IEEE P802.15
Wireless Personal Area Networks

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| One-to-many CIDs in D2 |
| Date: May 10, 2025 |
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Abstract

This document discusses and proposes resolutions for the following CIDs: 39, 40, 41, 199, 200, 201, 202, 204, 205, 206, 207, 283, 474, 477, 478

The discussion and proposed changes are based on P802.15.4ab™ D02 Draft Standard for Low-Rate Wireless Networks.

Revision history:

R0 - Initial version

R1 - some minor revisions

R2 - Major changes are 1) merge CID 41 and 206, both are for time-efficient one-to-many; 2) revise CID 477 to reflect “channel switching mechanism” is used only if enabled; 3) revise CID 39 and 204 to reflect suggestion from online discussion; 4) Revise CID 474 to move the descriptive text on the usage of different variant Poll frame out of figure title.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 39 | 133 | 10 | A report variant of Figure 117 that includes "Round-trip time" field is also required. | Add the report variant (Message control three) of Figure 117 that includes "Round-trip time" field is also required. | Revised. |
| 204 | 132 | 17 | change "0x10" by two | change "0x10" by two | Revised. |

## CIDs 39, 204

Discussion: in D02, the support of NBA-MMS UWB non-interleaved DS-TWR is added for one-to-one ranging. The description of this mode is still missing in 10.39.9, however, the extension on the report compact frame has been made to the draft. Four variants are defined for this frame depending on the usage.

Revise Line 11 on Page 132 as follows:

The Message Control field value (within the Message ID field) shall be zero, one, two or three. This value determines the formatting of the Message Content field.

Revise Line 17 on Page 132 as follows:

When the Message Control field value (within the Message ID field) is one, the Message Content field shall be formatted as shown in Figure 117.

Add the following after Line 22 on Page 133:

When the Message Control field value (within the Message ID field) is three, the Message Content field shall be formatted as shown in Figure XXX. Note that this frame is used for non-interleaved DS-TWR mode.

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| **Octets: 5** | **5** | **1** | **0/2/5/6** | **0/1** | **0/8** | **0/4** | **0/1** | **0/variable** |
| Reply Time | Round-trip Time | Presence Bitmap | NB Channel Map | Management PHY Configuration | Management MAC Configuration | Ranging PHY Configuration | MMS Number of Fragments | Pass Through |

The Reply Time field value is an unsigned integer reporting the time difference, measured at the responder, between the RMARKERs of the MMS fragments received from the initiator and the MMS fragments transmitted by the responder. The units of time are specified in 10.29.1.4.

The Round-trip Time field value is an unsigned integer that reports the time difference, measured at the responder, between the RMARKER of the MMS fragments transmitted by the responder in its ranging subround and the RMARKER of the MMS fragments received from the initiator in a subsequent ranging subround. The units of time are specified in 10.29.1.4.

The Presence Bitmap field is set as specified in 10.39.11.1.3.14, except that the Block and Round Index Present field and the Extended Presence Bitmap Present field shall both be set to zero. The encoding and meaning of the subsequent fields in the message content is identical to that of the Advertising Response Compact frame with Message Control field value (within the Message ID field) of one.

For the One-to-many Responder Report Compact frame with Message Control field value (within the Message ID field) one, at least one of the NB Channel Map, Management PHY Configuration, Management MAC Configuration, Ranging PHY Configuration, or MMS Number of Fragments fields shall be present in the Message Content field.

The Passthrough field is defined in 10.39.11.1.3.3. Its presence can be inferred from the frame length.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 40 | 133 | 10 | The usage of Message control two should be explained. | Add description to explain that Message control two is used for DS-TWR. | Revised. |

## CIDs 40

Add the following at the end of Line 11:

When the Message Control field value is two, the Message Content field shall be formatted as shown in Figure 118. Note that this frame is used for non-interleaved DS-TWR mode.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 41 | 134 | 7 | The usage of Message control one should be explained. | Add description to explain that Message control one is used for DS-TWR. | Revised. |
| 206 | 134 | 8 | This one-to-many Initiator Report Compact frame is used for Time-efficient one-to-many ranging | add in line 1 "The One-to-many Initiator Report Compact frames with the Message Control field values (within the Message ID field) of one is used for Time-efficient one-to-many ranging" | Revised. |

## CIDs 41, 206

Add the following at the end of Line 7:

When the Message Control field value (within the Message ID field) is one, the Message Content field shall be formatted as shown in Figure 121. Note that this frame is used for Time-efficient one-to-many ranging described in 10.39.9.3.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 199 | 125 | 14 | This one-to-many Poll Compact frame is used for basic one-to-many ranging with responder report | add "This one-to-many Poll Compact frame is used for basic one-to-many ranging with responder report" | Revised. |

## CIDs 199

Add the following at the end of Line 14:

When the Message Control field value (within the Message ID field) is one the Message Content field shall be formatted as shown in Figure 102. Note that this frame is used for the basic operation of one-to-many ranging described in 10.39.9.1.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 200 | 125 | 24 | This one-to-many Poll Compact frame is used for basic one-to-many ranging with responder report | add "This one-to-many Poll Compact frame is used for basic one-to-many ranging with responder report" | Revised. |

## CIDs 200

Add the following at the end of Line 24:

When the Message Control field value (within the Message ID field) is two the Message Content field shall be formatted as shown in Figure 103. Note that this frame is used for the basic operation of one-to-many ranging described in 10.39.9.1.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 201 | 127 | 16 | The One-to-many Poll Compact frames with the Message Control field values (within the Message ID field) of seven and eight are used for basic one-to-many ranging when operating parameters are updated. | add "The One-to-many Poll Compact frames with the Message Control field values (within the Message ID field) of seven and eight are used for basic one-to-many ranging when operating parameters are updated." | Revised. |

## CIDs 201

Add the following at the end of Line 16:

When the Message Control field value (within the Message ID field) is seven the Message Content field shall be formatted as shown in Figure 106. Note that this frame is used for the basic operation of one-to-many ranging described in 10.39.9.1 when operating parameters are updated.

Add the following at the end of Line 18 on Page 128:

When the Message Control field value (within the Message ID field) is eight the Message Content field shall be formatted as shown in Figure 108. Note that this frame is used for the basic operation of one-to-many ranging described in 10.39.9.1 when operating parameters are updated.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 202 | 130 | 2 | This one-to-many Poll Compact frame is used for Time-efficient one-to-many ranging | add in line 1 "The One-to-many Poll Compact frames with the Message Control field values (within the Message ID field) of nine and ten are used for Time-efficient one-to-many ranging" | Revised. |

## CIDs 202

Add the following at the end of Line 2:

When the Message Control field value (within the Message ID field) is nine, the Message Content field shall be formatted as shown in Figure 106. Note that this frame is used for Time-efficient one-to-many ranging described in 10.39.9.3.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 205 | 133 | 10 | Non-interleaved MMS ranging has been defined for one-to-one ranging but not for one-to-many ranging. Clarification is need for one-to-many ranging for a correct usage of one-to-many responder report compact frame with the Message Control field values (within the Message ID field) of two | remove line 10-22 or change definition | Rejected. |

## CIDs 205

Discussion: The definition is reasonable for non-interleaved MMS ranging for one-to-many. Need extra work for such mode.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 207 | 134 | 21 | Non-interleaved MMS ranging has been defined for one-to-one ranging but not for one-to-many ranging. Clarification is need for one-to-many ranging for a correct usage of one-to-many responder report compact frame with the Message Control field values (within the Message ID field) of two. For example, how to select the RMARKER for DS-TWR | remove line 20-3 or change definition | Rejected. |

## CIDs 207

Discussion: The definition is reasonable for non-interleaved MMS ranging for one-to-many. Need extra work for such mode.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 283 | 86 | 8 | Short-term parameters shall not be exchanged between the initiator and the responders is difficult to verify and may not be what we intend to say. It seems to contradict 10.39.3.8. At best this is unnecessary. There are probably a great many things that should not be exchanged between initiator and responder, such as elephants and wet puppies. It is not appropriate to specify what is not exchanged, only what is exchanged. Then there is the question of what to do if one receives short-term parameters when not expected. As stated this prohibits what is specified in 10.29.3.8, which is likely not what is intended.  | Delete sentence  | Revised. |
| 478 | 86 | 8 | Since "shall not" is hard to verify, the sentence "Short-term parameters shall not be exchanged between the initiator and the responders" probably should be changed. Also the since this is in control of the NHL a "shall" is perhaps the wrong thing to say. Actually I reckon what is meant here is that the Short-term parameters cannot be changed since the One-to-many Poll Compact frame with a Message Control field value of five, does not include the fields that would allow it. | Replace the sentence with: "This Compact frame format does not include the fields to request short term parameter changes"  | Accept. |

## CIDs 283, 478

Change the sentence on Line 8 into the following:

This Compact frame format does not include the fields to request short term parameter changes.

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| **CID** | **Page** | **Line** | **Comment** | **Proposed Change** | **Proposed resolution** |
| 474 | 85 | 19 | The figure 46 is showing one-to-many poll and then POLL in next sub-round, is this same of different poll, The text about the figure does not talk about this being same or different. | Make clarify what the poll is in second ranging sub-round in both the figure and the text description. | Revised. |

## CIDs 474

Discussion: It is the different types of Poll frame. When Poll frame is defined, the usage is described accordingly in 10.39.11.3.9. To make the description more clear, additional text are added to clarify the usage.

Change the text from Line 15 to the following:

A ranging round may use different variants of One-to-many Poll Compact frame that are described in 10.39.11.3.9. For example, in Figure 46, the Message Control field value is 1 for One-to-many Poll Compact frame in Slot 0, while the Message Control field value is 0 for One-to-many Poll Compact frame in Sub-round for Responder 2. During the control phase of each sub-round of one-to-many MMS ranging the following frames are used: the One-to-many Poll Compact frame, the One-to-many Response Compact frame and the One-to-many Report Compact frame.

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| 477 | 85 | 31 | "follows the same mechanism" is insufficient to describe it. Does the switch happen per NB TX, per sub-round, per round or when? This is not clear in the referenced clause. In one-to-many case this may be quite complex for all nodes to know what channel is to be used. | Make it clear when the channel switch is to be done. And how it works with multiple nodes. | Revised. |

## CIDs 477

Discussion: the channel switch follows the same rules for one-to-one ranging, which is per-block based.

Change the following text at the end of 10.39.9.1:

For channel switching, one-to-many ranging follows the same mechanism as described in 10.39.8.4. In each ranging block, if channel switching is enabled, the Initiator and the Responder(s) shall use the channel switching protocol described in 10.39.8.4.3.