**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **LB213/D02 comment resolution -- various CIDs -- p.71 to p.105** |
| Date Submitted | July 1, 2025  |
| Sources | Alex Krebs (Apple)krebs @ apple.com |
| Re: |  |
| Abstract |  |
| Purpose | To propose resolution for MMS related comments for “P802.15.4ab™/D02 Draft Standard for Low-Rate Wireless Networks”. |
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**Table of contents**

[CID 451 3](#_Toc202239109)

[CID 293 4](#_Toc202239110)

[CID 452, 453, 299, 503 5](#_Toc202239111)

[CID 454 7](#_Toc202239112)

[CID 461 8](#_Toc202239113)

[CID 12, 470, 115 9](#_Toc202239114)

[CID 469 10](#_Toc202239115)

[CID 174, 471, 472 11](#_Toc202239116)

[CID 175 12](#_Toc202239117)

[CID 94 13](#_Toc202239118)

[CID 182 14](#_Toc202239119)

[CID 495 15](#_Toc202239120)

[CID 27 16](#_Toc202239121)

[CID 504 17](#_Toc202239122)

[CID 509 18](#_Toc202239123)

[CID 509 19](#_Toc202239124)

# CID 451

|  |  |  |  |  |  |  |
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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| VERSO, BILLY | 451 | 78 | 10.39.3.9 | 35 | The phrase "supported message control commands" appears 3 times in the draft, all 3 assocaited with SMC TLVs field, but "message control commands" is an undefined term. | Could either define "message control commands", or perhaps it should replaced by "Message ID field values" |

Discussion: It is true there is no definition of "commands" and proposed resolution is good.

Proposed Resolution: Accepted.

Disposition detail: Note to editor: There are 4 instances where this occurs, two of which occur on p.136, the other on page 78 and page 111.

# CID 293

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| Shellhammer, Steve | 293 | 79 | 10.39.4.1 | 18 | What is the expected behaviour when the responder does not receive Poll? In this case, there is no point for the responder to send the response compact frame. | Add this sentence in line 18: "If the responder does not receiver the Poll, it shall skip sending the response Compact frame." |

Discussion: This may affect control signaling for short-term parameter updates.

Proposed resolution: Reassign to Rojan.

Disposition detail: n/a

# CID 452, 453, 299, 503

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| VERSO, BILLY | 453 | 79 | 10.39.3.9 | 3 | Message Control has been reduced to 4 bits and a 4-bit Message Version has been added to use the other 4 bits. Should message version also be mentioned on this line as as part of the SMC TLV field? | Update lines 3 and 5 to include mention Message Version if this is appropriate. |
| VERSO, BILLY | 452 | 78 | 10.39.3.9 | 37 | While TLV is flxible, I assume there is some minimum required set that is needed, which should be clarified. Also, it seems this field is only present in frames sent in the optional initialsisation phases, so it is potentially problematic. Most likely the contributers of the message definitions know which sets go with which sort of functionality, so a better chance of vendors interworking might be promoted by deleting the SMC TLV field and instead nominating the message set needed by operational category like one-to-one, one-to-many, and the various flavours thereof, and coding each category as a bit in a bitmap. . | List a manditory set of frames that need to be supported irresperctive, and/or consider an alternative way to speficy groups/sets of commands that are needed for particulatr cases to promote interworking. |
| SUN, LIHSIANG | 299 | 98 | 10.39.11.1.3.2 | 2 | "The SMC Values field is a list of valid Message Control field values …" | suggest change to Message ID field values |
| VERSO, BILLY | 503 | 98 | 10.39.11.1.3.2 | 2 | Should this "list of valid Message Control field values" be "list of valid Message ID field values to include both the Message Control and Message Version fields" | change "Message Control" to "Message ID" |

Discussion: Yes (CID 453) and providing an example could be helpful (CID 452). And there are additional changes (CID 299 and 503) needed after the Message Control Version field has been renamed to Message ID field.

Proposed resolution: Revised.

Disposition detail:

Instruction to editor: Change clause 10.39.3.9 as per below:

**10.39.3.9 Supported message control list indication**

The initiator (controller) may indicate the supported message ID field values for each Compact frame by

referencing the supported Compact Frame ID values and their Message Control and Message Version values

using the SMID TLVs field. Subclause 10.39.11.1.3.2 details the message encodings.

For example, a SMID\_TLVs to indicate support for basic one-to-one ranging with extended support for

Presence Bitmap signaling in Poll and Response frames with Message Control equal to 1 is represented by the following SMID\_TLVs field:

{ 0x00, 0x01, 0x00, //SMC\_Tag=0 (Advertising Poll), SMC Length=1, SMC\_Values=0

0x01, 0x01, 0x00, //SMC\_Tag=1 (Advertising Response), SMC Length=1, SMC\_Values=0

0x02, 0x01, 0x00, //SMC\_Tag=2 (Start of Ranging), SMC Length=1, SMC\_Values=0

0x03, 0x02, 0x00, 0x10, //SMC\_Tag=3 (One-to-one Poll), SMC Length=2, SMC\_Values={0x00, 0x10}

0x04, 0x02, 0x00, 0x10, //SMC\_Tag=4 (One-to-one Response), SMC Length=2, SMC\_Values={0x00, 0x10}

0x05, 0x01, 0x00, //SMC\_Tag=5 (One-to-one Initiator Report), SMC Length=1, SMC\_Values=0

0x06, 0x01, 0x00 } //SMC\_Tag=6 (One-to-one Responder Report), SMC Length=1, SMC\_Values=0

The responder (controlee) may request ranging session configuration in the Advertising Response Compact

frame and may indicate the supported message ID list for each Compact frame by referencing the

supported Compact Frame ID field values and their Message ID field values using the SMID TLVs field.

After the supported message control lists have been exchanged, devices shall use values for Compact Frame

ID and Message ID indicated in the peer's SMID TLVs field when transmitting Compact frames to the

peer.

Instruction to editor: Change clause 10.39.11.1.3.2 as per below:

**10.39.11.1.3.2 The Supported Message ID Tag Length Values (SMID TLV) field**

This is a variable length field that contains zero or more Supported Message ID Tag Length Value (SMID

TLV) structures. The SMID TLV structure is formatted as shown in Figure 57.

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| **Octet: 1** | **1** | **variable** |
| SMID Tag | SMID Length | SMID Values |

**Figure 57—The Supported Message Control Tag Length Value structure**

The SMID Tag field value specifies one of the non-reserved Compact Frame ID values defined in Table 10.

The SMID Length field value specifies the number of octets in the SMID Values field.

The SMID Values field is a list of valid Message ID field values for the associated Compact frame (as

specified by the SMID Tag field) that are supported by the sender.

Instruction to editor: Also change "SMC" to "SMID" on pages 108, 110, 111, 113, 135, and 136:

# CID 454

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| VERSO, BILLY | 454 | 79 | 10.39.3.9 | 6 | Since the secure compact frame enbcapsulates some of the others frames, it may be worth noting that to use the secured version the unsecured version must also be listed…. But …. What if we only want to support the secured version. Maybe we insterad need a 2-bit flag to say for each type whether the secured or unsecured version is to be used. | Add a a 2-bit flag to allow for each SMC TLVs field message to also say whether the secured or unsecured version is to be used….  |

Discussion: Rojan had proposed and the group had accepted a comment resolution before that separates encrypted compact frames into different FrameIDs. Since the FrameID is used as the tag in the TLV structure, no additional bits are necessary to signal support.

Proposed resolution: Rejected.

Disposition detail: Tag is sufficient.

# CID 461

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| VERSO, BILLY | 461 | 80 | 10.39.5 | 28 | Is it a "ranging round" or a sub-round? Maybe just avoid this distinction | Change "the ranging round is completed at this time" to "this MMS UWB ranging exchange finished",  |

Discussion: Seems appropriate to avoid confusion between round and sub-round eventually.

Proposed resolution: Accepted.

Disposition detail: n/a

# CID 12, 470, 115

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| Aldana, Carlos | 12 | 83 | 10.39.8.3 | 20 | In Figure 45, if the response is sent within 18us, LBT is not necessary.  | Add a packet extension to either the end of the first packet or the beginning of the second packet to reduce the gap to less than 18us. |
| VERSO, BILLY | 470 | 83 | 10.39.8.2 | 16 | This talks about skipping for a ranging round, maybe it should be just "for the current ranging exchange", or might imagine the device later in the ranging round, having some ranging sub-rounds allocatged to range to another device and as this is some ms later it may well be successful. | change to "for the current ranging exchange" |
| KREBS, ALEX | 115 | 83 | 10.39.8.3 | 14 | The European Commission (EC) has announced on Feb 7 2025 that [B1] lacks technology neutrality therefore cannot be used to provide a presumption of conformity for NBFH equipment. Therefore 15.4ab devices following the depicted procedure cannot be used for harmonized spectrum access in Europe. Since the EC approval process typically takes 1 year or longer from the time of submission and no submission of a corrected draft of EN 303 687 after [B1] has made so far and no submission is announced or can be expected within the time scope of TG4ab, the invalid section needs correction. | Replace all content of subsection 10.39.8.3 by: If LBT is required before a transmission, either for regulatory reasons or as a coexistence mechanism, then then one of the channel access methods defined in 6.3.2 or 10.45 with CCA mode 1 or 3 shall be applied by initiator and responder independently in each transmission slot, even if the same channel is used in consecutive slots. If LBT is not required, the same methods may be used to improve coexistence with other spectrum users. |

Discussion: In Commission Implementing Decision (EU) 2025/893 of 14 May 2025 the commission has finally voided EN 303 687 V1.1.1 for presumption of conformity with EU law for all NFBH equipment in a legally binding manner. There is no chance to update this released ETSI standard and instead ETSI will have to work on a new V2.X.X standard to fix the existing issues. Therefore not only the 16us timing is incorrect in this section, but the entire paragraph is specifies an incorrect LBT procedure that will have to be replaced in a future EN 303 687 V2.X.X standard. There is no expectation that ETSI TC BRAN can agree on a new V2.X.X standard and the commission can approve such tbd standard within the 802.15.4ab timeline to completion, therefore the LBT procedure in this paragraph should be updated to reference the 802.15.4 native methods with CCA mode 1 or 3 instead.

Proposed resolution: Revised.

Disposition detail: Instruction to editor: Replace all content of subsection 10.39.8.3 by:

If LBT is required before a transmission, either for regulatory reasons or as a coexistence mechanism, then then one of the channel access methods defined in 6.3.2 or 10.45 with CCA mode 1 or 3 shall be applied by initiator and responder independently in each transmission slot, even if the same channel is used in consecutive slots. If LBT is not required, the same methods may be used to improve coexistence with other spectrum users.

# CID 469

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| VERSO, BILLY | 469 | 83 | 10.39.8.2 | 11 | Since it looks like several NB channels starting at channel #50 don't overlap with 20 MHz WiFi, if this is the case maybe these should have some special extra weighting in the hopping algorigm? | Is it worth having special treatment or special usage for these? |

Discussion: Using channels #50-#57 for advertising/initialization in 6 GHz would be a good idea if it were available globally. Unfortunately, it is not available in Europe, and has PSD limitations in the US, and 6 GHz regulatory is undefined in most APAC. We should revisit this question if regulatory changes, but for now there too little certainty about these channels to declare those for advertising.

Proposed resolution: Rejected.

Disposition detail: Regulatory limitations.

# CID 174, 471, 472

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| MAMAN, MICKAEL | 174 | 84 | 10.39.8.4.1 | 10 | the channel switching mechanism dynamically switch among the coordinated channels on each successive ranging round but not block. | change "block" by "round" |
| VERSO, BILLY | 471 | 84 | 10.39.8.4 | 3 | I don't think it is clear where the channel switch occurs, i.e., it seems to be once per ranging block, but what happens when there are multiple ranging rounds involving same or different devices. Initiator may use different rounds to range to different responders, if the switch only happens per block does the initiator and all the responders stay on the same NB channel for the whole block?  | This should be clarified, i.e. stated whether the initiator & multiple responders stay on same channel for the possible multiple ranging rounds and sub-rounds in single ranging block in one to many cases, interleaved and not, or if they switch for each interaction. Ideally some example figures should be added to clarify it. |
| VERSO, BILLY | 472 | 85 | 10.39.8.4.3 | 5 | This is only talking about one initiator and one responder, the other cases should be included too... is there one seed for all nodes in a group so they all follow the hopping, or separate pair for each par of communicating devices. This is complex to specify correctly, and is probably in the domain of the NHL anyway (which knows what is going) to correctly set phyCurrentChannelInfo for the next message it wants to TX or RX. | Probably good to also capture the general operation of switching protocol in these more complex cases.  |

Discussion: This paragraph has been written for one-to-one ranging, where only one round per block is used for a ranging exchanged. Since round numbers are not unique, the channel switching function would not be able to pick more channels than the number of rounds per block, which would be well below 250 in most cases. If a specific non one-to-many ranging mode needs a different channel switching function then a change should/can be proposed against that section. The section referenced here is clearly assigning each block a channel number.

Proposed resolution: Rejected.

Disposition detail: Inefficient.

# CID 175

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| MAMAN, MICKAEL | 175 | 84 | 10.39.8.4.2 | 21 | How all 250 O-QPSK channels can be marked as blocked? At least CH2 and/or CH3 should be available. | add "The macMmsNbChannelAllowList shall at least contain channels 2 and 3". |

Discussion: If the initialization is performed via SP0 UWB (e.g. as referred to on p.73 line 9) then it could be that all NB channels are marked as blocked.

Proposed resolution: Rejected.

Disposition detail: UWB-driven mode.

# CID 94

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| Kivinen, Tero | 94 | 95 | 10.39.11.1.2.1 | 35 | This method does not allow cryptographic algorithm agility, i.e., changing the algorithms in the future.  | Include a method to specify secAeadAlgorithm as specified in the Table 9-9. |

Discussion: I don't see a need for that. Also Table 9-9 in 802.15.4-2024 references a ANA table from 2013 that does not at all contain any cryptographic algorithms. I would suggest 4me fixes the ANA table by introducing the necessary cryptographic algorithms for the base standard first, before we can consider this idea in 4ab.

Proposed resolution: Rejected.

Disposition detail: Unnecessary complication.

# CID 182

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| MAMAN, MICKAEL | 182 | 95 | 10.39.11.1.2.1 | 37 | Higher layer methods may be used to synchronize generation and application of RPA prand values between the initiator and the responder. The method to set or update the RPA PRand is missing. The Higher layer can set or update the RPA Prand PIB with MLME-SET.request primitive in the macIrkDescriptorElement for the associated macIrkEntry IRK stored.  | add at the end of the paragraph the following text "The Higher layer can set or update the RPA Prand PIB with MLME-SET.request primitive in the macIrkDescriptorElement for the associated macIrkEntry IRK stored." |
| MAMAN, MICKAEL | 216 | 144 | 10.39.12 | 22 | missing RPAPrand in MMS related MAC PIB attributes | add a new line in Table 32 macIrkAssocRpaprandpresent|Boolean|TRUE,FALSE| When macIrkAssocRpaprandpresent is TRUE, the macIrkDescriptorElement list has an associated RPA Prand value stored for each macIrkEntry IRK stored. When FALSE, the macIrkDescriptorElement list no associated RPA Prand stored with the IRKs.Add a new line in Table 33macIrkAssocRpaprand| set of octets|0x000000-0xFFFFFF| This RPA Prand value is a 3-octet bit random sequence computed with the associated IRK |

Discussion: Given the implications to user privacy, to which the MAC layer may have no grasp on whatsoever, it's a good idea to delegate the responsibility to create, update, and maintain the RPA Prand values to the higher layer.

Proposed resolution: Accepted.

Disposition detail: n/a

# CID 495

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| VERSO, BILLY | 495 | 96 | 10.39.11.1.2.1 | 7 | "... using one or more IRKs that the receiver assumes..." seems a little vague for a procedure. Probably should refer to the PIB structure where the UL sets the IRK and relevant PRAND to use for the resolving of incoming frames | Update the text to describe the RPA resolution process with reference to the macIrkDescriptor (if this is the appropriate attribute). Consider whether a flow chart or other diagram is needed to clarify. |

Discussion: Ok.

Proposed resolution: Revised.

Disposition detail: Instruction to editor: Change p.96 line 7 as follows:

To resolve the RPA of an incoming packet the receiving device shall compute value(s) for the RPA Hash

field using the IRKs contained in the macIrkEntry attribute for each element in the macIrkList attribute with the

received RPA prand field value communicated over-the-air by the transmitting device.

# CID 27

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| CHITRAKAR, ROJAN | 27 | 97 | 10.39.11.1.3.1 | 16 | The Message Version field doesn't seem to be used in any Compact frame. If it is not used anywhere, its existence is not justified. | Organize the applicable Compact frame variants (e.g., the O2M Poll Compact frame) into various Message Versions based on their intended use, e.g., a basic version, a version used for contention based O2M, a version for time-efficient O2M etc. |

Discussion: Message version use has been proposed in DCN 15-23-258 as a way to maintain backward compatibility and interoperability between devices. E.g. if the POLL frame with MessageControl=0 and MessageVersion=0 is superseded in a future 4ab revision standard by a "better" POLL frame with MessageControl=0 and MessageVersion>0, then this means that the initialization handshake between two devices will result in the initiator using the highest, mutually supported MessageVersion for this compact frame. Currently, there is no "better" POLL frame version, but we still need to define the use of this field to enable this feature in the future. We can add definition of this to the initialization clause.

Proposed resolution: Revised.

Disposition detail: Instruction to editor: Append the following sentence to 10.39.3.9 after p.79 line 6:

To assure interoperability among devices from different standard release generations, for a given Compact Frame ID and Message Control for that all peers have signaled support but with mismatching values for Message Version, all peers shall use the lowest Message Version that is mutually supported by all peers for this Compact Frame ID and Message Control.

# CID 504

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| VERSO, BILLY | 504 | 98 | 10.39.11.1.3.4 | 18 | I am wondering wherher macMmsNbChannelAllowList should be in the MAC or NHL. I think perhaps it should be MAC, with the MAC provding some primitive with state to set the next hop channel, the NHL then knowing it is appropriate to now hip to next channel (because it has reached end of ranging round or block etc, would invole the primitive. Given we are switching between NB and UWB it may be better for the HNL to be in control of setting phyCurrentChanelInfo at the approipriate time for the protocol. | Add primitive to provide the NB channel switch info. This would involve adding new clause 10.39.12 "MAC management service primitives for NBA channel switching" to contain the primitive. Updating to clause 10.39.8.4 to refer to new primitive(s) and incluide a statement that the next higher layer is responsible for setting phyCurrentChanelInfo after invoking the primitive. Finally in this clause 10.39.11.1.3.4 add appropriate text and cross reference to 10.39.8.4 or a subclause there of.  |

Discussion: A simple way to achieve that same goal would be the MLME-SET.request primitive.

Proposed resolution: Revised.

Disposition detail: Instruction to editor: Change 10.39.8.4.1 on p.84 lines 7-14:

This scheme is based on a list of channels that may be used by the initiator and the responder for channel

access. The list-based mechanism defined in 10.39.8.4.2 is used to coordinate a set of channels that may be

used by the initiator and the responder for channel access, and 10.39.8.4.3 specifies the mechanism to

dynamically switch among the coordinated channels on each successive ranging block. The next higher layer may use the MLME-SET.request primitive to update the phyCurrentChannelInfo at appropriate times. The initiator may

update the NB channel used for the current ranging round by including the NB Channel field as one of the

short-term operating parameters in the poll Compact frame as described in 10.39.4.1. The initiator may also

update the list of allowed channels for the next and subsequent ranging rounds by including the NB Channel

Map field as one of the long-term operating parameters in the poll Compact frame as described in 10.39.4.1.

# CID 509

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| VERSO, BILLY | 509 | 104 | 10.39.11.1.3.9 | 5 | is it worth rearanging to place 8-bit fields first so that they are byte octet alinged and pairs of 4-bit fields next, etc. to make software handling that little bit more efficient. | Consider. Then rearrange if worth it. |

Discussion:



has currently bit lengths of [3, 8, 8, 1, 1, 4, 4, 12, 4, 4, 4, 3]

If we moved the red marked fields to the end, it would create more octet-ish alignment. If we additionally move the 1-bit fields first to the end, followed by the 3+8+8 bit fields, we also keep related fields adjacent.

Proposed resolution: Revised.

Disposition detail: Instruction to editor: Change p.104, Figure 66 to the following:

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| Bits: 0-3 | 4-7 | 8-19 | 20-23 | 24-27 | 28-31 | 32-34 | 35 | 36 | 37-39 | 40-47 | 48-55 |
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# CID 509

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| **Name** | **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| MAMAN, MICKAEL | 186 | 105 | 10.39.11.1.3.9 | 9 | one to many Response compact frame instead of Poll | change Poll by Response |

Discussion: Likely an oversight/typo.

Proposed resolution: Accepted.

Disposition detail: n/a