarriers by v OFDM symbols)
 - Provide additional diversity over different resource blocks

16m DL OL/CL MIMO Challenges

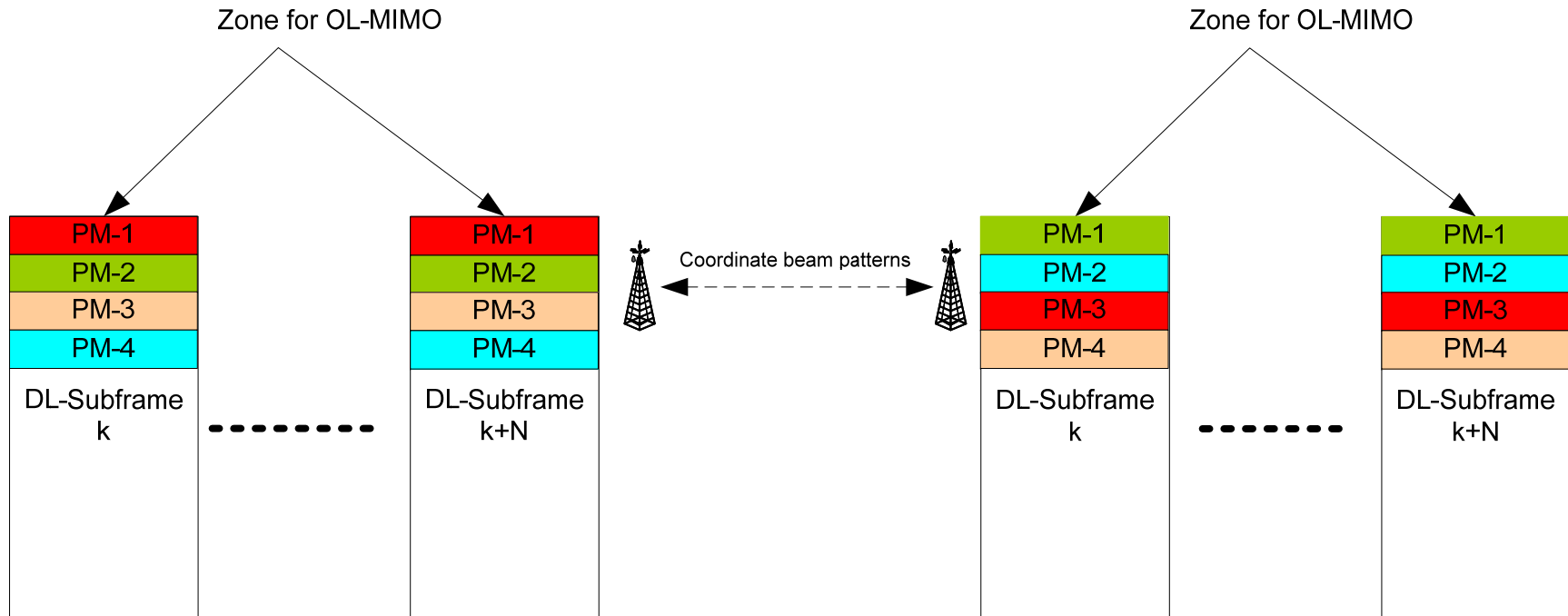
- Flash light effect
 - When serving BS applies a signal-enhancing PM, neighboring BS may apply an interference-enhancing PM on the same RB
 - Without active coordination (coordinating schedulers between BS), this enhanced interference signal can be a “surprise” and unpredictable
- Mismatch between reported CINR and the CINR when real transmission happens
 - Again, due to unpredictable interference
 - BF/PM typically increases the variance of the CINR
 - Mismatch exists even for slow/static MS

Pseudo Random Precoding Matrix Allocation



- A zone in time/frequency is dedicated for OL-MIMO
 - Same zone is dedicated in every sector
- Each sector allocates a precoding matrix for each RB (sub-band) within the zone
- The precoding matrices (PM) over RBs in the zone is pre-defined and can change slowly (pseudo random)
- The precoding matrices over subframe/frame is pre-defined and can change slowly (pseudo random)
- The pseudo random sequence of precoding matrices is periodic
 - Period may be configured depending on CINR and scheduler delay

Pseudo Random Precoding Matrix Allocation (cont)



N is a period that the pseudo random sequence of precoding matrices repeats. It may correspond to the delay between CINR feedback and DL scheduler

Signaling Impacts

- BS DL signaling
 - DL signal on the OL-MIMO zone allocation
- MS UL signaling
 - MS feedbacks CQI corresponding to the RB (or sub-band) in the zone
 - Similar CQI feedback overhead as in B-AMC
- Backhaul signaling for BS coordination (optional)
 - Signal to coordinate the zone allocation for cell-edge mobiles
 - Signal to coordinate PMs or codebook PMIs across sectors
 - Coordination should be on a slow time scale
- In summary
 - No significant signaling overhead
 - Very light use of backhaul (optional) to achieve BS coordination
 - No additional delay introduced as in coordinated BS scheduling

Pseudo Random Precoding Matrix Allocation

- Using MS CQI feedback and choice of RB (sub-band)
 - Enhance desired signal through precoding matrix (or codebook PMI) from the serving sector
 - Avoid interference through precoding matrix (or codebook PMI) from adjacent sectors
- CINR is predictable
 - Avoid flash light effect
 - Improve scheduler efficiency