Time Domain CSI Feedback for MU-MIMO

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Wooram Shin, Choong Il Yeh, Young Seog Song, Byung-Jae Kwak, Jihyung Kim, Min Sik Seo, Dong Seung Kwon

ETRI

138, Gajeongno, Yuseong-gu, Daejeon, 305-700, Korea

E-mail: w.shin@etri.re.kr (Wooram Shin)

dskwon@etri.re.kr (Dong Seung Kwon)

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SDD Session 56 Cleanup; in response to the TGm Call for Contributions and Comments IEEE C802.16m-08/033 for Session 57

Base Contribution:

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Purpose:

For discussion and approval by TGm

Rationale

- CSI Feedback Schemes for MU-MIMO
  - Codebook-based feedback
  - Analog feedback
- Frequency Domain CSI Feedback for distributed MU-MIMO
  - Acquiring full-band CSI using simple MMSE interpolation
  - But, requiring the knowledge of the second-order statistics
    - Not good enough in performance
    - High computational complexity
  - Suboptimal due to neglecting the correlation at different subcarriers

Rationale (Cont'd)

- Frequency Domain CSI Feedback for Short Multipath Delay
  - Not guaranteeing FSS gain or MU diversity gain from Best-M feedback schemes
  - Necessary to use the full-band CSI for exploiting MU diversity gain

Time domain CSI feedback can resolve those problems.

Time Domain CSI Feedback

- Feedback Information
  - Transmitting only time impulse response
    - Less or small overhead depending on multipath profile
    - Enabling to cover the whole channel bandwidth for distributed MU-MIMO
- Time Domain Quantization Feedback
  - Training Stage
    - Measuring the multipath profile (i.e., delay profile and power profile)
  - Fining and Tracking Stage
    - Based on the measured or known multipath profile, quantizing the time impulse response on the sampled delay profile
    - Power profile used for efficiently quantizing the impulses on each delay to reduce feedback overhead

Suggested Remedy

- *At line 40 in page 73, add the following sentence*
  - *Codebook-based feedback and analog feedback are performed in frequency domain. As well, time domain CSI feedback such as time domain quantization feedback is also supported.*