IEEE P802.11
Wireless LANs

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| Proposed CR for Clause 35.3.15.6. Sync PPDU start time |
| Date: 2021-09-23 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Dmitry Akhmetov | Intel Corporation |  |  | Dmitry.akhmetov@intel.com |
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Abstract

This submission proposes comment resolutions for the following CIDs related to 35.3.15.6 Start time sync PPDUs medium access in CC36:

Revisions:

* Rev 0: Initial version of the document.

4482

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| **CID** | **Commenter** | **Clause Number** | **Comment** | **Proposed Change** | **Resolution** |
| 4482 | Arik Klein | 35.3.14.6 | The "non-STR" term shall be replaced with NSTR in the following sentence "A \*non-STR\* MLD contending for the WM to become a TXOP holder ..." | As in comment | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 4483 | Arik Klein | 35.3.14.6 | The "non-STR" term shall be replaced with NSTR in the following sentence "A STA that is affiliated with a \*non-STR\* MLD shall follow ..." | As in comment | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 6316 | Ming Gan | 35.3.14.6 | it is not clear for "another STA of the affiliated MLD", please use NSTR link pair | as in the comment | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 6317 | Ming Gan | 35.3.14.6 | Add "and did not transmit a frame", otherwise, this bullet is broken | as in the comment | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 6383 | Morteza Mehrnoush | 35.3.14.6 | Please change the non-STR to NSTR.Also change the non-STR in line 22. | as in comment | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 6771 | Romain GUIGNARD | 35.3.14.6 | Please change non-STR to NSTR in this subclause | as in comment | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 6773 | Romain GUIGNARD | 35.3.14.6 | The concept of NSTR MLD or NSTR non-AP MLD is not defined in the document. Currently, NSTR link pair and STA NSTR limited are defined. | Please define NSTR MLD and NSTR non-AP MLD or change the wording by using A STA affiliated with a non-AP MLD that belongs to a NSTR link pair instead of NSTR MLD | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 7871 | Yongho Kim | 35.3.14.6 | For multi-link synchronous PPDUs transmission, there is a case to choose to not transmit and keep its backoff counter at zero while waiting for the other link's backoff success. While waiting with backoff counter at zero for the AC, the other AC's backoff counter can reach zero on the same link. In this case, two ACs' backoff counter has reached zero value on a link while waiting for the other link's backoff success. This can be a case of internal collision: one AC's backoff counter is already zero and the other AC's backoff counter has become zero. A rule for a internal collision resolution needs to be defined. | As in the comment. | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 8249 | Yuxin LU | 35.3.14.6 Start time sync PPDUs medium access | Suggest to unify the use of "non-STR" and "NSTR" in multiple places to avoid inconsistency | As in comment | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 8347 | Zhiqiang Han | 35.3.14.6 | The spec doesn't define EDCA count down procedure. It's better to use EDCA backoff procedure. And Different links have different EDCA count down procedure,It's better to change "the EDCA count down procedureis completed in all the links." to " the EDCA count down procedures are completed in all the links." | as in comment. | Revised.This is already addressed in draft 1.5Tgbe editor: no further action needed |
| 4233 | Alfred Asterjadhi | 35.3.14.6 | The procedure described below is not a channel access procedure. It is a list of advisory statements. Please call out explicitly what the rules are (rely on baseline EDCA as much as possible and add these as exceptions or smth). | As in comment. | RevisedAgree in principle, Reformatted the text to bring clarityTGbe editor to make the changes with the CID tag (#4233) in doc.: IEEE 802.11-20/1575r0[https://mentor.ieee.org/802.11/dcn/21/11-21-1575-00-00be-cc36-cr-for-clause-35-3-15-6-sync-ppdu-start-time.docx] |
| 4412 | Arik Klein | 35.3.14.6 | The following 2 sentences refer to the case where the backoff counter reaches zero:- "When the backoff counter of the STA reaches zero, it may choose to not transmit and keep its backoff counter at zero"- "If the backoff counter of the STA has already reached zero, it may perform a new backoff procedure."Need to add conditions/scenarios when the STA may keep the backoff counter at zero and when it may perform a new backoff procedure. | Add clear definitions when a sTA that is affiliated with NSTR non-AP MLD and its backoff counter has reached zero on one of the links, may keep the counter at zero and when it may perform a new backoff procedure | Revised,Reformatted text, to bring clarityAdded statements in (2) and in (3) explaining behavior when STA can transmit following condition (a) or (b)TGbe editor to make the changes with the CID tag (#4412) in doc.: IEEE 802.11-20/1575r0[https://mentor.ieee.org/802.11/dcn/21/11-21-1575-00-00be-cc36-cr-for-clause-35-3-15-6-sync-ppdu-start-time.docx] |
| 4753 | Chunyu Hu | 35.3.14.6 | Accepted text from 11-21/514r10 has some descriptions that overlap and needs improvement for clarity. There is this paragraph "A STA with backoff counter that has already reached zero on a link and has a frame available for transmission shall follow channel access procedures described 10.23.2.4. (Obtaining an EDCA TXOP) after it detect medium transition from busy to idle. (#1511, 3205)", and there is a preceeding note: "Note 1: A STA with backoff counter that has already reached zero and there is a frame available for transmission performs a new backoff procedure before being allowed to initiate transmission on a link following condition (a) (#3399)." The note describe a general case and the first paragraph mentioned here describes a casee under the same category but specifically about "when the medium transitions from busy to idle". Both both eventually just point to the same reference 10.24.2.4. Why not merge the two? And why one is in note and one is as normative text? | As commented | RevisedAgree in principle, reformatted text to bring clarityThe Note 1 in the comment (Note 2 in the spec text) refer to a case if STA with bk==0 change its mind and do not want to initiate transmission following condition (b). In such a case, STA need to perform new backoff to be able to TX under condition (a)The paragraph, on the other hand say that if a STA with bk==0 observe change of medium state from busy to idle, it shall follow baseline procedure and start new backoff. These are two similar pieces of text to address two different situationsMerget old Note 2 with numbered paragraph (3)TGbe editor to make the changes with the CID tag (#4753) in doc.: IEEE 802.11-20/1575r0[https://mentor.ieee.org/802.11/dcn/21/11-21-1575-00-00be-cc36-cr-for-clause-35-3-15-6-sync-ppdu-start-time.docx] |
| 7787 | Yanchao Xu | 35.3.14.6 | It's not very clear to understand the wording of the rules to make PPDU Start Time Sync on more than one link.The current spec description is as follow, "A STA that is affiliated with a non-STR MLD shall follow the channel access procedure described below: a.) -- The STA may initiate transmission on a link when the medium is idle and one of the following conditions is met: a.1) \* The backoff counter of the STA reaches zero on a slot boundary of that link. a.2) \* The backoff counter of the STA is already zero, and the backoff counter of another STA of the affiliated MLD reaches zero on a slot boundary of the link that the other STA operates.b.) -- When the backoff counter of the STA reaches zero, it may choose to not transmit and keep its backoff counter at zero.c.) -- If the backoff counter of the STA has already reached zero, it may perform a new backoff procedure. CW[AC] and QSRC[AC] are left unchangedFor example, the first bullet a.) and the second bullet b.) are exclusive. If the first bullet a.) is selected, and the sub-bullet a.1) is selected, the STA can transmit even the EDCA of the other link is not completed. But the key point of the 35.3.14.6 is about how to make PPDU Start Time Sync on more than one link. It can cause confusions for people as the selection of a) and a.1) only allows transmission on one link. | The 35.3.14.6 shall only include the rules that can make PPDU Start Time sync on more than one link.A proposed change is,If a NSTR MLD needs align the start times of thePPDUs scheduled for transmission on more than one link, it shall follow all the channel access procedures described below:a.) the EDCA count down procedureis completed in all the linksb.) if EDCA on one link is completed and the EDCA on other link(s) is not completed, it shall follow one of the followings until rule a.) is satisfied, - b.1) keep backoff counter zero on that link - b.2) invoke a new backoff on that link. And CW[AC] and QSRC[AC] are left unchanged | Revised, Reformatted the text to add more clarity Existing text clearly say that STA can initiate transmission in two cases: 1a) – right after completing EDCA backoff on a link it operates and 1b) right after another STA of the same MLD on another link completes EDCA backoff and the former STA already completed backoff.In (2) we provide a mechanism for a STA to wait for the completion of contention on another linkIn (3) we provide a mechanism for a STA to transmit on its own (i.e. using 1a) condition ) in case if for some reasons STA on a link no longer wish to align PPDUs start timesTGbe editor to make the changes with the CID tag (#7787) in doc.: IEEE 802.11-20/1575r0[https://mentor.ieee.org/802.11/dcn/21/11-21-1575-00-00be-cc36-cr-for-clause-35-3-15-6-sync-ppdu-start-time.docx] |
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| 8040 | Yuchen Guo | 35.3.14.6 | The 2nd and 3rd bullets of this paragraph should have some dependency, e.g., the condition in the 3rd bullet can be a result of the 2nd bullet. However, the current text does not reflect that. | add "due to the NSTR deferral as described in 35.3.14.3 (Nonsimultaneous transmit and receive(NSTR) operation)" after "reached zero". Or, add some text to clarify the relationship between the 2nd and the 3rd bullet. | Revised,Reformatted text to bring clarityTGbe editor to make the changes with the CID tag (#8040) in doc.: IEEE 802.11-20/1575r0[https://mentor.ieee.org/802.11/dcn/21/11-21-1575-00-00be-cc36-cr-for-clause-35-3-15-6-sync-ppdu-start-time.docx] |
| 8348 | Zhiqiang Han | 35.3.14.6 | The use case to which thie bullet applies is not clear. In which cases, the STA shall perform a new backoff procedure? | Please clarify it | Revised,Reformatted text, to bring clarityTGbe editor to make the changes with the CID tag (#8348) in doc.: IEEE 802.11-20/1575r0[https://mentor.ieee.org/802.11/dcn/21/11-21-1575-00-00be-cc36-cr-for-clause-35-3-15-6-sync-ppdu-start-time.docx] |
| 4413 | Arik Klein | 35.3.14.6 | The sentence " CW[AC] and QSRC[AC] are left unchanged" does not state any normative behaviour and need to specfiy when it is applied. | 1. If it is mandatory that the values of CW[AC] and QSRC[AC] should be left unchanged - please rephrase the sentence as follows: "In such a case, the values of CW[AC] and QSRC[AC] shall be left unchanged"2. If it is optional that the values of of CW[AC] and QSRC[AC] should be left unchanged - please rephrase the sentence as follows: "In such a case, the values of CW[AC] and QSRC[AC] should be left unchanged" | Accepted.Change text to “In such a case, the values of CW[AC] and QSRC[AC] shall be left unchanged”TGbe editor to make the changes with the CID tag (#4413) in doc.: IEEE 802.11-20/1575r0[https://mentor.ieee.org/802.11/dcn/21/11-21-1575-00-00be-cc36-cr-for-clause-35-3-15-6-sync-ppdu-start-time.docx] |
| 5897 | Liangxiao Xin | 35.3.14.6 | 11be D1.0 says an MLD shall wait for expiration of the largest number of backoff counters of STAs. This may cause long delay to start transmission of the PPDUs and may lead STA to loose its transmission opportunity. | Add a note: when a non-STR MLD invokes backoff procedures with the same CW on different links at the same time, it may generate one random value to initialize the backoff counters on those links. | RejectedGroup reached consensus on document 0974r4 with 21Y/34N count. There were no other contributions/discussions/follow ups on this idea. |
| 7608 | Tomoko Adachi | 35.3.14.6 | This mechanism is for NSTR. So, this subclause should be under 35.3.14.3. | As in comment. | RejectedThe subclause describes one mechanism out of many for multi-link channel access and therefore should be in clause 35.3.15 |

**TGbe Editor to make the following changes in Subclause 35.3.15.6: of Draft 1. 5**

**35.3.15.6 Start time sync PPDUs medium access**

Each STA of an MLD operating on a pair of NSTR links for that MLD that aligns the start times of 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.

A STA of an MLD operating on a link that is a 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 mechanisms and one of the following conditions is met:
2. The STA obtained an EDCA TXOP following procedure in 10.23.2.4 (Obtaining an EDCA TXOP)
3. 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 obtained an EDCA TXOP following the procedure in 10.23.2.4 (Obtaining an EDCA TXOP).
4. When the backoff counter of the STA reaches zero, it may choose to not transmit and keep its backoff counter at zero. (#4412, 7787, 8040) A STA with backoff counter that has already reached zero initiate transmission only following condition (b)
5. (#4412, 7787, 8040) A STA with backoff counter that has already reached zero and that choose not to transmit following condition (b), performs a new backoff procedure following deferral as described in 10.23.2.4 and 10.3.4.3 (#4753, 8348) before being allowed to initiate transmission on a link following condition (a). (#4413) In such a case, CW[AC] and QSRC[AC] shall be left unchanged

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 (a) as in (3) is implementation specific.

~~Note 2: A STA with backoff counter that has already reached zero and there is a frame available for transmission performs a new backoff procedure before being allowed to initiate transmission on a link following condition (a).~~

A STA that chooses not to transmit after the backoff counter reached zero on a link of 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 (a) or (b) and has one or more EDCAF backoff counter that already reached zero shall choose only one implementation specific EDCAF for the transmission.

A STA with backoff counter that has already reached zero on a link and has a frame available for transmission shall follow channel access procedures described 10.23.2.4. (Obtaining an EDCA TXOP) after it detect medium transition from busy to idle.

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 4us following slot boundary of the link on which the other STA whose backoff counter reaches zero operates.

(21 CIDs)

SP:

Do you support to incorporate the changes proposed by the following CIDs in 11/1575r0:

4233, 4412, 4413, 4482, 4483, 4753, 5897, 6316, 6317, 6383, 6405, 6496, 6771, 6773, 7608, 7787, 7871, 8040, 8249, 8347 , 8348