IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Proposed CR for Clause 35.3.16.6 | | | | |
| Date: 2023-07-05 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Dmitry Akhmetov | Intel Corporation |  |  | Dmitry.akhmetov@intel.com |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission addresses the following CIDs relative to 11be draft 2.2.

15680

15749

16243

16244

16305

16306

16311

16889

16890

16891

16892

15226

15726

18012

Revisions:

* Rev 0: Initial version of the document.
* Rev 1. Added SP text
* Rev 2. Added CIDs 15226, 15726, 18012
* Rev 3. Minor correctios for CID (# 16890),
* Rev4 Minor corrections/typos
* Rev5. Mistyped (#16891) instead of (#16305) for the corresponding changes of CID 16305

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Comment** | **Proposed Change** | **Resolution** |
| 15680 | Yanchao Xu | For the NSTR, the below paragraph allows the STA perform a new backoff procedure when STA has already a backoff counter of 0. "A STA with backoff counter that has already reached zero and that chose not to transmit following condition 1b) may perform a new backoff procedure following deferral as described in 10.23.2.4 (Obtaining an EDCA TXOP) and 10.3.4.3 (Backoff procedure for DCF) before being allowed to initiate transmission on a link following condition 1a)."  But the legacy EDCAF (10.23.2.4) operations shall be performed at certian specific slot boudnaries (as in 10.23.2.4). And at those existing slot boundaries, there is no one existing slot boudnary that can let STA "perform a new backoff procedure". | As comments, the proposed changes can be one of the followings, 1. define a new slot boundary in 10.23.2.4 to allow to "perform/invoke a new backff procedure". For example, this slot boundary can be "Followling a SlotTime of idle medium after the (NSTR) STA chose not to transmit and tries to perform a new backoff procedure";  2. On those existing specific slot boudaries, besides the following existing functions (10.2.3.2.4) that EDCAF can make, -- Decrement the backoff counter. -- (#109)Initiate a frame exchange sequence. -- Invoke the backoff procedure due to an internal collision. -- Do nothing   define a new function that the EDCAF can make, as follow -- Invoke the backoff procedure due to the NSTR STA deferral as in 35.3.16.6 | Rejected  A STA that decided to perform SYNC Start transmission and that reached zero on a link still required to track medium state. That sensing is not different from sensing a STA is performing during regular channel access procedure, i.e. STA is aware about current slot boundaries. So when STA decide not o transmit using condition 1b), it simply start new BK procedure using know slot boundaries |
| 15749 | Yanchao Xu | For the NSTR transmission, the Start Time of PPDUs on NSTR links can have a delta/offset (up to 4us), as the below paragrah, "The STA with backoff counter that has already reached zero and is initiating transmission following condition b) is not mandated to initiate transmission on a slot boundary of the link on which the STA operates. The STA that is initiating transmission following condition b) shall commence the transmission no later than 4 Âµs following slot boundary of the link on which the other STA whose backoff counter reaches zero operates"  For the current device's CCA mechanism, if the STA0 on link0 is anticipated to start a later transmission than the other STA1 on link1, it has high propability that the STA0's CCA mechansim may falsely trigger CCA busy caused by the transmission of PPDU of STA1 on link1. And STA0 will stop the transmission. | As comments, there should be mechanism to allow STA1's transmission with the CCA busy caused by STA1's earlier transmission.  The simpliest proposed change is to make STA be able to ignore the ED-CCA or medium status when this STA is initiating transmission for the case in this paragraph." | Rejected  No need to define new rules.  It is reasonable to expect that STAs of an MLD which decided to initiate SYNC start transmission are aware about each other BK process.  A STA on link 1 may have BK aready at zero waiting for STA on a link 2 to finish its contention.  When STA on a link 2 completes its countdown, it will a) in some implementation specific way contact STA on link 1 and b) initiate transmission on a link 2.  The signal from STA on a link 2 will initiate transmission on link 1. The determination whetrer medium is busy or IDLE is done at the slot boundary. |
| 16243 | Stephen McCann | "reaches zero" should be "equal to 0" | Change the initial part of the cited sentence to "When the backoff counter of the STA is equal to zero...". | Rejected  In many places in a spec we use same wording as “reaches value”. |
| 16244 | Stephen McCann | The sentence starting "A STA with backoff counter..." is not required, as it repeats the statement in item 1) | Delete the cited sentence (the 2nd sentence in item 2)). | Rejected  Commented failed to identify the issue  There is no sentence that start with “A STA with backoff counter” in item 1). The sentence that start with “A STA with backoff counter” in item 2) required to specify the behavior of a STA that reached zero a while ago |
| 16305 | Juseong Moon | For clear description of start time sync PPDUs access, the text should be described with per-EDCAF operation. | An EDCAF of a STA affiliated with an MLD operating on a link that is part of an NSTR link pair for that MLD shall follow the channel access procedure described below: 1) The EDCAF of the STA may initiate transmission on a link when the medium is idle as indicated by the physical and virtual CS mechanism and one of the following conditions is met: a) The EDCAF of the STA obtained an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP). b) The backoff counter of the STA's EDCAF is already zero, and and the EDCAF of the STA operating on the other link of NSTR link pair of the affiliated MLD obtains an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP). 2) When the backoff counter of the EDCAF reaches zero, it may choose to not transmit and keep its backoff counter at zero. An EDCAF with backoff counter that has already reached zero may initiate transmission only following condition 1b). 3) An EDCAF with backoff counter that has already reached zero and that chose not to transmit following condition 1b) may perform a new backoff procedure following deferral as described in 10.23.2.4 (Obtaining an EDCA TXOP) and 10.3.4.3 (Backoff procedure for DCF) before being allowed to initiate transmission on a link following condition 1a). In such a case, CW[AC] and QSRC[AC] are left unchanged.   NOTE 1--The backoff counters of EDCAFs for each link count down as specified in 10.23.2.4 (Obtaining an EDCA TXOP). NOTE 2--The decision to choose to not transmit when the backoff counter of EDCAF(s) of the STA reaches zero as in 2) or to perform a new backoff procedure to be allowed to initiate transmission following condition 1a) as in 3) is implementation specific. | Revised  Agree in principle.  **TGbe editor:** Apply the changes tagged with #16305 in this document |
| 16306 | Juseong Moon | While a STA of a STA MLD's multiple EDCAFs with backoff counter 0 are waiting for the other STA of the same STA MLD's backoff counter becomes 0, another STA MLD can transmit instead of the same STA MLD. In this case the STA of the STA MLD with multiple EDCAFs' backoff counter 0 should follow channel access as defined in 10.23.2.4, which does not define invoking EDCA backoff. As a result the STA's multiple EDCAFs with backoff counter 0 will transmit frames without invoking a new backoff, which can cause collision. | An EDCAF of a STA with backoff counter that has already reached zero on a link and has a frame available for transmission shall (#12414)invoke backoff described in 10.23.2.2 (EDCA backoff procedure) with event a) after it detects medium transition from idle to busy and it shall follow channel access procedures described in 10.23.2.4 (Obtaining an EDCA TXOP) after it detects medium transition from busy to idle | Rejected  The behavior of the “other” EDCAFs thar did not gain EDCA TXOP is covered by bullet (3) and paragraph on line 17.  Per (3) it may keep its backoff counter at zero. If an EDCAF is not selected for transmission, it either may chose to keep counter at zero or invoke backoff procedure.  A STA after transmission from selected EDCAF will observe (mostlikely) medium BUSY condition which eventually change to IDLE. Per paragraph on line 17, this will trigger behaviour described in 10.23.2.4 |
| 16311 | Juseong Moon | When NSTR link pairs are more than 2, more description is requied to cover more cases including backoff status. | Please extend condition 1b) as:  "b) The backoff counter of the STA is already zero, and the STA operating on the other link of NSTR link pair of the affiliated MLD obtains an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP)."  To:  "b1) The backoff counter of the STA is already zero, and the STA operating on the other link of NSTR link pair of the affiliated MLD obtains an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP) b2) The backoff counter of the STA is already zero, and the STA operating on the other link of NSTR link pair of the affiliated MLD obtains an EDCA TXOP following condition b1)" | Rejected  Similar (identical) comment was reviewd during CR for LB266. The group hold a vote and decided not to implement additional rules for the case when NSTR link pairs is more than 2 |
| 16889 | Mark RISON | "NOTE 2--The decision to choose to not transmit when the backoff counter of the STA reaches zero as in 2) or to perform a new backoff procedure to be allowed to initiate transmission following condition 1a) as in 3) is implementation specific." -- why would a STA ever want to redo backoff if it's not required to? This just reduces its throughput and increases its latency | Delete this NOTE and item 3) above | Rejected  NOTE 2 and item 3 explain the STA behavior in case when STA change its initial decision to perform SYNC START time. How STA changes its decision from “WAIT” to “TX without SYNC” shall not be specified and but the transmission need to account for new contention in such a case  Example: Consider a case with a number of .11be STAs that follow that procedure. STA on a link 1 of MLD1 count down BK to zero and made a dicision to wait for a STA on link 2. Same decision made STAs of MLD2, 3 and 4. Unfortunately, STAs operating on link 2 see CCA busy signal and their respective STAs on link 1 decided not to wait anymore. Their BK=0. Withoun new BK they start transmission and collide. |
| 16890 | Mark RISON | "condition a) or b)" is not clear | Change to "condition 1a) or 1b)". Ditto 2x first para on next page | Revise  **TGbe editor:** Apply the changes tagged with #16890 in this document |
| 16891 | Mark RISON | "on a link of NSTR link pair" missing article | Add "an" before "NSTR" | Revised  **TGbe editor:** Apply the changes tagged with #16891 in this document |
| 16892 | Mark RISON | "shall follow channel access procedures" missing article | As it says in the comment | Revised  **TGbe editor:** Apply the changes tagged with #16892 in this document |
| 15226 | Akira Kishida | In the sentence of 35.3.16.7, "b)The backoff counter of the STA is already zero, and the STA operating on the other link of NSTR link pair of the affiliated MLD obtains an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP).",  As the case of the condition of the NSTR STA can transmit frames, following the condition should be considered in addition to the state of (b);  NSTR STA can obtain TXOP for the transmission if the other STA defers its transmission. | As in comment | Rejected  Commented failed to identify the issue.  First, the comment is about clause 35.3.16.6 and not about 35.2.16.7  Second, deferring transmission on one link (i.e. holding BK at zero and transmitting) is the way to organized synchronous TX from both STAs operating on NSTR link pair and that what the STA with BK==0 is actually doing as explained in (2) |
| 15726 | KENGO NAGATA | "A STA affiliated with an MLD operating on a link that is part of an NSTR link pair for that MLD shall follow the channel access procedure described below: 1)The STA may initiate transmission on a link when the medium is idle as indicated by the physical and virtual CS mechanism and one of the following conditions is met: a)The STA obtained an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP). b)The backoff counter of the STA is already zero, and the STA operating on the other link of NSTR link pair of the affiliated MLD obtains an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP)." The intention of the condition 1a) is not clear. There would be some different channel status on the other link of the NSTR link pair which may prevent the transmission on the link. For example, the other link might be busy due to a transmission addressed to the MLD. In this situation, the STA which obtained an EDCA TXOP should not initiate transmission which cause interference on the other link. | "a)The STA obtained an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP), and  the STA operating on the other link of NSTR link pair of the affiliated MLD has not been receiving any frames addressed to the STA." | Rejected.  A STA has a choice to either TX on a link , if it obtained TXOP using regular contention (default behavior, condition (a)) or it may chose not to TX to organize sync transmission with the other STA.  A STA that counted down BK may decide to TX regardless of the status of the other link – this is completely implementation choise. |
| 18012 | Yusuke Asai | In 35.3.16.7, "b)The backoff counter of the STA is already zero, and the STA operating on the other link of NSTR link pair of the affiliated MLD obtains an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP)." To allow the NSTR STA to transmit transmit frames in this case, the following condition should be added.  "An NSTR STA can obtain an EDCA TXOP for the transmission when the other STA defers its transmission." | As in comment | Rejected.  No need to add any extra conditions. As explained in (2) , the STA that counted BK down may choose not to TX.  This is, I believe, effectively what commenter is asking  Contitions a) and B0 only explain that STA can TX either when it counted down BK to zero (a) or when STAs BK already ==0 (i.e. STA counted it down some time ago and deferred its TX) and another STA just counted down its BK |

***TGbe editor: revise the following text in 35.3.16.6 Start time sync PPDUs medium access of 11be draft 3.2 as:***

Each STA affiliated with an MLD operating on a pair of NSTR links for that MLD that aligns the start times of the PPDUs scheduled for transmission on more than one link shall ensure that the EDCA rules on each link permit access to the medium on all the links at the time of issuance of the PHY-TXSTART.request for each link.

An EDCAF of a (#16305)STA affiliated with an MLD operating on a link that is part of an NSTR link pair for that MLD shall follow the channel access procedure described below:

1) The EDCAF of a(#16305) STA may initiate transmission on a link when the medium is idle as indicated by the physical and virtual CS mechanism and one of the following conditions is met:

a) The EDCAF of a (#16305)STA obtained an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP).

b) The backoff counter of the STA’s EDCAF (#16305) is already zero, and the EDCAF of the (#16305)STA operating on the other link of NSTR link pair of the affiliated MLD obtains an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP).

2) When the backoff counter of the EDCAF (#16305)reaches zero, it may choose to not transmit and keep its backoff counter at zero. An EDCAF (#16305)with backoff counter that has already reached zero may initiate transmission only following condition 1b).

3) An EDCAF (#16305)with backoff counter that has already reached zero and that chose not to transmit following condition 1b) may perform a new backoff procedure following deferral as described in 10.23.2.4 (Obtaining an EDCA TXOP) and 10.3.4.3 (Backoff procedure for DCF) before being allowed to initiate transmission on a link following condition 1a). In such a case, CW[AC] and QSRC[AC] are left unchanged.

NOTE 1—The backoff counters for each link count down as specified in 10.23.2.4 (Obtaining an EDCA TXOP)

NOTE 2—The decision to choose to not transmit when the backoff counter of the EDCAF(s) (#16305)reaches zero as in 2) or to perform a new backoff procedure to be allowed to initiate transmission following condition 1a) as in 3) is implementation specific.

A STA that chooses not to transmit after the backoff counter reached zero on a link of an (#16891)NSTR link pair may have one or more EDCAF backoff counters with value zero on that link. The STA that initiates transmission on that link following condition 1a) or 1b)(# 16890), and has one or more EDCAF backoff counters that already reached zero shall choose only one EDCAF to gain an EDCA TXOP. The basis for selection is implementation specific.

An EDCAF (#16305)with backoff counter that has already reached zero on a link and has a frame available for transmission shall follow the (#16892) channel access procedures described in 10.23.2.4 (Obtaining an EDCA TXOP) after it detects medium transition from busy to idle.

The EDCAF(#16305) with backoff counter that has already reached zero and is initiating transmission following condition 1b) (# 16890), is not mandated to initiate transmission on a slot boundary of the link on which the STA operates. The EDCAF(#16305) that is initiating transmission following condition 1b) (# 16890), shall commence the transmission no later than 4 µs following slot boundary of the link on which the other STA whose EDCAF(#16305)backoff counter reaches zero operates.

NOTE 3—The value of 4 µs is derived from aRxTxTurnaroundTime being equal to 4 µs for the purpose of this requirement.

(14 CIDs)

SP:

Do you support to incorporate the changes proposed by the following CIDs in 11/1151r4:

15680, 15749, 16243, 16244, 16305, 1630, 16311, 16889, 16890, 16891, 16892,

15226, 15726, 18012