Initial Ranging in 16m

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Source:

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Venue:

    Re: MAC: Network Entry;   in response for IEEE 802.16m-08/033," Call for Contributions and Comments on Project 802.16m System Description Document (SDD) (2008-08-01)".

Base Contribution:

    This contribution proposes the scheme to accelerate and reduce overhead of the initial ranging procedure in 16m.

Purpose:

    To be discussed and adopted by TGm for SDD.

Notice:

Release:

Patent Policy:

Outline

- Issues with Initial Ranging in 16e

- Proposed Scheme

- Proposed Texts

Issues with Initial Ranging in 16e(2-1)

- ## Long Latency
    - After transmission of initial ranging code, the MS has no awareness of whether the code being decoded successfully or not.

    - In the case the code is not decoded successfully, only after the timer (T3) expires, the MS can conduct back off algorithm to perform another initial ranging transmission.

Issues with Initial Ranging in 16e (2-2)

- ## Overhead
  - Before the initial ranging process is over successfully, no identity (Basic ID) for MS is used in air interface.

  - RNG-RSP and CDMA Allocation IE are all broadcasted with the "RPI" (Ranging Process Identity) temporally-named .

  - RPI consists of: the received ranging code index, the ranging slot (frame number, time symbol reference, subchannel reference)-> 4 bytes length totally.
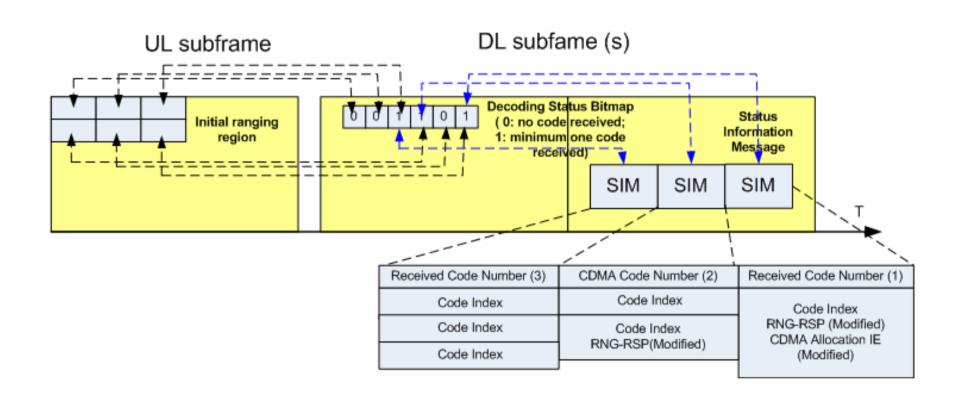
Proposed Scheme(3-1)

- ## Respond to the MS's initial ranging quickly

  – In the following frame/ DL subframe just after the frame/UL subframe where the MS transmits the initial ranging code/indicator, the BS broadcasts the DSB (Decoding Status Bitmap), where each bit is mapped into initial ranging transmission slot. "0" indicates no code is received, "1" indicates one code is received minimally.

- ## Simplify the RPI

  –Link RNG-RSP and BW Grant to corresponded bit of DSB, where DSB bit implies the ranging slot already, only the received ranging code index is necessary for RPI-> Simplified RPI with 1 byte length only .

Proposed Scheme(3-2)

Proposed Scheme(3-3)

- After transmission of initial ranging code, the MS shall detect the DSB broadcasted in the next DL subframe/frame.

- If the bit corresponding to the ranging slot is "0", the MS can conduct the back off algorithm promptly.

- If the bit is "1", the MS shall find the detailed information contained in corresponded SIM (Status Information Message) to further determine whether the code transmitted by itself is decoded or not.
  - If no code index transmitted by MS is found, the MS shall conduct back off algorithm promptly.
  - If only code index is found, the MS shall wait for the normal RNG-RSP or CDMA Allocation IE in the following DL subframe/frame – In case at the moment when SIM is transmitted, RNG-RSP hasn't been originated or no enough BW to allocate.
  - Otherwise, the MS can get the RNG-RSP only/and UL BW granted by the BS, then conduct the remaining ranging procedure according to the indication by the RNG-RSP and CDMA Allocation IE.

Proposed Texts

- ## 10.x Network Entry
  - ### 10.x.x initial ranging

    The BS shall respond to the MS' initial ranging code transmission by broadcasting a status indication message (e.g.: Decoding Status Bitmap) in the following DL frame/subframe. The RNG-RSP and BW Grant can be linked to the corresponded bit of the status indication message to reduce overhead.