**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 |  |
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| 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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**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 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:**

The ranging process uses *Enh-Ack* frames to achieve the fixed reply time defined by the *phyFixedReplyTime* attribute. During the configuration of the initiator and the responder, the Challenge IE and Response IE are set using MLME-RAW-ENABLE.request. This will also disable the FCS checking to pass the unfiltered MAC Payload to the next higher layer. Since challenge and response data are only valid for one transmission the *macMaxFrameRetries* is set to 0.

The ranging is started by the initiator sending the challenge with *AckTx* set and starting the ranging counter. The responder will reply after the *phyFixedReplyTime* with an *Enh-Ack* frame using the response data to the challenge data. The ranging counter at the initiator is stopped at the RMARKER position. The responder will pass the received MAC Payload to the responder next higher layer and the initiator will pass the received MAC Payload from the *AckPayload* together with the ranging counter to the initiator next higher layer. The initiator MAC shall use a timeout for the reception of the *Enh-Ack* frame according to the duration of the *phyFixedReplyTime*, the duration of the SHR and the time-of-flight.



**Figure 8—Example of ranging with fixed response (return) time**

* 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:**

Figure 23 illustrates the message sequence chart for multi-node SS-TWR between one initiator and N responders using *phyFixedReplyTime*, i.e., each responder is configured with its own fixed reply time such that the acknowledge frame 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 counter stop 1…N and each *AckPayload* *1...N*. As described for the unicast operation in Figure 8 each responder will reply with an *Enh-Ack* frame. The responder 1…N shall respond to one destination address and respond 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. The initiator next higher layer timeout for the *Enh-Ack* frames shall be set according the N responder fixed reply time as described in 6.9.7.5 for figure 8.



**Figure 23—Message sequence chart for multi-node SS-TWR with fixed reply time**

* 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 send to the responder 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 challenge length depend on the security levels defined in 6.9.9.3.

**7.4.4.60 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 depend on the security levels defined in 6.9.9.3.

* Remove this clause and entry in Table 7-16

**7.4.4.61 ReplyTime IE**

The ReplyTime IE includes the fixed reply time which is used during ranging with fixed reply time as described in 6.9.8.4 with Figure 23. This fixed reply time is used to schedule the Enh-Ack frame from the responder device during multi-node ranging procedure.

* New 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. FCS checking will be automatically enabled when the timer expires or when the *RxOnTime* is set to 0x000000. The *PayLoadIeList* includes the Challenge IE or Response IE for ranging with fixed reply time as shown in figure 8. 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,*

*PayloadIeList,*

*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. |
| *PayLoadIeList* | List of IEs as described in 7.4.3 | --- | The payload IEs, excluding Termination IEs, to be added to the frame. |
| *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 | Configure the transceiver to Rx with ranging for a value of RANGING\_ON or to not enable ranging for RANGING\_OFF. |

**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. |