Approaches for Power Saving in Wireless Networks

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Wireless Sensor Networks

- Attractiveness of WSN for LifeScienceAutomation
  - Monitoring, localization, environmental surveillance, maintainability
- Benefits using WSN
  - Easy deployment of wireless sensors
  - Low cost of wireless sensors compared with wired solution
- Limited Energy as a resource constraint
  - Requires intelligent low-power solutions

Fig. 1: aspects of wireless sensor networks (WSN)

Microcontroller CC1010

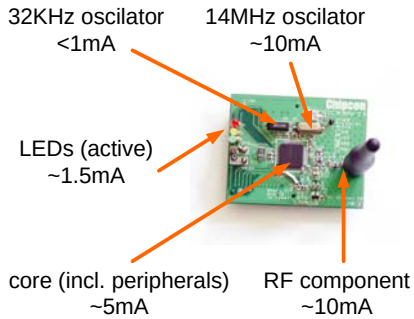

Fig. 2: component current consumption of the CC1010 EM

- Components of CC1010 responsible for current consumption shown in Fig. 2
- Support of different power modes and clock modes
- Power modes:
  - Active mode
  - Idle mode
  - Power down
  - ADC mode

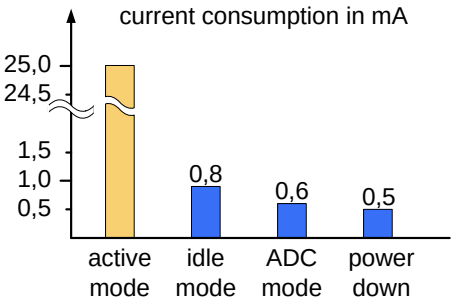

Fig. 3: current consumption in different power modes

Increasing Lifetime of Sensor Nodes

- Idle mode reduces energy consumption by more than 95% (Fig. 3)
- No transmission possible in idle mode
- Periodic mode allows periodic wakeups and data transmissions
- Controlled by real-time clock
- Lifetime of a node depends on duty-cycle (ratio between active time and idle time)
- Assuming energy capacity of 1500mAh for a node, Fig. 4 shows estimated lifetime.

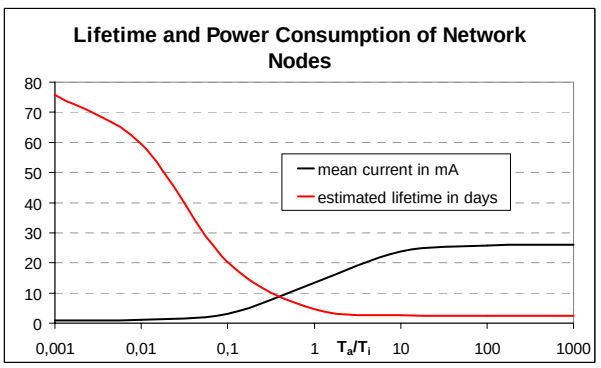

Fig. 4: Power Consumption and Lifetime of a Network Node depending on the ratio of active and idle periods

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