**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | Resolutions for Draft C comments 611 and 211 | |
| 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. | |
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# CID # 611

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| **Index** | **Page** | **clause** | **Line** | **Comment** | Proposed Change |
| 611 | 49 | 10.38.3.6 | 7 | Define a MAC PIB (e.g., macNBCoordinationActive) that the higher layer can set to control whether coordination is active or not. See macPriorityChannelAccess as a reference. | Define a MAC PIB macNBCoordinationActive and replace all occurance of "If coordination is active" with "If macNBCoordinationActive is TRUE" |

**Discussion:**

The “coordination” function requires the initiator to transmit Acquisition Compact frames with information about its UWB channel usage, and scan for Acquisition Compact frames.

There are two types of Acquisition Compact frames (UWB and NB), and either may be sent or both, while the scanning is trying to discover what is going on in the neighbourhood. There are many aspects of this that are undefined. The length of the scanning period is implementation dependent. The text says: “The initiator thus obtains information of UWB channel usage from other initiators, and with this knowledge, the initiator may select values for configuring its new session to minimize the overlap with active periods of other sessions nearby. The details of this are implementation specific.”

If we want the MAC to do this autonomously then we would need to specify the operation much more precisely so that implementations behave predictably and can interact effectively, and we would need to specify many parameters to control it.

Instead, it is more straightforward to have a simple model of the MAC where for a transmission, the next higher layer tells the MAC to send frame W (at time X), i.e., to send the Acquisition frame when it wants, and for the scanning to turn its receiver on for the desired scanning period and have the next higher layer process what is received according to its needs. We can then offload the details of specific application use cases to the next higher layer and allow other SDO to specify what works best for their individual use cases.

Given the above, it is better that the upper layer remembers for itself whether it is doing coordination or not. So, the proposed resolution is Reject.

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| Proposed  **Disposition** | Proposed:  **Disposition Detail** |
| **Rejected** | This is functionality best kept above the 802.15.4 MAC. |

# CID # 211

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| **Index** | **Page** | **clause** | **Line** | **Comment** | Proposed Change |
| 211 | 60 | 10.38.9 | 3 | The procedures talk only about over-the-air messages, but not about the upper layer interactions and primitives. If we follow 15-23-0306 as a good model for this, then we need to ensure we have sufficient PIB configurations (or a configuration primitive) defined for the necessary configuration/control operations, and additional parameters in MCPS-DATA primitives to do the necessary control and/or report the appropriate results. | Define PIB parameters or configuration primitive(s) to cover all required configuration parameters, and update MCPS-DATA primitives to include control and status parameters as necessary. |

**Discussion:**

It makes sense to use MCPS-DATA primitives for UWB MMS packets, since MCPS-DATA.request is already used for sending other ranging packets, including the SP3 (STS only) packets which are similar to the minimal UWB MMS packet.

How should we do this? Read on….

In the fragmented MMS packet, fragment transmissions and receptions are interleaved. To allow for this the MCPS-DATA.request needs to be able to initiate this transmission and interleaved reception…. Initiating Tx and Rx from a single MCPS-DATA.request is not new, e.g., for acknowledged data transmission the MCPS-DATA.confirm indicates that the transmission has completed also indicates the ack reception. Indeed, for ranging the MCPS-DATA.confirm already has a RangingReportDescriptor parameter that includes many parameters needed for ranging, including the TxRangingCounter and RxRangingCounter values for conveying the Transmission and Reception timestamps. This is another reason to reuse it and not invent a new primitive.

Following the ideas presented in 15-23-0306, the changes described below include: modifying the MCPS-DATA.confirm primitive to report the times when the NBA Poll or Response frames are sent; modifying the MCPS-DATA.indication primitive for reporting the receive time and clock offset of received NBA Poll or Response frames; and, it modifying the MCPS-DATA.request primitive to support transmission and interleaved reception of the fragmented UWB MMS Packet.

The changes described here are based on the draft revision IEEE P802.15.4me/D03, and the 4ab draft informally reviewed “*P802.15.4ab™/Draft (pre-ballot) C*”.

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| Proposed  **Disposition** | Proposed:  **Disposition Detail** |
| **Revised** | Apply changes as documented below. |

See changes on the following pages.

**8. MAC services**

**8.3 MAC data service**

**8.3.2 Ranging**

**8.3.2.1 General**

**8.3.2.2 DataRequestRangingDescriptor**

***Insert new parameters into the DataRequestRangingDescriptor, Table 8-27, (802.15.4 ME D3 sub-clause 8.3.2.2) as shown below:***

**Table 8-27—Elements of the DataRequestRangingDescriptor**

| **Name** | **Type** | **Valid range** | **Description** |
| --- | --- | --- | --- |
|  |  |  |  |
| MmsRangingRxOnTime | Unsigned Integer | 0x00000000–0xffffffff | For UWB MMS ranging where fragment transmissions and receptions are interleaved, this parameter specifies the expected arrival time of the first received fragment in the units defined in 10.29.1.4. |
| MmsRxClockTrackInterval | Unsigned Integer | 0x00000000–0xffffffff | For UWB MMS ranging where fragment transmissions and receptions are interleaved, this parameter along with the MmsRxClockTrackOffset specifies the clock offset for the fragment receptions. |
| MmsRxClockTrackOffset | Integer | 0x00000000–0xffffffff | For UWB MMS ranging where fragment transmissions and receptions are interleaved, this parameter along with the MmsRxClockTrackInterval specifies the clock offset for the fragment receptions. |
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NOTE—The while the MmsRangingRxOnTime is in ranging counter time units, the O-QPSK receiver may be unable to provide the arrival time of the poll / response Compact frames to this accuracy.

**8.3.3 TxOptions**

***Insert new parameters into the TxOptions, Table 8-29, (802.15.4 ME D3 sub-clause 8.3.3) as shown below:***

**Table 8-29—Elements of the TxOptions**

| **Name** | **Type** | **Valid range** | **Description** |
| --- | --- | --- | --- |
|  |  |  |  |
| MmsReceive | Boolean | TRUE. FALSE | For UWB MMS Ranging (where the transmitter is sending RSF/RIF fragments, this parameter is set TRUE if interleaved reception of UWB MMS fragments is required as well as transmission, or FALSE otherwise. |
|  |  |  |  |

***Insert the following new paragraphs at the end of 8.3.4 MCPS-DATA.request:***

The MmsReceive parameter (in TxOptions) applies to UWB MMS packet transmissions and when TRUE serves to enable the reception of UWB MMS fragments interlaced between the transmitted UWB MMS fragments.

For the purposes of the interleaved transmission and reception of UWB MMS ranging fragments, the RangingTxTime parameter specifies the transmission time of the first fragment, and the MmsRangingRxOnTime specifies the reception time for the first receive fragment, and the MmsRxClockTrackInterval, and MmsRxClockTrackOffset specify the clock offset. Generally, it is expected that the RangingTxTime parameter value will be set based upon the transmission time of a MMS Ranging Control Phase packet, (e.g., for an initiator this might be a One-to-one Poll Compact frame), and that the MmsRangingRxOnTime and MmsRxClockTrackInterval, and MmsRxClockTrackOffset parameter values will be set based upon the reception of a MMS Ranging Control Phase packet, (e.g., for an initiator this might be a One-to-one Response Compact frame). The selection of whether fragment transmission or reception is done first, (i.e., whether the device is initiator or responder), is defined by which of times specified by RangingTxTime and MmsRangingRxOnTime is the earlier. For the interleaved fragments these times a are nominally separated by 600 RSTU. When MmsReceive is FALSE, no MMS reception is done and the MmsRangingRxOnTime, MmsRxClockTrackInterval, and MmsRxClockTrackOffset parameters are ignored.

**8.3.5 MCPS-DATA.confirm**

***Insert the following at the end of 8.3.5 MCPS-DATA.confirm:***

Where the MCPS-DATA.confirm is reporting the transmission of One-to-one Poll, One-to-one Response, One-to-many Poll, or One-to-many Response Compact frames, the TxRangingCounter parameter in the RangingReportDescriptor is used to convey the transmission time of the packet.

**8.3.6 MCPS-DATA.indication**

***Insert the following at the end of 8.3.6 MCPS-DATA.indication:***

Where the MCPS-DATA.indication is reporting the reception of One-to-one Poll, One-to-one Response, One-to-many Poll, or One-to-many Response Compact frames, the RxRangingCounter, RangingTrackingInterval, and RangingOffset parameters in the RangingReportDescriptor are used to convey the arrival time and clock offset information for the received packet.

***<END >***