Keep-awake mechanism for 802.16m sleep mode

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Venue:
        IEEE 802.16m-08/024 - Call for Comments and Contributions on Project 802.16m System Description Document (SDD)
        Target Topic: Upper MAC concepts and methods - power management

Base Contribution:
    This is the base contribution.

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

Notice:

Release:

Patent Policy:

Background

- In 802.16, sleep mode is defined to minimize MS power usage and decrease usage of serving BS air interface resources.
- For each involved MS, the BS keeps one or several contexts, each one related to certain Power Saving Class (PSC). There are three types of PSCes in 802.16e.
- PSC of type I
  - PSC of type I is mainly intended for Best Effort (BE) and Non Real Time / Variable Rate (NRT-VR) connections.
  - When active, the PSC of type I alternates between Sleep and listening windows.
  - If traffic triggering wakening flag (TTWF) = '0', even if there is traffic to/from the MS during the listening window, the PSC will not be deactivated.

Motivation

- Listening window of PSC type I has fixed duration. If BS can not finish transmitting/receiving data to/from MS during the listening window, BS has to
  - Either: wait till the next listening window
    - Latency is introduced.
  - Or: deactivate the PSC
    - Overhead of control message is introduced.
- In this contribution, we target at designing simple mechanism to flexibly adjust the length of listening window to solve the problem.

"Keep-awake" mechanism
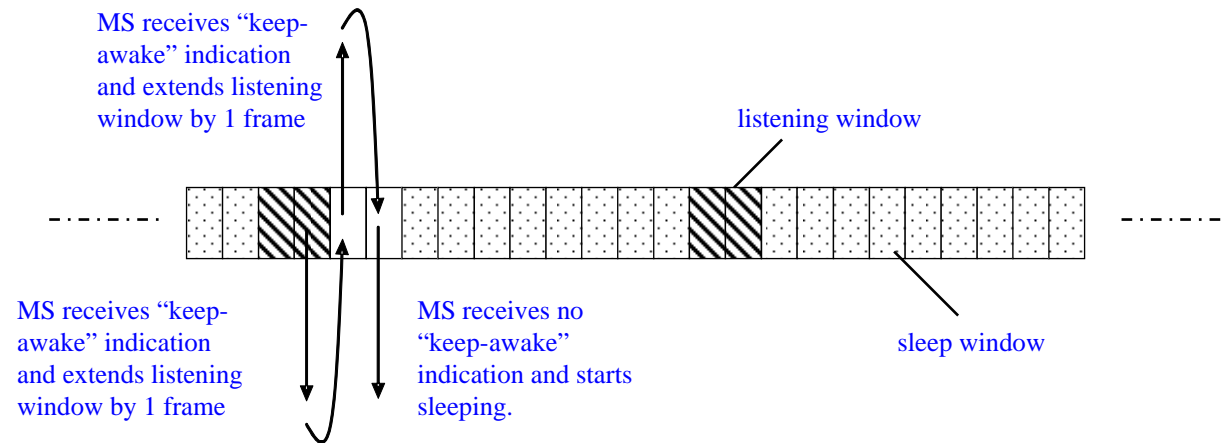
- At the last frame of listening window,
  - if the scheduling information for a new traffic specific for a MS is transmitted to the MS, then the listening window should be extended by one frame.
  - if a specific PS control message is transmitted to MS, then the listening window should be extended by n frames. n is an integer, which could be a fixed value or configured by BS.
  - if MS fails to decode the Unicast Service Control Signaling in the last frame of the listening window, it should keep awake until it successfully receive a Unicast Service Control Signaling.

  If a listening window is extended by m frames in all, the length of the sleep window following the listening window should be s-m frames, supposing that the sleep window should be s frames if there is no listening window extension.

Proposed Text to SDD

10.x Power management

- 16m should provide flexible listening/sleep interval with the least signaling overhead.