IEEE P802.15

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | Revision to Low Energy text in 15-09-0604-03-004e draft | |
| Date Submitted | Tuesday December 1, 2009 | |
| Source | [Wei Hong]  [510 2nd St., Suite 410  San Francisco, CA USA] | Voice: [+1 415-692-0828]  E-mail: [whong@archrock.com] |
| Re: | [] | |
| Abstract | [This document contains revisions to low energy text in 15-09-0604-03-004e draft.] | |
| Purpose | [] | |
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Revisions to Low Energy text in 15-09-0604-03-004e

* **Section 4 (page 2): add the following**
  + **LE: Low Energy**
  + **CSL: Coordinated Sampled Listening**
* **Section 7.3.14.1-3 (page 94-95): move the 3 sections to a new subsection of 7.2 titled LE-Frame Formats because Wakeup Frame and Secure Ack Frame are not command frames.**
* **Section 7.3.14.4 (page 95): Leave section as is under 7.3.14.**
* **Page 100: replace Table 127.h with the following**

**Table xx—MAC PIB attributes**

| **Attribute** | **Identifier** | **Type** | **Range** | **Description** | **Default** |
| --- | --- | --- | --- | --- | --- |
| macCSLPeriod |  | Integer | 0 … 65535 | CSL sampled listening period in unit of 10 symbols. 0 means always listening, i.e., CSL off. | 0 |
| macCSLMaxPeriod |  | Integer | 0 … 65535 | Maximum CSL sampled listening period in unit of 10 symbols in the entire PAN. This determines the length of the wakeup sequence when communicating to a device whose CSL listen period is unknown. NHL may set this attribute to 0 to stop sending wakeup sequences with proper coordination with neighboring devices. | macCSLPeriod |
| macCSLChannelMask |  | Integer |  | 32-bit bitmap relative to phyCurrentPage of channels. It represents the list of channels CSL operates on. 0 means CSL operates on phyCurrentChannel of phyCurrentPage. | 0 |
| macCSLFramePendingWaitT |  | Integer |  | Number of symbols to keep the receiver on after receiving a payload frame with FCF frame pending bit set to 1. |  |
| macSecAckWaitDuration |  | Integer |  | The maximum number of symbols to wait for a secure acknowledgement frame to arrive following a transmitted data frame. |  |
| macRitPeriod |  | Integer | 0x000000 -0xffffff | The interval (in unit periods) for periodical transmission of RIT data request command in RIT mode.  The unit period is aBaseSuperframeDuration.  0 means RIT is off | 0 |
| macRitDataWaitPeriod |  | Integer | 0x00 – 0xff | The maximum time (in unit period) to wait for Data frame after transmission of RIT data request command frame in RIT mode.  The unit period is aBaseSuperframeDuration. | 0 |
| macRitTxWaitTime |  | Integer | macRitPeriod - 0xffffff | The maximum time (in unit periods) that a transaction is stored by a device in RIT mode.  The unit period is aBaseSurperframeDuration. | 0 |

* **Section 7.5.2.1 (page 106): insert the following paragraph:**

When macCSLPeriod is set to non-zero, CSL is deployed in channel scans. When macCSLMaxPeriod is set to non-zero, each coordinator broadcasts beacon frames with wakeup sequence. This allows devices to perform channel scans with low duty cycles.

* **Section 7.5.11.1.1.4 (page 134): Replace the bullet “Unsynchronized transmission” with the following:**
  + Unsynchronized transmission: This is the case when the MAC layer does not know the CSL phase and period of the destination device. In this case, the wakeup sequence length is macCSLMaxPeriod.
* **Page 135 line 4: delete the word “milliseconds”.**
* **Section 7.5.11.1.1.9 (page 158): replace section with the following paragraph:**

The next higher layer has the option to turn off sampled listening and stop sending wakeup sequences to reduce latency for urgent messages. This assumes that the higher layer manages the coordination between the sender and receiver in turning on and off sampled listening. To turn off sampled listening, the higher layer simply sets macCSLPeriod to zero. To turn on sampled listening, the high layer restores macCSLPeriod to their previous non-zero values. Similarly, to stop sending wakeup sequences, the higher layer sets macCSLMaxPeriod to zero and restores it to its previous value to return to normal CSL mode. To request a neighboring device to turn off sampled listening, the higher layer must send a frame to the device with frame pending bit set to 1. This prevents CSL from turning off the radio before the request is processed.

* **Starting at Section 7.5.11.1.2 (page 158): renumber sections as follows:**

**Change:**

7.5.11.1.2 Receiver Initiated Transmission (RIT)

7.5.6.8.1 Periodical RIT data request transmission and reception

7.5.11.1.3 Data transmission in RIT mode

7.5.11.1.4 Muticast transmission

**To:**

7.5.11.2 Receiver Initiated Transmission (RIT)

7.5.11.2.1 Periodical RIT data request transmission and reception

7.5.11.2.2 Data transmission in RIT mode

7.5.11.2.3 Muticast transmission