Downlink open-loop single user MIMO

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Venue:
TGm, DL_MIMO RG – Call for comment of final draft : SDD Text on Downlink MIMO Schemes (IEEE 802.16m-08/657r2)
Base Contribution:
IEEE C80216m-08/861
Abstract:
Comment for DL OL-SU-MIMO
Purpose:
Discussion and adoption

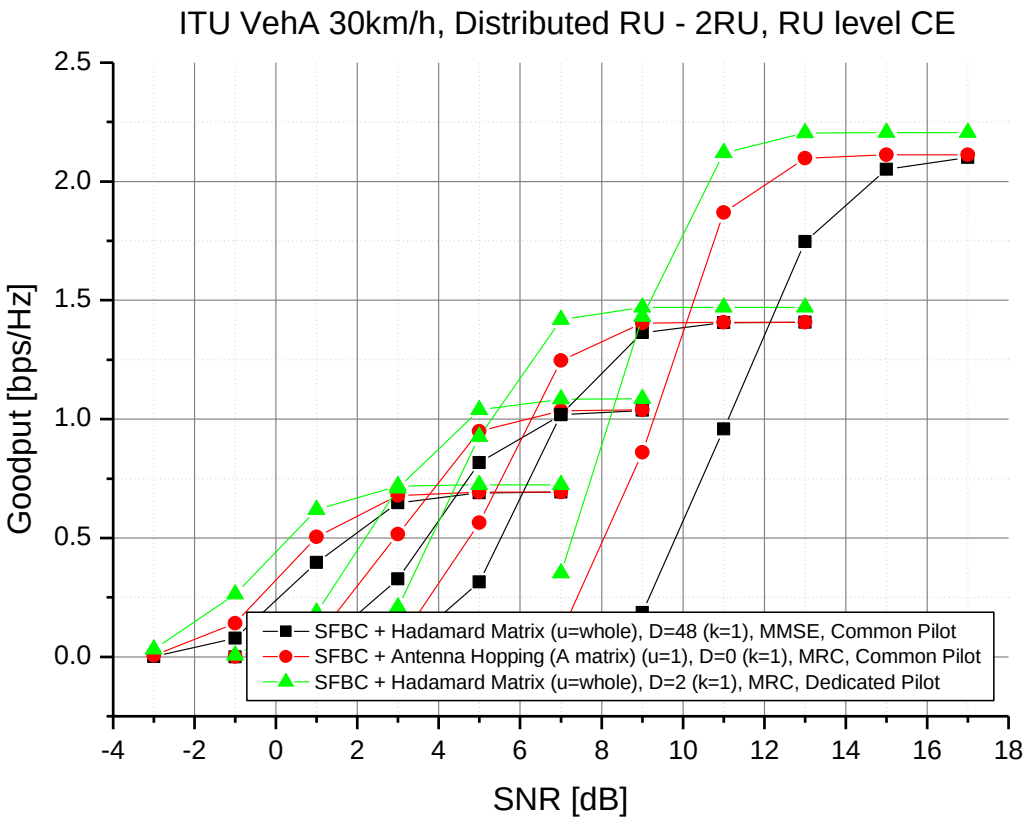
OL SU-MIMO structure

- $\mathbf{P}(k) = \mathbf{D}(k)\mathbf{W}(k)$.
- $\mathbf{D}(k) = \begin{bmatrix} e^{j\theta_0 k} & 0 & \cdots & 0 \\ 0 & e^{j\theta_1 k} & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & e^{j\theta_{(N_T-1)} k} \end{bmatrix}$
  - Examples of θ : $\theta_1 = 0$, $\theta_1 = -2*\pi/N_{fft}*D$, $\theta_2 = 2*\theta_1$, $\theta_3 = 3*\theta_1$
- Examples of W(k)
  - Hadamard Matrix
  - DFT based codebook size = 16
  - Antenna hopping matrix size = 6
- k, u are defined in physical subcarrier index
  - If k = 1, then it is same as physical subcarrier index
  - If u = 18, then it is same granularity as PRU

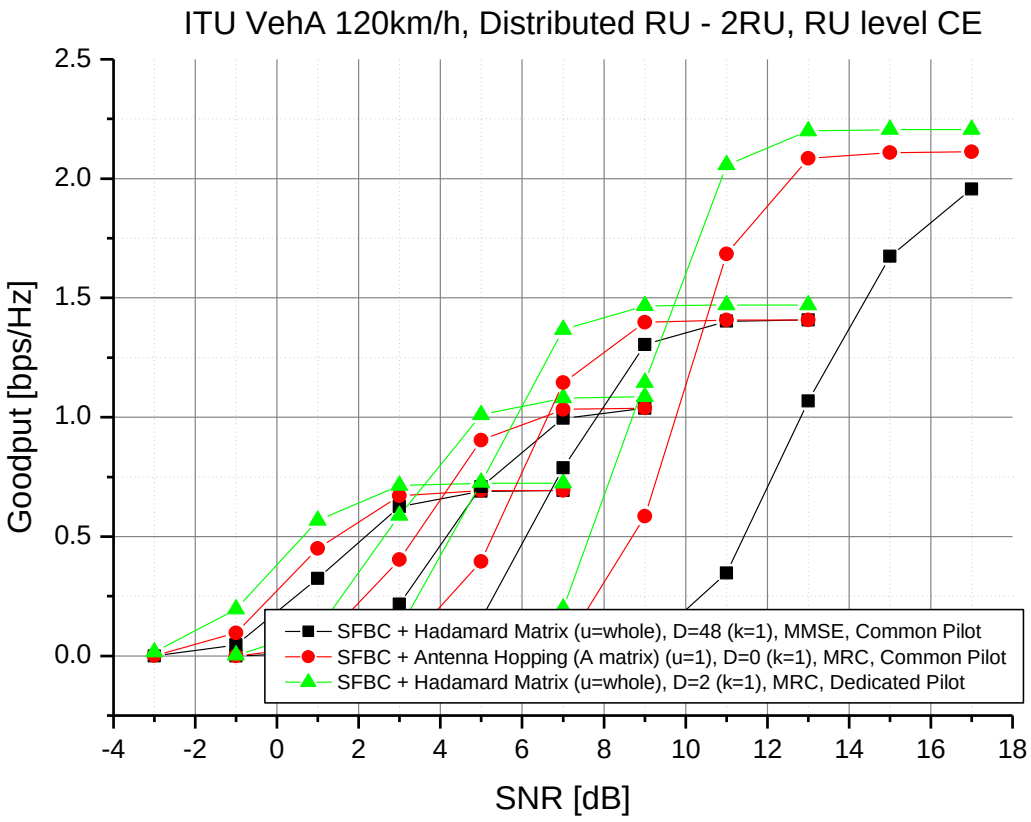
Simulation assumptions

- ITU VehA 30km/h and 120km/h
- MRC or MMSE receiver and MLD receiver
- QPSK ½ , QPSK ¾ , 16QAM ½ , 16QAM ¾ with Turbo code (Difficult to simulate with current version of CTC)
- 2D MMSE channel estimator with 1 RU granularity
- 2 subcarrier level permutation (SFBC support)
- Assume whole band is available for distributed permutation
- Zero Correlated Channel
- For common pilot, we use 14.8% pilot overhead pilot pattern
- For dedicated pilot, we use 11.1% pilot overhead pilot pattern

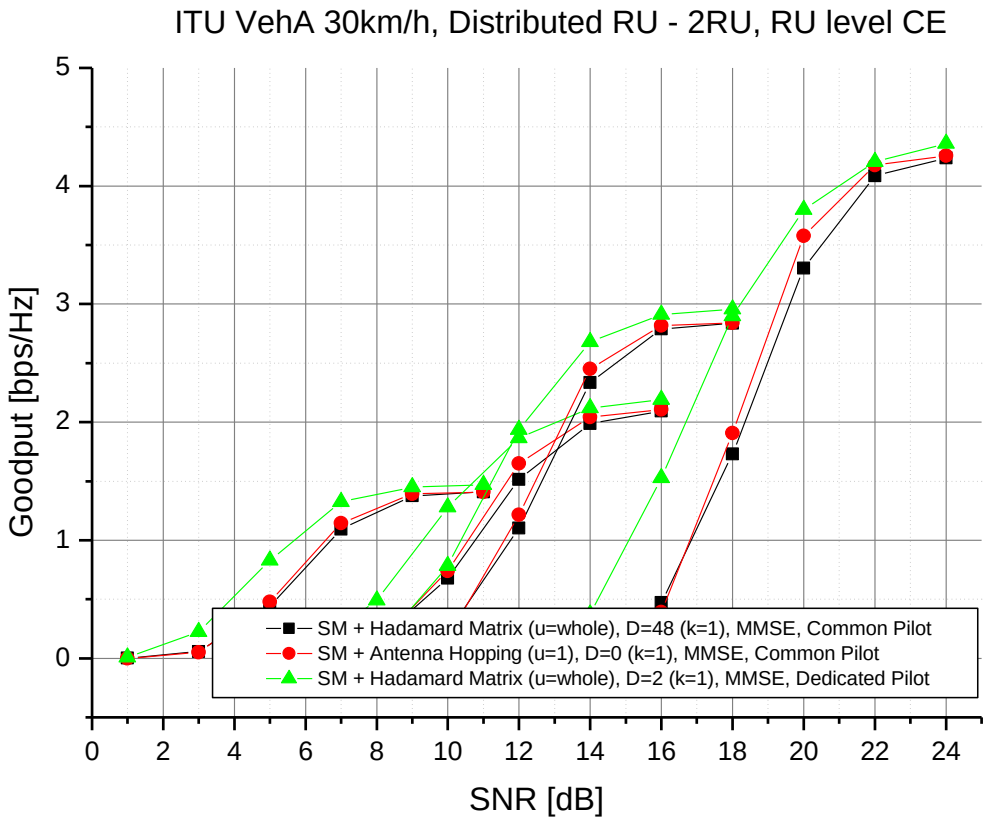
Rate 1 Comparison : ITU VehA 30km/h



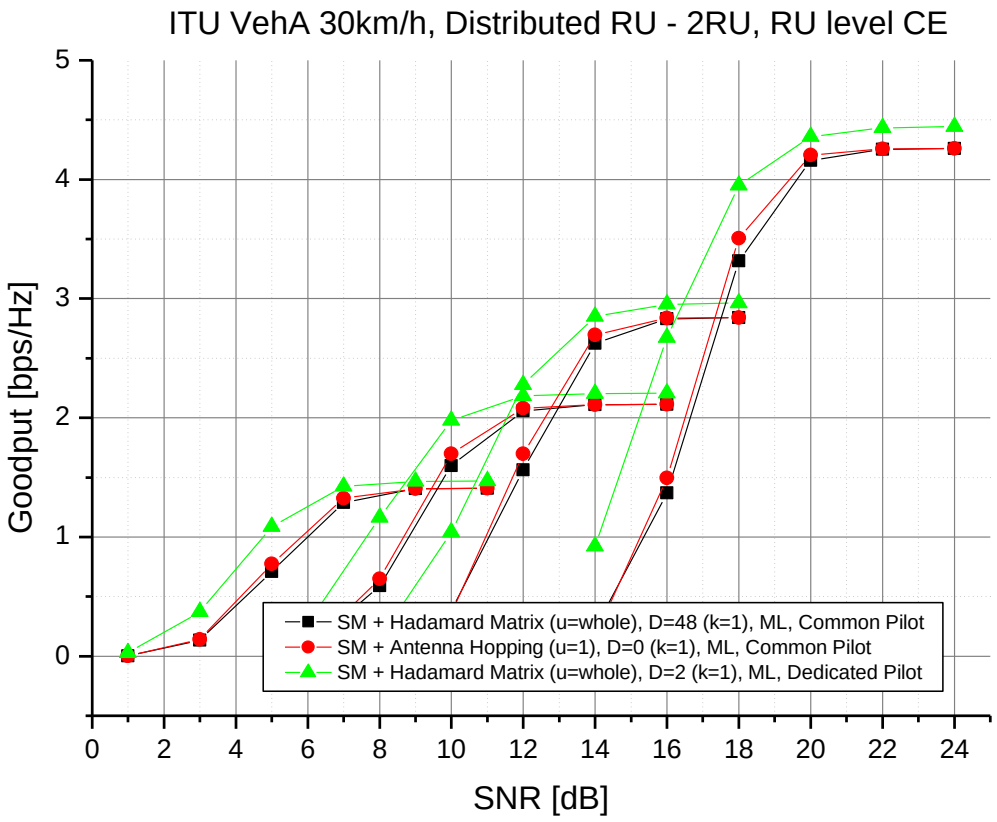
Rate 1 Comparison : ITU VehA 120km/h



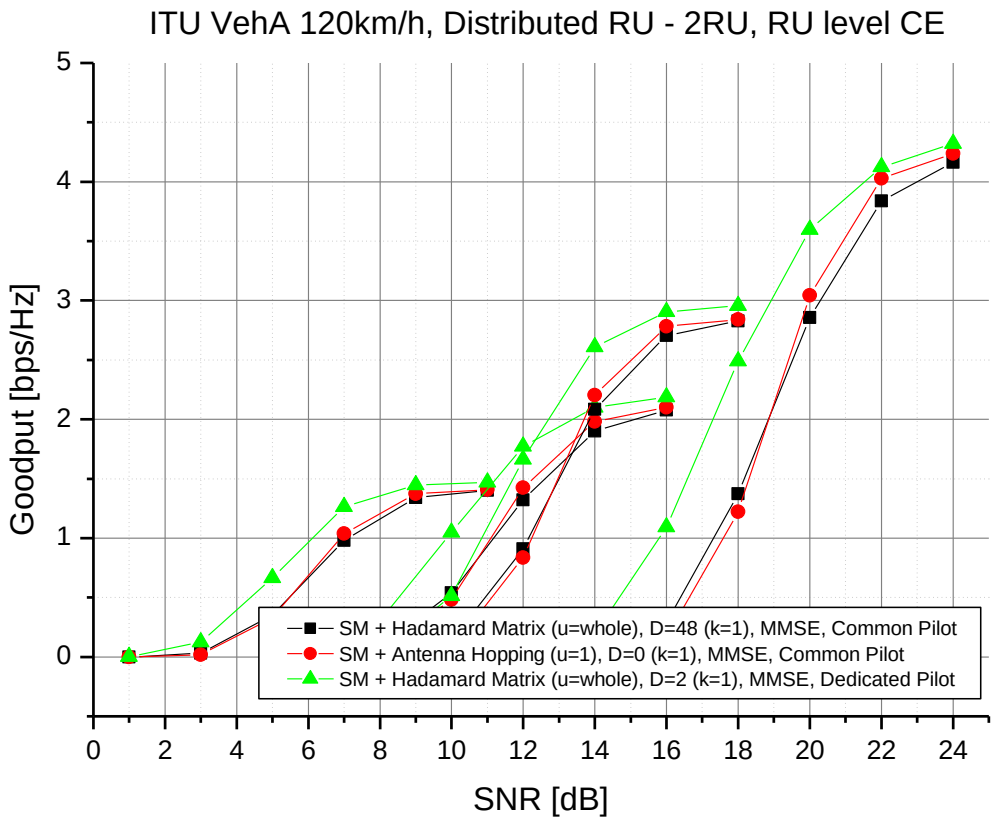
Rate 2 Comparison : ITU VehA 30km/h, MMSE receiver



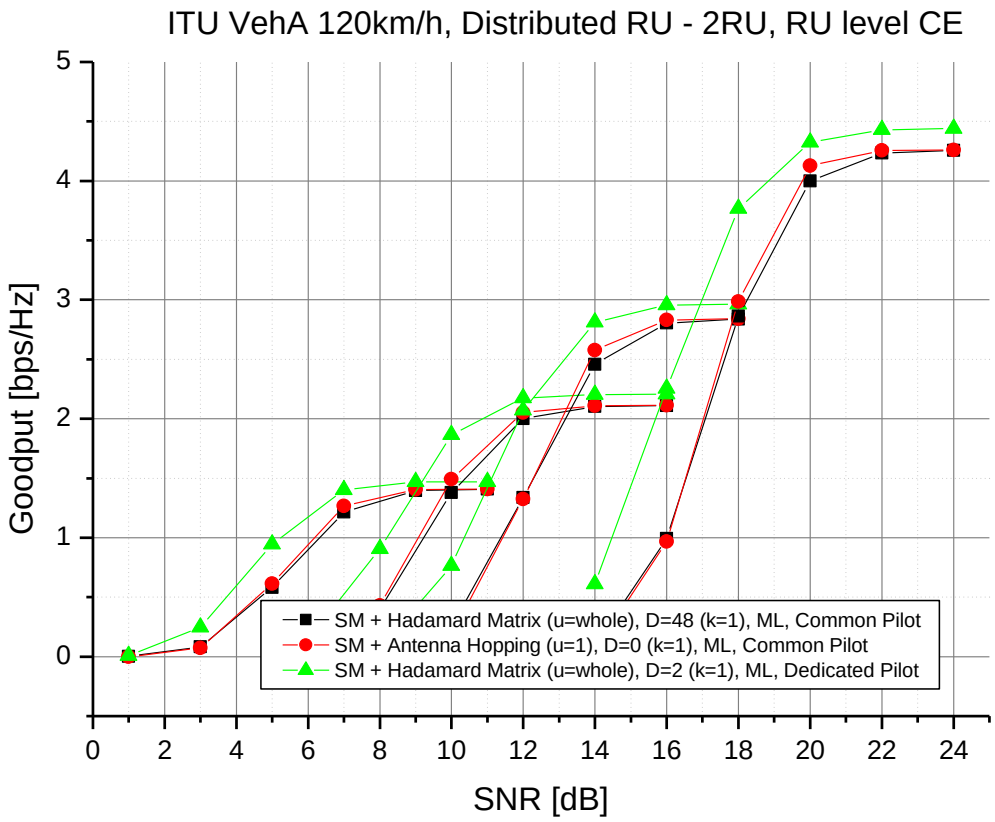
Rate 2 Comparison : ITU VehA 30km/h, ML receiver



Rate 2 Comparison : ITU VehA 120km/h, MMSE receiver



Rate 2 Comparison : ITU VehA 120km/h, ML receiver



Suggestions

- Precoded pilot can get pilot overhead reduction gain
- For 8Tx OL-SU-MIMO system, 8Tx common pilot introduces too much overhead
- For multiplexing different rank preferred MS, make two DRUs, one for 2Tx pilot zone and one for 4Tx pilot zone
  - How to multiplexing these two DRUs are FFS (FDM or TDM)

Remedy

- *Line 38, page 4, Add the following text;*
  - Demodulate pilot is precoded. For closed-loop SU-MIMO, the number of pilot is same as number of streams. For MU-MIMO, the number of pilot is same as number of MS. For open-loop SU-MIMO in localized permutation zone, the number of pilot is same as number of streams. For open-loop SU-MIMO in distributed permutation zone, the number of pilot is either two or four depending on MS multiplexing.