**IEEE P802.15**

**Wireless Personal Area Networks**

|  |  |
| --- | --- |
| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **LB213/D02 comment resolution -- LBT related comments and CRG motion for approval** |
| Date Submitted | September 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”. |
| 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. |

**Table of contents**

[CID 307 (Rejected) 3](#_Toc207647154)

[CID 131, 290 (Revised) 4](#_Toc207647155)

[CID 3, 13 (Revised) 5](#_Toc207647156)

[CID 237 (Revised) 6](#_Toc207647157)

[CID 308, 309, 313 (Rejected) 7](#_Toc207647158)

[CID 236, 292, 271 (Rejected) 8](#_Toc207647159)

[CID 1, 2 (Rejected) 10](#_Toc207647160)

[IEEE 802.15.4ab CRG Motion 11](#_Toc207647161)

# CID 307 (Rejected)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| 307 | 71 | 10.39.3.6 | 33 | Instead of "may", Contention based protocol like LBT shall be mandatory, | as in the comment |

Discussion: The referenced section is about contention based initialization and not about contention based protocols:



Proposed resolution: Rejected.

Disposition detail: The referenced section is about contention based initialization and not about contention based protocols.

# CID 131, 290 (Revised)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| 131 | 83 | 10.39.8.3 | 22 | This mechanism should be an optional feature. Decision on using it or mot should be made according to local regulation. | change 'shall' to 'may' |
| 290 | 83 | 10.39.8.3 | 14 |  The behavior defined in this clause already exists in the standard, though it might not be clear to the reader this is so. Clarify that the methods defined in the standard as Random access methods (6.3.2) can be used to achieve the described behavior. Provide an example using SSBD that meets the timing constraints stated. | Change "then the device shall perform CCA before" to "then one of the channel access methods defined in 6.4.3 shall be used, with CCA mode 1 or 3 used, configured to meet the following constraints:"  |

Discussion: The conditional statement "If LBT is required [...] for regulatory reasons or as a coexistence mechanism, then [...] shall be applied" is unclear because:

1. "regulatory reasons" imply the existence of a legal requirement. Mandating the use of a specific IEEE 802.15.4 method may not meet this requirement. In that case, implementers would have to make a choice between violating regulatory requirements or violating 802.15.4ab requirements.
2. "coexistence reasons" would be for the device/implementer to determine subjectively since no objective (normative) criteria for coexistence exist in the 802.15.4-2024 standard.

The proposed text change clarifies the sentence adequately by suggesting options to meet the requirements if either of the stated conditions carries. See revised text below to merge this proposed changed with the previously agreed changes from 15-25-0307-01-04ab.



Proposed resolution: Revised.

Disposition detail: Instruction to editor: Apply the following changes (redlined against the previously approved 15-25-0307-01-04ab changes against subsection 10.39.8.3):

If LBT is required before a transmission for regulatory reasons then one of the channel access methods defined in 6.3.2 or 10.45 with CCA mode 1 or 3a may 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 3, 13 (Revised)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| 3 | 80 | 10.39.4.2 | 6 | There is no baseline coex mechanism for NB channel access using O-QPSK | Change the "may" to a "shall" to be consistent with ETSI 303687 and adopt changes described in document 15-407-07 |
| 13 | 83 | 10.39.8.3 | 22 | Change the "may" to a "shall" to enable a baseline NB coex mechanism | Change the "may" to a "shall" to be consistent with ETSI 303687 and adopt changes described in document 15-407-07 |

Discussion: The meaning of a "baseline" mechanism is undefined. Instead, there are various coexistence mechanisms defined in the IEEE 802.15-2024 "base standard". The proposed change to make the text "consistent with ETSI 303687" predates the EU commissions decision (EU) 2025/893 of 14 May 2025 that disallows "ETSI 303687" for declaring conformity with the EU regulatory framework. A CRG motion to apply the changes in 15-407-07 has already failed and another TG motion to revise the text as proposed in 15-25-0307-01-04ab has passed. The revised solution follows the updated text of the agreed 15-25-0307-01-04ab resolution and the proposed update in CID 131 in this document.



Proposed resolution: Revised.

Disposition detail: As proposed for CID 131 in this document.

# CID 237 (Revised)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| 237 | 83 | 10.39.8.3 | 22 | Sentence is unclear. What does "according to regulatory constraints" mean?  | Change to :"LBT shall be applied to channel numbers 0 to 249." |

Discussion: The meaning of "LBT" is unclear in the proposed change. Instead, the group has agreed by motion to clarify the section in 15-25-0307-01-04ab by referencing the CSMA/CA and SSBD methods defined in clauses 6.3.2 or 10.45 with CCA mode 1 or 3.

Proposed resolution: Revised.

Disposition detail: As proposed for CID 131 in this document.

# CID 308, 309, 313 (Rejected)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| 308 | 80 | 10.39.4.2 | 6 | channel access shall use contention based protocol for better coexistence. Certain exemption condition may be considered for low duty cycle operation | as in the comment |
| 309 | 80 | 10.38.4.2 | 9 | Mutliple channel access in different NB channels within the same slot can be allowed to increase the chance of transmission | as in the comment |
| 313 | 83 | 10.39.4.2 | 16 | Details of LBT scheme need to be defined such like the energy detection threahold, | as in the comment |

Discussion: No actionable changes proposed.

Proposed resolution: Rejected.

Disposition detail: No actionable changes proposed.

# CID 236, 292, 271 (Rejected)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| 236 | 83 | 10.39.8.3 | 13 | NB coexistence with other technologies in UNII-3 and UNII-5 bands needs to be addressed by defining a mandatory channel access mechanism for NB operation in UNII-3/5, with clear guidance for the implementers.A good option is the LBT mechanism proposed and evaluated in DCN 15-24-212/r5. | 1. Adopt a mandatory coexistence mechanism for NB operation in UNII-3 and UNII-5 bands. 2. Define specific parameters for NB (such as LBT with ED threshold value, CCA duration, etc.)such that they are clear to the implementers.A good proposal is presented and evaluated in DCN 15-24-212/r5. Add the following text from DCN 15-24-212/r5 following:"A NB capable device operating in UNII-3 or UNII-5 band shall measure its NB transmission duty cycle.For a NB capable device, if its NB transmission duty cycle is more than 2.5%, it shall perform listen-before-talk (LBT) before any NB transmission. Otherwise, LBT is optional." |
| 292 | 83 | 10.39.8.3 | 13 | NB coexistence with other technologies in UNII-3 and UNII-5 bands needs to be addressed by defining a mandatory channel access mechanism for NB operation in UNII-3/5, with clear guidance for the implementers.A good option is the LBT mechanism proposed and evaluated in DCN 15-24-212/r5. | Adopt a mandatory coexistence mechanism for NB operation in UNII-3 and UNII-5 bands. A good proposal is presented and evaluated in DCN 15-24-212/r5. Add the following text from DCN 15-24-212/r5:"A NB capable device operating in UNII-3 or UNII-5 band shall measure its NB transmission duty cycle.For a NB capable device, if its NB transmission duty cycle is more than 2.5%, it shall perform listen-before-talk (LBT) before any NB transmission. Otherwise, LBT is optional." |
| 271 | 83 | 10.39.8.3 | 13 | Since WiFi is disallowed to operate in 6GHz band in China, 5GHz UNII 3 band becomes very important for Wi-Fi in China. Therefore, it is better to mandate a coexistence mechanism between NB and Wi-Fi devices in 5GHz UNII 3 band even if this mandatory requirement is not specified in the regulations.  | Change the sentence to "If LBT is required before a transmission, either for regulatory reasons or as a coexistence mechanism, then the device shall perform CCA before each O-QPSK PHY transmission." |

Discussion: The proposed resolutions for CIDs 236 and 292 violate FCC regulatory requirements for the 6 GHz UNII-5 band in 47 CFR Part 15, subpart E, section 15.407, clause (d)(6) that require to employ a contention based protocol for radio equipment operation with less than 2.5% duty cycle. Regarding CID 271, the proposed change would specifically deprioritize 15.4ab operation in an ISM band in China. The proposed change would further restrict 802.15.4ab operation with 14 dBm eirp to 2.5% duty cycle while China's MIIT regulation No 129 allows WLAN operation in the UNII-3 band with up to 33 dBm output power and 10% duty cycle for short control signaling (SCS) without LBT. Noting that WLAN is permitted to operate in China also in the UNII-1, UNII-2a, and UNII-3 bands, but UNII-3 is an ISM band and the only possible band for 802.15.4ab operation in China. The proposed change would add additional restrictions for 802.15.4ab devices in the only accessible band in China.

Proposed resolution: Rejected.

Disposition detail: Proposed change contradicts regulatory rules in the US and adds more constraints to already much restricted very low power operation for 802.15.4ab in the only accessible band in China.

# CID 1, 2 (Rejected)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Index #** | **Page** | **Sub-clause** | **Line #** | **Comment** | **Proposed Change** |
| 1 |  | 10.39.8.3  |  | CCA with energy detect is currently optional for NB transmissions. This implies that there is no assurance that NB transmissions will defer for ongoing Wi-Fi transmissions. | Make CCA based on energy detect mandatory for NB transmissions in channels 0-249, so that the spectrum can be shared with other technologies. Changes can be made per 15-25-0099-01-04ab-multiple-cca-for-nb or one of its revisions, which also proposes to reduce the impact of CCA busy events. |
| 2 |  | 10.39.8.3  |  | The absence of retries in the protocol design makes that any NB packet loss or CCA busy before an NB transmission causes a high penalty, because the entire exchange may be lost. | To increase the resilience of the protocol against interference or CCA busies without building retries into the protocol, a possible consideration might be to allow for more than one CCA before an NB transmission or transmission sequence. A work in progress on this topic is 15-25-0099-01-04ab-multiple-cca-for-nb or one of its revisions. Adopt this document or one of its revisions in 802.15.4ab. |

Discussion: The comments states 15-25-0099-01-04ab is a work in progress document. It appears technically incomplete by proposing text changes such as "[Need to define a negotiated time between transmitter and receiver for being at the next channel.]" and "[Need to add a maximum energy detect threshold.]". The document has not been updated since March 2025 and appears to be superseded by 15-25-0426-00-04ab, eventually.

Proposed resolution: Rejected.

Disposition detail: Proposed text changes are technically incomplete.

# IEEE 802.15.4ab CRG Motion

Motion: Move to approve comment resolutions proposed in 15-25-0427-02-04ab.

Moved:

Seconded:

Discussion:

Result: