Proposal for Physical Structure of UL Feedback Channel

Source:

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Venue:

    Session #59, San Diego, USA

Re:

    802.16m SDD

Base Contribution:

        None

Purpose:

    To be discussed and adopted by TGm for the 802.16m SDD

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Objective

- **According to the SDD,**
  - Physical tile structure for Fast Feedback Channel (FFBCH) is (2X6)
  - Two types of FFBCHs : Primary and Secondary

Sequence for Primary FFBCH

- **64 Binary Semi-orthogonal Sequences**
  - Binary orthogonal subsequences with length 4
  - Reed-Solomon mapping for minimum distance 8
  - Binary Phase semi-orthogonal vector

Advanced Receiver for High Mobility

- **Wiener Filter Receiver**
  - Provides significant performance gain in high mobility,
  - Can be applied to all kinds of semi-orthogonal sequences (Intel, LGE, Samsung)
  - Requires Prior-knowledge about channel statistics such as Doppler frequency and SNR

- **Enhanced Receiver for supporting High Mobility**
  - Can improve the detection performance in high mobility,
  - Doesn't need any prior knowledge on channel statistics
  - In high mobility case, most of misdetection occur between different phase vectors, not between RS mapping

Sequence Mapping to FMTs

- **Cyclic Shifted Mapping by 4**
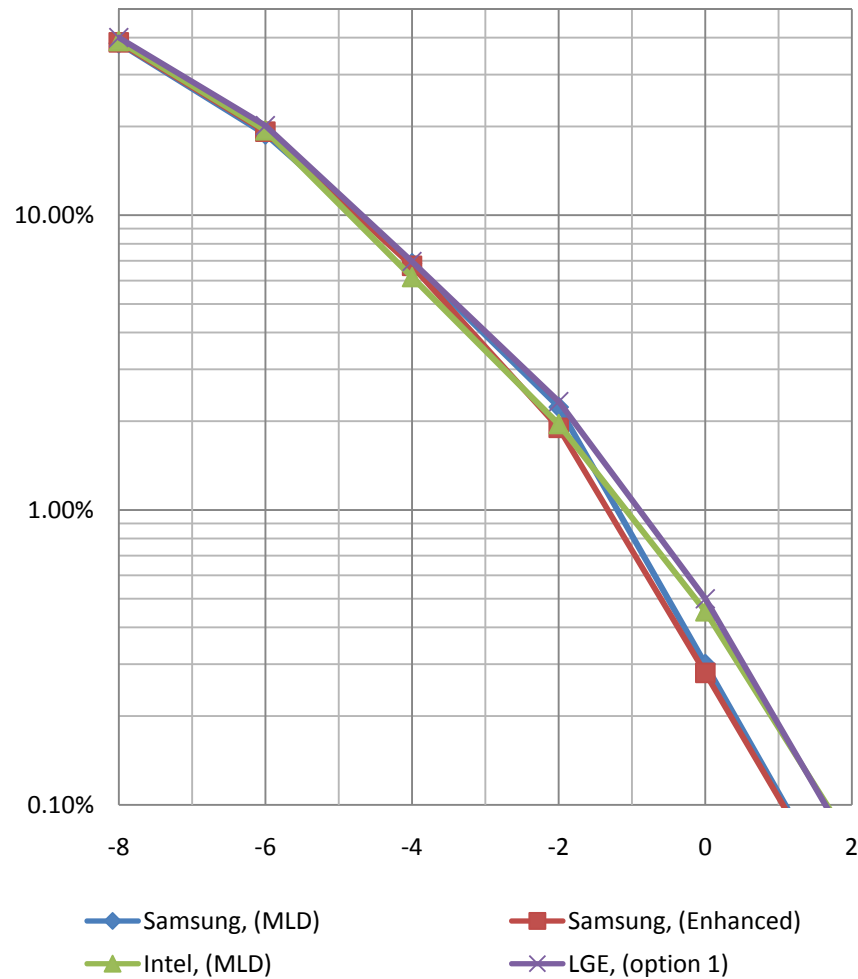 - Cyclic shifted mapping on Different tiles

Detection Performance of Primary FFBCH

- ## Ped B 3km/h

- ## Veh A 350km/h

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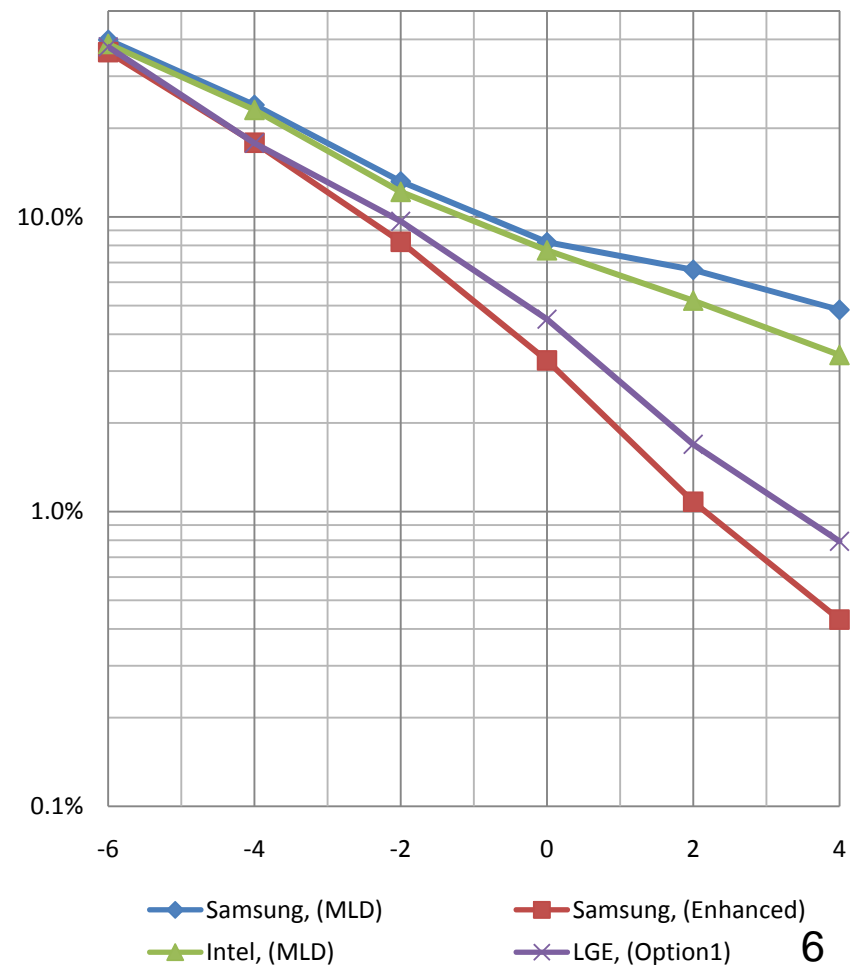
Enhanced Receiver for High Mobility

- **General ML Detection**
  - Single Full length correlator

$$\hat{l} = \arg_l Z_l$$

$$Z_l = \max \sum_t \left| \sum_{k=1}^{12} s_l^*[k] \cdot y_t[k] \right|^2$$

- **Phase Vector Correction**
  - Two Short length correlators

S1	S3	S5	S7	S9	S11
S2	S4	S6	S8	S10	S12

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