

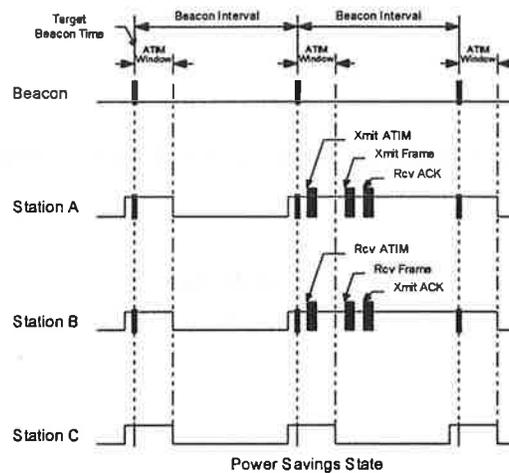
Power Management in an Ad Hoc Network

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Basic Approach

- **Announcement of buffered frames for Power Save (PS) mode stations is done using an Ad Hoc Traffic Indication Message (ATIM)**
- **ATIMs are sent during the ATIM Window following the beacon.**
- **All stations are awake during the ATIM Window.**
- **If a station receives an ATIM, it will remain awake for the entire Beacon Interval.**
- **If a station does not receive an ATIM, it can go back to PS mode.**

Basic Approach Diagram



Power Management State Estimation

- A station can monitor the Power Management bits within the frames generated by other stations in the network. A station that intends on using PS mode must indicate that in all frames transmitted.
- A station can transmit the frame when received from the LLC and assume the destination station is in PS mode if an Ack is not received.
- A station can use RTS/CTS to transmit a frame. If a CTS is not received, the destination station can be assumed to be in PS mode.
- A station can always assume all other stations are operating in PS Mode. In this case, the station will always transmit an ATIM in the ATIM Window before transmitting a frame

ATIM Window and Beacon Transmission

- Station shall wake up prior to Target Beacon Time.
- The length of the ATIM window is defined in the Ad Hoc Parameter Set element in the Beacon. A station that receives a beacon will update its aATIM_Window MIB variable with the value contained in the beacon. A station that transmits a beacon will use the value of the aATIM_Window MIB variable for the ATIM Window parameter in the Ad Hoc Parameter Set element.
- Station receives/transmits a Beacon. The procedure for generating Beacons is defined in Section 8.1.
- After a Beacon is received/transmitted, a station may transmit ATIMs for all buffered frames until the end of the ATIM Window using the DCF Access Procedure.
- If a station has an ATIM to transmit and is unable to do so before the end of the ATIM Window, it must wait until the next ATIM Window.

ATIM and Frame Transmission

- The station will send an ATIM during the ATIM Window using the DCF Access procedure.
- Only ATIMs shall be transmitted during the ATIM Window. ATIMs can only be transmitted during the ATIM Window.
- Following the ATIM Window, the station will transmit the buffered frame/s using the DCF Access procedure.
- The station transmitting the ATIM will remain awake for the entire Beacon Interval.
- Buffered frames may be fragmented.
- If more than one frame is buffered for a given station, multiple frames can be transmitted using the DCF Access procedure. A frame will indicate if more frames are buffered via the Power Management bits.

Receive Operation for Power Save Mode

- Stations shall wake up prior to Target Beacon Time.
- The station will remain awake for the duration of the ATIM Window.
- If an ATIM addressed to the station is not received, the station may go back to Power Save mode at the end of the ATIM Window.
- If the station receives an ATIM frame, then the station shall remain awake for the entire Beacon Interval to receive the subsequent Data frame/s.

Other Changes to the Draft Standard

- Add New Frame - Ad Hoc Traffic Indication Message (ATIM)
- Add New Element, Ad Hoc Parameter Set, to Beacon and Probe Response frames
- Add ATIM_Window MIB variable

Motion

- **Move that the draft text for ad hoc power management in 95/137 be adopted and added to the next version of the Draft Standard.**

