**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | IEEE 802.15.4z MAC LRP - CRG |
| Date Submitted | 27th June 2019 |
| Source | Peter Sauer (Microchip), David Barras (3dB-technologies), Boris Danev (3dB-technologies), Patrik Leu (ETH Zurich) |
| Re: | Letter Ballot Comments with Figures and Tables – P802.15.4z-D1 |
| Abstract | This contribution proposes updated text for the baseline draft P802.15.4z-D1 |
| Purpose | Provision of the text to facilitate its incorporation into the draft text of the IEEE 802.15.4z standard currently under development in TG4z. |
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| Patent Policy | The contributor is familiar with the IEEE-SA Patent Policy and Procedures:  <http://standards.ieee.org/guides/bylaws/sect6-7.html#6> and  <http://standards.ieee.org/guides/opman/sect6.html#6.3>.  Further information is located at <http://standards.ieee.org/board/pat/pat-material.html> and  <http://standards.ieee.org/board/pat>. |

**Technical Comments**

* i-0143:

**Page 5 Line 18 to 19:**

*Reject comment; do not change text in draft as time unit is already defined in standard 15.4-2015 Table 8-40.*

* i-0423, i-0424, i-0425, i-0426, i-0427, i-0428, i-2428, i-0713, i-1350, i-0429, i-0145, i-0430, i-0144, i-2819, i-2815, i-2816, i-2813, i-2814, i-2817, i-2817, i-2820, i-2818:

**Page 16 Line 9 to 23:**

*Revise comments for this section lines 9 to 23 and Figure 8 and replace with text in draft P802.15.4z-D1:*

For ranging with SS-TWR and DS-TWR and fixed reply times using one way authentication with and without tolerating bit errors refer to section 6.9.9.4.

* i-0237, i-0468, i-0469, i-0046, i-0147, i-2698, i-0847, i-1484, i-2696, i-0845, i-1482, i-2697, i-0846, i-1483, i-2694, i-0843, i-1480, i-2695, i-0844, i-1481, i-2693, i-0842, i-1479:

**Page 31 Line 10 to 19:**

*Revise comments for this section. This description (lines 10 to 19 and Figure 23) shall be moved and inserted after section 6.9.9.4.1 in the document 15-19-0259-00-004z-lb-comment-resolution-6.9.9.docx and can be removed from page 31 in the draft P802.15.4z-D1.*

6.9.9.4.2 SS-TWR with one-way authentication for multiple nodes

Figure 3 illustrates the message sequence chart for multi-node SS-TWR with one-way authentication between one initiator and N responders using different *phyFixedReplyTime 1…N*, i.e., each responder is configured with its own fixed reply time such that the acknowledge frames do not overlap. In case of variable PRP as defined in 19.2.5 the acknowledge frames may overlap each other. In both cases the initiator implementation shall capture each ranging counter stop 1…N and each *Response IE* *1...N*. As described for the unicast operation in figure 2 each responder will reply with an *Enh-Ack* frame. The responder 1…N shall respond to one destination address with a unique source address. The initiator shall use *AddressMask* defined with the MLME-RAW-ENABLE.request to accept a range of responder source addresses and set *RangingRXControl* to RANGING\_ON. The Initiator will issue a MCPS-DATA.confirm for the first received *Enh-Ack* frame and MCPS-DATA.indication for the following *Enh-Ack* frames. The initiator next higher layer timeout for the *Enh-Ack* frames shall be set according the N responder fixed reply time.



**Figure 3—Message sequence chart for multi-node SS-TWR with fixed reply time**

* i-2147, i-0769, i-1406:

**Page 23 Line 6 to 7:**

Revise comment with new text from document *15-19-0259-00-004z-lb-comment-resolution-6.9.9.docx:*

~~For LRP-SRDEV, the payload only mode (see 19.4.7) can be used in which case the time structure of the Ranging Round can be similar to that shown Figure 15 for HRP-SRDEV SP3 ranging.~~

* i-0200, i-0072, i-0570, i-0509, i-0301, i-2112, i-1133, i-1770, i-0107, i-2109, i-0131, i-0136, i-0139, i-1849, i-0005, i-0154, i-0201, i-0073, i-0571, i-0510, i-0302, i-2198, i-1134, i-1771, i-0108, i-2195, i-0132, i-0137, i-0140, i-1850, i-0006, i-0155, i-0109, i-2196, i-0133, i-0138, i-0141, i-1851, i-0007, i-0202, i-0303, i-0074, i-0572, i-0511, i-2296, i-1135, i-1772, i-0156, i-0018:

**Page 77 Line 3 to 12:**

**7.4.4.59 Challenge IE**

The Challenge IE includes the initiator challenge data for the ranging procedure with fixed reply time used as shown in figure 8 and figure 23. The challenge shall only be used for one ranging operation, i.e. every ranging operation requires a new challenge.

|  |
| --- |
| **Octets: 4/8/16** |
| Challenge |

**Figure 73—Challenge IE field format**

The response length depends on the security levels defined in 6.9.9.3.

**7.4.4.59 Response IE**

The Response IE includes the responder response data for the ranging procedure with fixed reply time used in the Enh-Ack frame from the responder as shown in figure 8 and figure 23. The response shall only be used for one ranging operation, i.e. every ranging operation requires a new response.

|  |
| --- |
| **Octets: 4/8/16** |
| Response |

**Figure 74—Response IE field format**

The response length depends on the security levels defined in 6.9.9.3.

* Remove this clause and the entry in Table 7-16

**7.4.4.61 ReplyTime IE**

* New addition and add entry in table 8-1:

**8.2.26.3 MLME-RAW-ENABLE.request**

The MLME-RAW-ENABLE.request primitive allows the next higher layer to request that the receiver is enabled for a finite period of time or disabled and FCS checking is disabled during this period when setting RANGING\_RAW\_ON for *RangingRxControl*. FCS checking will be automatically enabled when the timer expires or when the *RxOnTime* is set to 0x000000. The *SMode* defines scrambling of the payload data for the data and the *Enh\_Ack* frame. In case of multi-node ranging as shown in figure 23 the *AddressMask* is used for the address filtering of the *Enh-Ack* responses from responder 1…N.

The semantics of this primitive are:

MLME-RAW-ENABLE.request (

*RxOnTime,*

*RxOnDuration,*

*AddressMask,*

*RangingRxControl*

)

The primitive parameter is defined in Table 27

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| *RxOnTime* | Integer | 0x000000 – 0xFFFFFF | The number of symbols measured from the start of the superframe before the receiver is to be enabled or disabled. This is a 24-bit value, and the precision of  this value shall be a minimum of 20 bits, with the  lowest 4 bits being the least significant. This parameter is ignored for nonbeacon-enabled PANs.  If the issuing device is the PAN coordinator, the term  superframe refers to its own superframe. Otherwise, the term refers to the superframe of the coordinator  through which the issuing device is associated. |
| *RxOnDuration* | Integer | 0x000000 – 0xFFFFFF | The number of symbols for which the receiver is to be enabled.  If this parameter is equal to 0x000000, the receiver is to be disabled. |
| *AddressMask* | Short address or extended address | --- | The address mask enables the address bit check when set to 1. When set to 0 the address bit is don’t care. |
| *RangingRxControl* | Enumeration | RANGING\_OFF, RANGING\_ON,  RANGING\_RAW\_ON | Configure the transceiver to Rx with ranging for a value of RANGING\_ON or to not enable ranging for RANGING\_OFF.  With RANGING\_RAW\_ON the FCS checking is ignored. |

**8.2.26.4 MLME-RAW-ENABLE.confirm** (

*Status*

)

The primitive parameter is defined in Table 28

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| *Status* | Enumeration | SUCCESS, PAST\_TIME, ON\_TIME\_TOO\_LONG,  INVALID\_PARAMETER,  RANGING\_NOT\_SUPPORTED | The result of the request to enable or disable the receiver. |