Proposal for Bit Selection and Repetition of Channel Coding and HARQ

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Venue:

   IEEE 802.16m-08/040, "Call for Comments and Contributions on Project 802.16m System Description Document (SDD)",

   TGm SDD: Other (for contributions in support of a comment)

Base Contribution:

   None

Purpose:

   To be discussed and adopted by TGm for use in 802.16m SDD

Notice:

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Proposal for Bit Selection and Repetition of Channel Coding and HARQ

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About This Contribution

- Goal and scope of this contribution
  - Propose bit selection and repetition schemes on channel coding and HARQ for 802.16m

- Issue to be addressed in this contribution
  - Buffer capability negotiation in 802.16e
  - New bit selection and repetition scheme for memory limited MS to support higher throughput in 802.16m

Buffer capability negotiation in 802.16e

- Negotiation on max. burst size (N_{ep_max}) between MS and BS
  - N_{ep_max} is determined by the following factors
    - N_{buffer}: the total number of soft-bits can be stored in MS's buffer
    - MCR: mother code rate (e.g. 1/3)
    - Aggregation Flag: if the flag is on, MS can share buffers for multiple HARQ channels

  - In 802.16e, the length of burst should be less than or equal to
    - N_{ep_max} if aggregation flag is off.
    - # of HARQ channel $\times N_{ep\_max}$ if aggregation flag is on.

- This method can solve the problem of buffer overflow but results in the limitation of throughputs

Proposed bit selection and repetition scheme

- In new scheme, it is possible to transmit bursts with lengths larger than N_{ep_max}.
  - BS can recognize N_{ep_max} through the negotiation defined in 802.16e.
  - When burst size $> N_{ep\_max}$, the bit selection procedure is as follows.
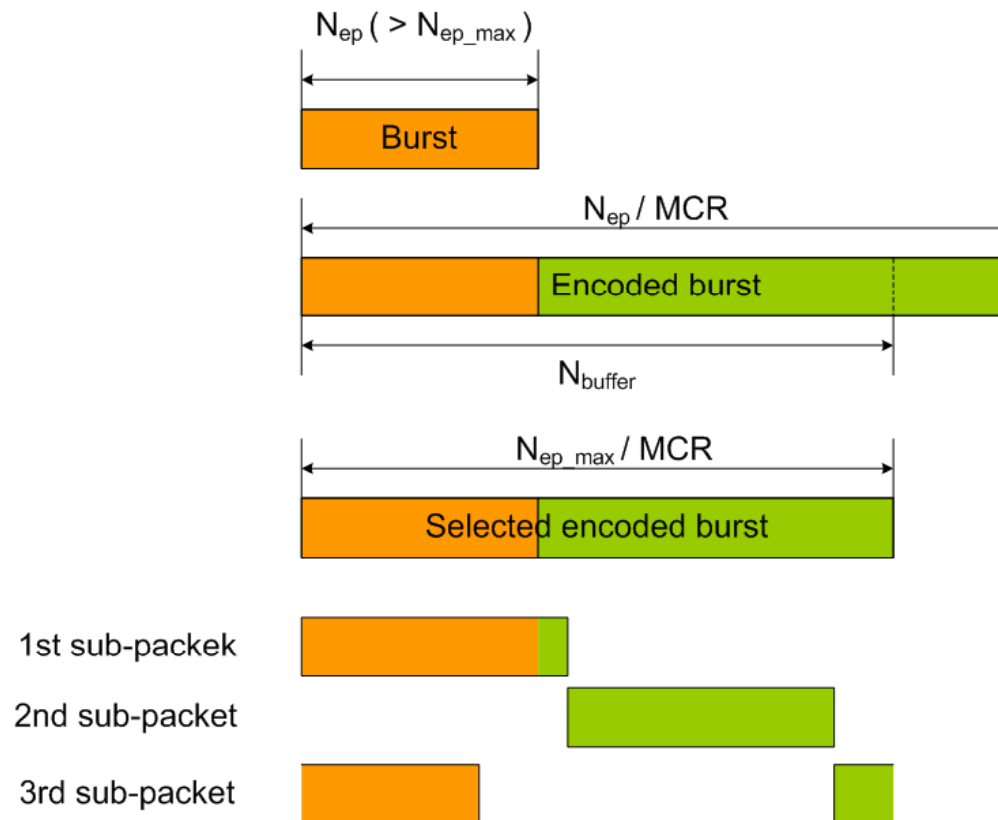
Text Proposal to 802.16m SDD

Modify Chapter 11.13.1.4 in IEEE 802.16m-08/003r5 as follows;

11.13.1.4 Bit selection and repetition

Bit selection and repetition are used in 802.16m to achieve rate matching. Bit selection adapts the number of coded bits to the size of the resource allocation (in QAM symbols) which may vary depending on the LRU and subframe type.

Mother Code Bits, the total number of information and parity bits generated by FEC encoder, ~~after the FEC~~ are considered as selected bits in a circular buffer. In case that the number of Mother Code Bits is larger than the size of the circular buffer N_{buffer}, the first N_{buffer} bits of Mother Code Bits are considered as selected bits.

Repetition is performed when the number of transmitted bits is larger than the number of selected bits. ~~Mother Code Bits (total number of information and parity bits generated by FEC encoder).~~ The selection of coded bits is done cyclically over the buffer.