RS Sleep Mode

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Purpose:
This contribution proposes RS sleep mode procedure and restrictions.

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Design Considerations

- The trigger methods of RS sleep mode shall be initiated by either RS itself or MR-BS.
- The trigger methods of MS sleep mode are still initiated by either MS or MR-BS as defined in IEEE 802.16e-2005.
- RS sleep mode shall be centralized control at MR-BS in MR networks with centralized scheduling or distributed scheduling.
- Support of RS sleep mode is optional.
Principles of Centralized Control

• MR-BS is responsible for controlling RS sleep mode
• MR-BS and MS exchange MS sleep mode messages end-to-end and RS shall have the associated information
RS Sleep Mode

- RS could get into sleep mode only when all subordinated MSs and RSs are in sleep mode
- RS sleep mechanism:
  - RS can request the activation of RS sleep mode by exchanging RS_SLP-REQ/RS_SLP-RSP messages with MR-BS
  - Alternatively, RS sleep mode is activated by MR-BS by sending unsolicited RS_SLP-RSP to designated RS
  - RS is notified sleep information of all subordinate MSs and RSs by MR-BS
  - The RS sleep window shall be less than or equal to the overlapping time interval of all sleep windows of connections of subordinate MS(s) and RS(s)
- RS wake up mechanisms:
  - The RS can be woken up via the notification of MOB_TRF-IND sent by the MR-BS
  - The RS can also be woken up by itself when it wants to send data to the MR-BS
RS Sleep Mode Initiation

RS initiated by MR-BS initiated

RS initiated

MR-BS initiated
RS Sleep Modes

• Full RS Sleep Mode
  – No traffic at relay link and access link

• Partial RS Sleep Mode
  – No traffic at relay link or access link except the DL Start Frame Preamble, FCH, DCD, UCD, DL_MAP, UL_MAP, broadcast messages, etc., sent by RS at predefined intervals
  – When the RS supports its subordinate MS event-based actions, it shall send the DL Start Frame Preamble, FCH and UL_MAP, and allocate UL BW for bandwidth requests
  – RS in Partial RS Sleep Mode may
    • Send its own broadcast messages
    • Relay broadcast messages from MR-BS
Conclusions

• Propose procedures for RS sleep mode
  – Full and partial RS sleep mode procedures
  – RS_SLP-REQ/RSP management messages between MR-BS and RS to support RS sleep mode

• The partial RS sleep mode is proposed to support MS event-based actions such as MS mobility, MS network entry/re-entry, etc