**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |
| --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | Acknowledgements |
| Date Submitted | 16 May 2024 |
| Source | Billy Verso (Qorvo),  | billy.verso at qorvo.com |
| Re: | Comment Resolutions |
| Abstract | Comment Resolutions for selected comments on the Pre-Ballot Draft C of the P802.15.4ab amendment. |
| Purpose | This document provides text changes intended to be part of the final IEEE Std 802.15.4ab (amendment to IEEE Std 802.15.4), as part of resolving selected consolidated comments spreadsheet (doc 15-24-0010) that have been assigned to the author to resolve. |
| Notice | This document does not represent the agreed views of the IEEE 802.15 Working Group or IEEE 802.15.8 Task Group. It represents only the views of the participants listed in the “Source(s)” field above. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |
| Release | The contributor acknowledges and accepts that this contribution becomes the property of IEEE and may be made publicly available by P802.15. |
| 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>. |

|  |
| --- |
| . |

# CID # 188, 72, 190, 191

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Index** | **Page** | **clause** | **Line** | **Comment** | Proposed Change |
| 188 | 17 | 6.6.3.3 | 13 | In general ACK is a little broken, and this change is not helping, so should be backed out. | Remove this change completely, and work on repairing ACK in a more complete way, |
| 72 | 17 | 6.6.3.3 | 17 | Edit this per approved document 539/r2. The text in the document is more clear in restricting AIFS to imm-ack for HRP-EMDEV. Also, listing mandatory and optional value would make this clear for the reader (as per DCN 539/r2). | Use the paragraph suggested in DCN 539/r2. |
| 190 | 17 | 6.6.3.3 | 23 | To interwork with 4z (which includes optional support for 31.2 Mb/s with K=7 encoding) the HRP-EMDEV needs to be able to support ACK frames with the 4z timing.  | Add appropriate configuration possibilities allow for this interworking and change the text / here appropriately to not mandate such incompatible operation. |
| 191 | 17 | 6.6.3.3 | 25 | The HRP-EMDEV is not a PHY therefore the "for all other PHYs" needs change. | Change to "for all other PHYs and modes." |

**Discussion -- ImmAck:**

The original IEEE 802.15.4 (2003/2006) used a 12-symbol time for (immediate) Ack which was ~190 µs.

4a (2007) developed contemporaneously probably did not think about this parameter. However, since 4a had a much shorter symbol period not changing from 12 symbols essentially made the Ack time requirement much more difficult to achieve. TG4a probably should have set a similar ack time, e.g., approximately 190 µs, whether in symbols or in microseconds. The much shorter time means that typically software cannot meet the Ack requirement, necessitating a dedicated hardware solution.

A possible way forward to consider / recommend for ImmAck, for the UWB PHYs (and possibly allow for others) is:

1. Re-specifying the (default) immediate ack period as a larger time, something closer to this 190 µs figure, and,
2. Adding a mechanism for negotiation of a (different) shorter immediate ack, and
3. Adding MAC PIB attributes to allow configuration of the RX-to-TX and TX-to-RX delays for ImmAck, and
4. Also stating that an OOB method could also be used to agree/select the values to use.

**Discussion -- EnhAck:**

TG4e 2012 updated the data frames (to frame version 2) adding the capability for them to carry IEs, and, specified an “Enhanced” ack to send in response to these. The EnhAck included source and destination addressing and could include IEs in response to IEs in frame being acknowledged. In addition, 4e specified security processing where if the incoming frame was secured requires that the responding EnhAck needs also to be secured.

Essentially then, when a secured frame is received (and needs ack) it has to be de-secured and the ack formed and also secured before it can be sent.

To allow time for this processing: TG4e/TG4g defined the ack time to be 1 ms (in essence for these enhanced Ack frames), but only stated it as being for the SUN PHYs. It would have been better to have specified a blanket Ack time for the EnhAck as 1ms, rather than specify it as a 1ms Ack time just for the SUN PHYs.

A possible way forward to consider / recommend for EnhAck for UWB (and any other?) PHYs is:

1. Specifying that the 1ms time applies to EnhAck for all devices, and,
2. Adding a mechanism for negotiation of a (different) shorter or longer EnhAck response time, and,
3. Adding MAC PIB attributes to allow configuration of the RX-to-TX and TX-to-RX delays for EnhAck, and,
4. Also stating that an OOB method could also be used to agree/select the values to use.

**Proposal:**

If people in TG4ab generally agree that this a good way forward, the author will work on a set of proposed changes to provide for this in the 4ab amendment.