**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **Proposed Resolutions for CIDs** **:** **39, ~~89~~, 302, 332, 564, 624, 625, 816** |
| Date Submitted | May 16, 2024 |
| Sources | Youngwan So (SAMSUNG Elec.)youngwan.so@samsung.com |  |
| Re: |   |
| Abstract |  |
| Purpose | To propose resolutions for suggested comments including hyper block, coordination as well as multiple transmission for “P802.15.4ab™/D (pre-ballot) C Draft Standard for Low-Rate Wireless Networks” .  |
| Notice | This document does not represent the agreed views of the IEEE 802.15 Working Group or IEEE 802.15.4ab Task Group. It represents only the views of the participants listed in the “Sources” field above.It is offered as a basis for discussion and is not binding on the contributing individuals. The material in this document is subject to change in form and content after further study. The contributors reserve the right to add, amend or withdraw material contained herein. |

Rev 0: Addressing the following CIDs

 (CID #: 39, ~~89~~, 302, 332, 564, 624, 625, 816)

Rev 1: Addressing the following comments

 CID#89 : Removed as I couldn’t have chance to have further offline discussion with commenter Pooria.

 CID#302 : HRP-ARDEV/SDEV/EMDEV/LLDDEV →HRP-EMDEV

***Comment Indices in 15-24-0010-01-04ab-consolidated-comments-draft-c:***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Index#** | **Pg** | **Sub-Clause** | **Ln** | **Comment** | **Proposed Change** | **Disposition** |
| Li-Hsiang Sun | 39 | 96 | 10.38.10.20.1 | 8 | is preamble code index field also signals MMRS sequence code index?  | change to 'preamble code index/MMRS sequence code index' | Revised |

**Disposition Detail:**

Below paragraph is corresponding parts (P96L8) as FYI.



The ‘Preamble Code Index’ in Figure 110, which is in ‘UWB Per-Session Info element’, is to indicate preamble code index used for the UWB Session. AP is to let other initiators avoid from using the conflicting time resources basically. Assuming conflicted time is avoided well among initiators, MMRS sequence code index information cannot give any further meaningful benefits as confliction is avoided anyway.

In case of NBA-MMS mode, there’s no need of sending SHR (SYNC+SFD) in the sessions, but SHR can exist for SHR of UWB AP or UWB-based ranging report case, once it’ used. Then in such cases, the Preamble Code Index can be used for SHR, but otherwise the field can be ignored.

**Proposed text changes on P802.15.4ab™/D (pre-ballot) C:**

***Change the P96L8 as follows***

When the Type of UWB Per-Session Info field value is one, each element of the UWB Per-Session Info List field shall be formatted as shown in Figure 110.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Octets: 3** | **Bits: 0–4** | **5** | **6–7** | **Octets: 1** |
| Block Duration | UWB Channel | Hop Mode | Reserved | Preamble Code Index |

**Figure 110—Format of UWB Per-Session Info elements type 1**

The Block Duration field is an unsigned integer that specifies the duration of a block in RSTU.

The UWB Channel field indicates the UWB channel number used by the UWB session.

The Hop Mode field specifies the hop mode for a block of UWB session, where zero means no hopping and one means hopping.

The Preamble code Index field value specifies the UWB preamble code used by the UWB session. MMS specific code information including MMRS sequence number is being delivered in SOR. When SHR is not used, the Preamble Code Index field can be ignored by responders.

***~~Comment Indices in 15-24-0010-01-04ab-consolidated-comments-draft-c:~~***

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| **~~Name~~** | **~~Index#~~** | **~~Pg~~** | **~~Sub-Clause~~** | **~~Ln~~** | **~~Comment~~** | **~~Proposed Change~~** | **~~Disposition~~** |
| ~~Pooria Pakrooh~~ | ~~89~~ | ~~97~~ | ~~10.38.10.20.1~~ | ~~7~~ | ~~How is the "active round" field defined and used when there is UWB round hopping? This info seems to be useless in the case of round hopping.~~ | ~~Clarify the definition of "active round" for the case that there is round hopping.~~ | ~~Revised~~ |

**~~Disposition Detail:~~**

 ~~Commenter’s argument in Denver meeting ;~~

~~“When there is a bitmap to signal the active round within a block and when there is round hopping, every block’s bitmap is different because a different round is used within that block. So from block to block this bitmap changes. Then, when we signal this, it’s not useful because in next block everything will change.”~~

~~Basically, Active Rounds fields have a bitmap string that maps active rounds in the block of UWB session. A session will have a fixed binary bitmap string. And if once round hopping is enabled, It’s true this bitmap should changes from block to block, with hopping sequences based on either of (a) pre-negotiated sequence that is known to all devices, or (b) all the information exchanged necessary such that each device can generate the hopping sequence. The round hopping makes different usage of rounds per each block but, this should stem from initial active rounds.~~

~~~~

**~~Proposed text changes on P802.15.4ab™/D (pre-ballot) C:~~**

***~~Change the text in P97L7 as follows (Track changes ON)~~***

~~The Active Rounds field contains a binary bitmap string. Each bit maps to the rounds in the block of UWB session. The bit is set to one to indicate active, otherwise it is set to zero. In case of round hopping is enabled, Active Rounds provide initial round usage information and it should change based on hopping sequence which are already known as stated above.~~

***Comment Indices in 15-24-0010-01-04ab-consolidated-comments-draft-c:***

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| **Name** | **Index#** | **Pg** | **Sub-Clause** | **Ln** | **Comment** | **Proposed Change** | **Disposition** |
| Bin Qian | 302 | 29 | 10.31.1 | 9 | Some fields are in both the ARC IE and the AC IE, e.g., Multi-node Mode field, Ranging Round Usage field, STS Packet Config field, Deferred Mode field, and MMRCR field. If both ARC IE and AC IE exist in RCM, which IE will the controlee follow? | Clarify how the ARC IE and AC IE coexist | Revised |

**Disposition Detail:**

*NOTE : THIS COMMENT WAS APPROVED IN THE LAST F2F MEETING (DCN143r4) BUT DECIDED TO REVISE AGAIN DUE TO THE WRONG DESCRIPTION REGARDING 4z/4ab DEVICES.*

Both of ARC IE and AC IE are commonly transmitted by controller.

By definition (P111L27), configuration information in AC IE is supposed to be used by every application (ex. MMS, Sensing, etc) and application-specific control parameters. On the other hand, configuration information in ARC IE is mainly for ranging application purpose (P78L11@4z).

But if there are cases that both appear concurrently in the RCM, it’s reasonable to assume overlapping parameter values should be jointly used to configure devices and be the same to avoid confusion.

More importantly, this is mentioned already in sensing part (P116L11) as below ; 

**Proposed text changes on P802.15.4ab™/D (pre-ballot) C:**

***Change the text in 10.31.1 as follows (Track changes ON)***

**10.31 Ranging: Multi-node ranging**

**10.31.1 Introduction**

***Change the first paragraph of 10.31.1 as shown:***

The use and support of the procedures and associated IEs in this subclause are optional. An RCM is a data frame conveying the either an Advanced Ranging Control IE (ARC IE) described in 10.31.9.1 or an Application Control IE (AC IE) carrying a Ranging Control field (as described 10.39.7.1) or both. The RCM can be used to convey ranging parameters to control and configure aspects of the ranging procedure(s) such as the timeslot structure shown in Figure 10-220, the ranging methods specified in 10.28.1.2, and the STS packet configuration as specified in 16.2. If both of ARC IE and AC IE are conveyed at the same time, the parameter values in both IE jointly configures HRP-EMDEV, while those of ARC IE are for ERDEV devices.

***Comment Indices in 15-24-0010-01-04ab-consolidated-comments-draft-c:***

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| **Name** | **Index#** | **Pg** | **Sub-Clause** | **Ln** | **Comment** | **Proposed Change** | **Disposition** |
| Bin Qian | 332 | 62 | 10.38.9.4.2 | 12-18 | It seems the multiple transmissions could extend to the RIF as well |  | Rejected |

**Disposition Detail:**

Below are referred text paragraph for your information.



While RSF uses Ternary codes that can guarantee low cross correlation, RIF just uses STS pulses, so the cross correlation cannot be guaranteed among received signals. Therefore, it’s difficult to use multiple transmissions in RIF.

**Proposed text changes on P802.15.4ab™/D (pre-ballot) C:**

***None***

***Comment Indices in 15-24-0010-01-04ab-consolidated-comments-draft-c:***

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| **Name** | **Index#** | **Pg** | **Sub-Clause** | **Ln** | **Comment** | **Proposed Change** | **Disposition** |
| Youngwan So | 564 | 50 | 10.38.3.6 | 3 | The channel specified by "default value of" the macMmsNbInitChannel attribute and the channel specified by "default value of" the macMmsUwbChannel attribute shall be used for coordination | Change"If coordination is active, before starting a new session, the initiator scans for Acquisition Compact frame on the initialization channel specified by the macMmsNbInitChannel attribute and/or the channel specified by the macMmsUwbChannel attribute."to "If coordination is active, before starting a new session, the initiator scans for Acquisition Compact frame on the initialization channel specified by the **default value of** macMmsNbInitChannel attribute and/or the channel specified by the **default value of** macMmsUwbChannel attribute." | Revised |

**Disposition Detail:**

**ALREADY ACCEPTED IN DCN0143r4 IN DENVER MEETING.**

**Proposed text changes on P802.15.4ab™/D (pre-ballot) C:**

 **NONE**

***Comment Indices in 15-24-0010-01-04ab-consolidated-comments-draft-c:***

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| **Name** | **Index#** | **Pg** | **Sub-Clause** | **Ln** | **Comment** | **Proposed Change** | **Disposition** |
| Rojan Chitrakar | 624 | 62 | 10.38.9.4.3 | 22 | "… trigger multiple RSF transmissions." How the responders transmit the multiple RSFs should be described in more detail, the figure is not self-explanatory. | Describe how the respondes transmit the multiple RSFs. | Revised |

**Disposition Detail:**

The CID #624 is the exactly same comment with CID #626 whose resolution was already accepted in March meeting at Denver through “15-24-0178-04-04ab-comment-resolution-continued.docx “ except the fact that sections/paragraphs those are pointing at are different. If we capture the corresponding sections for information, it’s as below;

1. Text at page 62, line 22 (CID #624) – Unsolved comment



1. Text at page 63, line 6 (CID #626) – Already approved comments in DCN#178r04

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| --- | --- | --- | --- | --- | --- | --- |
| Rojan Chitrakar | 626 | 63 | 10.38.9.4.4 | 6 | "… trigger multiple RSF transmissions." How the responders transmit the multiple RSFs should be described in more detail, the figure is not self-explanatory. | Describe how the respondes transmit the multiple RSFs. |



**Proposed text changes on P802.15.4ab™/D (pre-ballot) C:**

***(1) Change the text in P63L5 as follows (Track changes ON)***

**10.38.9.4.4 Multiple RSF transmissions in a slot with NB assist**

The operation of multiple RSF transmissions in a slot with NB assist is shown in Figure 42. The control phase is conducted by sending a One-to-many Poll Compact frame in the NB channel. After control phase, the UWB MMS packet including the initial SYNC+SFD fragment, as per Figure 176, is transmitted to trigger multiple RSF transmissions. Example operation of the multiple RSF transmissions per slot with NB assist is shown in Figure 42. In the ranging slot 3, the initiator transmits one (SYNC + SFD) fragment to trigger Multiple RSF transmissions. If responder receives the (SYNC + SFD) fragment of the initiator, after AIFS the responders reply with RSF as configured by the one-to-many Poll Compact frame in the Control Phase which transmitted in slot 0 in Figure 42. After the RSF transmission occurs, the measurement report phase is proceeded by sending ranging report Compact frames in the NB channel from the responders to the initiator.



***(2) Change the text in P62L22 as follows (Track changes ON)***

**10.38.9.4.3 Multiple RSF transmissions in a slot without NB assist**

The operation of multiple RSF transmissions in a slot without NB assist is presented in Figure 41. Control phase is conducted in the UWB channel by transmitting a Data frame that carries the Scheduling IE, (10.31.9.10). In the ranging phase, one (SYNC + SFD) only packet is transmitted to trigger multiple RSF transmissions as in 10.38.9.4.4. In the measurement report phase the ranging reports are sent in the UWB channel from the responders to the initiator.

***Comment Indices in 15-24-0010-01-04ab-consolidated-comments-draft-c:***

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| **Name** | **Index#** | **Pg** | **Sub-Clause** | **Ln** | **Comment** | **Proposed Change** | **Disposition** |
| Rojan Chitrakar | 625 | 63 | 10.38.9.4.4 | 6 | Which variant of One-to-many Poll Compact frame? | Specify the variant of the one-to-many Poll compact frame that triggers the mutlitple RSF transmissions. | Revised |

**Disposition Detail:**

The corresponding paragraph is as below FYI ;

 

And above CID#625 is covered at CID#336 which was already approved at DCN#0178r4 in Denver.

If I capture the CID336 and its proposed text, it’s as below;

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| **Name** | **Index#** | **Pg** | **Sub-Clause** | **Ln** | **Comment** | **Proposed Change** | **Disposition** |
| Bin Qian | 336 | 63 | 10.38.9.4.4 | 6, 9 | The one-to-many Poll Compact frame transmitted after the control phase is not clearly defined. Is it the Poll transmitted by UWB in Ranging Slot 3 in Figure 42? Does the initiator need to tranmit a RSF before multiple RSF transmissions from responders | As in the comment | revised |

**Proposed text changes on P802.15.4ab™/D (pre-ballot) C:**

***Change the text in P63L5 as follows (Track changes ON)***

**10.38.9.4.4 Multiple RSF transmissions in a slot with NB assist**

The operation of multiple RSF transmissions in a slot with NB assist is shown in Figure 42. The control phase is conducted by sending a One-to-many Poll Compact frame in the NB channel. After control phase, the UWB MMS packet including the initial SYNC+SFD fragment, as per Figure 176, is transmitted to trigger multiple RSF transmissions. Example operation of the multiple RSF transmissions per slot with NB assist is shown in Figure 42. In the ranging slot 3, the initiator transmits one (SYNC + SFD) fragment to trigger Multiple RSF transmissions. If responder receives the (SYNC + SFD) fragment of the initiator, after AIFS the responders reply with RSF as configured by the one-to-many Poll Compact frame in the Control Phase which transmitted in slot 0 in Figure 42. After the RSF transmission occurs, the measurement report phase is proceeded by sending ranging report Compact frames in the NB channel from the responders to the initiator.



***Comment Indices in 15-24-0010-01-04ab-consolidated-comments-draft-c:***

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| **Name** | **Index#** | **Pg** | **Sub-Clause** | **Ln** | **Comment** | **Proposed Change** | **Disposition** |
| Carl Murray | 816 | 94 | 10.38.10.20.2 | 10 | Why not just use 1 bit for the NB AP Type and combine the other 2 bits with the existing reserved bits |  | Revised |

**Disposition Detail:**

Carl worried current 3 bits assignment to NB AP Type can ;

1. Use up the pool of reserved bits while we haven’t actually specify what we’re doing
2. Need to get the functionality in now rather than reserving it and not using them,

In some sense, it’s true so we accept his suggestion in principle and made changes as below.



**Proposed text changes on P802.15.4ab™/D (pre-ballot) C:**

***Change the Figure 108 in P94L6 as follows (Track changes ON)***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Bits:** **0** | **1–7** | **8–10** | **11 – 14** | **15** | **Octets:** **0/2** | **0/4** | **variable** |
| NB AP Type | Reserved | Type of UWB Per-Session Info | Number of UWB Per Session Info | UWB AP Info Present | Next NB AP | UWB AP Info | UWB Per-Session Info List |
| Common Info |

**Figure 108—Format of the Message Content field in the Acquisition Compact frame when the Message Control field value is 0x00**