**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **DraftC comment resolution - NB channel access - CIDs 149, 161** |
| Date Submitted | May 02, 2024 |
| Sources | Alex Krebs (Apple)  krebs @ apple.com |
| Re: |  |
| Abstract |  |
| Purpose | To propose resolution for MMS related comments for “P802.15.4ab™/D (pre-ballot) C Draft Standard for Low-Rate Wireless Networks”. |
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Abstract

This submission contains the proposed comment resolutions for 802.15.4ab pre-ballot DraftC

R0: initial document

R1: updated CID 161 following offline discussion with commenter

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| **Name** | **CID** | **p.** | **Sub-clause** | **l.** | **Comment** | **Proposed Change** | **Proposed Resolution** |
| Benjamin Rolfe | 149 | 51 | 10.38.4.2 | 8 | Technically unclear, possible incorrect, and use of "shall not" to instead of properly specifying the requirement. Not sure what 'warrant the transmission" means but interpreting it to mean that if channel access fails at the beginning of the ranging slot, This seems a bit extreme to silence the device for the remainder of the entire ranging round though. Should it be just for one slot? | Change to: When channel access returns FAILURE, the transmission attempt shall be terminated and no further transmissions attempted for the remainder of the ranging round. | Accept. (also see discussion below) |
| Benjamin Rolfe | 161 | 57 | 10.38.8.3 | 13 | The behavior defined in this clause already exists in the standard. Use one of the existing channel access methods, defining the control parameters to use to achieve the desired behavior. Unslotted CSMA or SSBD are the optimal choices. For example using SSBD we set | Replace clause text:  Channel access using listen before talk may be required by regulatory domains, and/or may be desired for improved coexistence performance. When used for narrow band assist SSBD as defined in 6.2.2.2 is recommended using the following control attribute values: phyCcaDuration should be set to less than 16 microseconds or as required by local regulations; macSsbdUnitBackoffPeriod should be set to 1 (microsecond); macSsbdMinBf and macSsbdMaxBf should be set to 1; macSsbdMaxBackoffs should be set to 1; macSsbdTxOnEnd should be set to FALSE; phyCcaMode should be set to 1 (energy above threshold) Note: use of these settings assures the channel access attempt will complete within 16 microseconds. With these attribute values, channel access will return Success when CCA indicates clear, and Failure when energy above the detection threshold is detected. When channel access returns Failure, the radio shall defer transmission for the current ranging block. Figure 35 illustrates this channel access for the two-sided packet exchange across two consecutive ranging slots between the initiator and responder, as needed during the UWB MMS control phase. The timings shown in Figure 35 are based on information in [B3]. LBT shall used when required by regulatory constraints. LBT may be used to all channels in the absence of regulatory constraints, for example, to improve coexistence with other spectrum users. When used, LBT shall be performed by initiator and responder independently in each transmission slot, even if the same channel is used consecutively. And update the figure as needed | Revise (see below) |

Discussion: "This seems a bit extreme to silence the device for the remainder of the entire ranging round though. Should it be just for one slot?" NBA cannot do retries after CCA busy in a contention window with typical maximum allowed delay of <16us after CCA clear, since the NB packet is phase coherently coupled with the UWB radio and the transmission time of the UWB fragments changes the RMARKER position therefore invalidating the ToF measurement, and 16us is practically infeasible to achieve a phase coherent rescheduling and of the NBA-UWB concurrent radio operation. The idea of "deferring by one slot" would allow enough time to reschedule the radios but is not aligned with the 802.15.4z concept of the block-based MAC, and the block-based MAC is a very useful concept for device internal coexistence with other radios (cf. discussions interval-based vs scheduling-based MAC in 802.15.4z). Concluding, the mandatory "give-up on CCA busy" statement here makes sure that the receiving device is not waiting unnecessarily long for incoming NB transmission after beginning of the slot, thereby reducing power consumption and RX complexity.

Offline discussion: Proposed values by commenter lead to undesirable 0-1us random backoffs, but can be corrected by below revised disposition detail.

Disposition detail (CID 161):

Replace clause text:   
Channel access using listen before talk may be required by regulatory domains, and/or may be desired for improved coexistence performance. When used for narrow band assist SSBD as defined in 6.2.2.2 is recommended using the following control attribute values:  
phyCcaDuration as required by local regulations;  
  
macSsbdMinBf and macSsbdMaxBf should be set to 0;  
macSsbdMaxBackoffs should be set to 0;  
macSsbdTxOnEnd should be set to FALSE;  
phyCcaMode should be set to 1 (energy above threshold)  
Note:   
With these attribute values, channel access will return Success when CCA indicates clear, and Failure when energy above the detection threshold is detected. When channel access returns Failure, the radio shall defer transmission for the current ranging block.  
  
LBT shall used when required by regulatory constraints. LBT may be used to all channels in the absence of regulatory constraints, for example, to improve coexistence with other spectrum users. When used, LBT shall be performed by initiator and responder independently in each transmission slot, even if the same channel is used consecutively.

Note to the editor: (replacing clause text includes removal of Figure 35 and deprecates reference [B3])

*Additional instruction to the editor: Change "Range" in Table 8-35 on p.23 as follows:*

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| --- | --- | --- | --- | --- |
| **Attribute** | **Type** | **Range** | **Description** | **Default** |
| ... | | | | |
| macSsbdMaxBf | Integer | 0-63 | The maximum value of the backoff  factor (BF) in the SSBD algorithm  as described in 6.2.2.2. | 5 |
| macSsbdMaxBackoffs | Integer | 0-255 | The maximum number of deferral  iterations the SSBD algorithm will  attempt before exiting. | 5 |
| macSsbdMinBf | Integer | 0-macSsbdMaxBf | The minimum value of the backoff  factor (BF) in the SSBD algorithm  as described in 6.2.2.2 | 1 |