IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Remaining CR for 35.3.15.8.1 and others | | | | |
| Date: 2021-11-08 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Dibakar Das | Intel |  |  | Dibakar.das@intel.com |
| Dmitry Akhmetov |  |  |  |
| Laurent Cariou |  |  |  |
| Danny Alexander |  |  |  |
| Alfred Asterjadhi | Qualcomm |  |  |  |
| Gaurang Naik |  |  |  |

Abstract

This submission addressed the following CIDs relative to 11be draft 1.5:

(medsync) 7782 4237 4836 5103 5105 6319 6320 6657 8349 8350 6136 7609 5127

(AAR) 4268, 4733, 5131, 5354, 5442, 5835, 5942, 6927

(TXS) 6022 6590 6591 5362 7869 7666 5143 6556 7776 5241 5242 5965 6357 6358 6978 7774 8184 8319 8326 5599 6531 4191 4192

(NSTR bitmap) 4367 6214 6389 7583 6976 6215

.

| **CID** | **Page** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 5105 | 279.62 | 35.3.14.7.1 | Multiple STAs can have a nonzero MediumSyncDelay timer. For example, when an AP can solicit TB PPDUs from multiple MLDs operating on NSTR link pair, the solicited STAs sets its MediumSyncDelay timer.  In this case, if one of the multiple STAs transmits an RTS frame as the first frame, all other STAs can reset its timer based on the RTS frame, even though there is no response to the RTS frame. | The timer should not be reset when the received frame is an RTS frame. | **Reject.**  Based on offline discussion with members we could not reach consensus on the proposed change. |
| 6136 | 279.48 | 35.3.14.7 | This subclause specifically refers to medium sync lost to TX on another link of an NSTR pair, but should also include language that recognizes its use for recovery by an MLMR STA that has lost sync due to lack of RX resources which were all temporarily allocated to the other link. | Add language to the subclause to ensure that the MLMR case is accounted for. Note that the MLMR medium sync loss is due to RX activity, not TX activity. Propose that the MLMR case uses identical parameters to the eMLSR case so that no new parameters are needed. If a STA is both MLMR and eMLSR, does that complicate things? | **Reject**  The Medium Sync recovery procedure described in this section applies to events when the STA loses medium sync frequently. It does not apply to cases where the STA will lose sync for a large period of time (e.g., due to PS reasons). Since the EMLMR operations belong to the latter category, it should not apply for EMLMR. |
| 6319 | 279.57 | 35.3.14.7.1 | The initialized value is not correct given there is immediate response. Please change it to "aPPDUMaxTime + SIFS + Block Ack transmission time | as in the comment | **Reject**  Based on offline discussion with members we could not reach consensus on the proposed change. |
| 6320 | 280.05 | 35.3.14.7.1 | Please add a capability for this STA to support a TXOP by using the following methods | as in the comment | **Revised.**  The current text already clarifies that a STA may not support obtaining a TXOP. Since its an internal decision at the STA that does not need to be signaled over the air, a capability signaling is not needed.    **TGbe editor:** no further changes needed. |
| 7609 |  | 35.3.14.7 | This mechanism is for NSTR. So, this subclause should be under 35.3.14.3. | As in comment. | **Reject.**  The solutions proposed in this section may be applied with minor modification to other MLO operations that result in frequent loss of medium synchronization (e.g., EMLSR). |
| 8349 | 279.57 | 35.3.14.7.1 | For example, non-AP MLD hase two affilicated STAs(STA1 and STA2). ased on the above procedure, STA1 and STA2 shall initiated to aPPDUMaxTime or update based on beacon or other frame. STA1 and STA2 will reset to zero because STA1 and STA2 receive a PPDU with a valid MPDU. When STA2 wants to transmit at the end of the STA1 transmission event that caused loss of medium synchronization. so STA2 should do Medium synchronization recovery procedure, but the MediumSyncDelay timer is zero or here STA2 need to set the timer again, but based on which parameter? the Medium Synchronization Duration field? where to store the value indicated by the Medium Synchronization Duration field?So I think we need a new dot11 parameter to save the value indicated by the Medium Synchronization Duration field of the Basic variant MLelement, and the dot11 parameter initialized to aPPDUMaxTime, or update based on beacon or other frame. | Please clarify it | **Revised.**  Agree with the commenter. Added a new set of MIB variables to capture the parameters used for the Medium Sync Recovery procedure.  **TGbe editor:** Apply the changes tagged with #8349 in this document**.** |
| 8350 | 280.21 | 35.3.14.7.1 | It's better to have a dot11 parameter to store MSD\_TXOP\_MAX . | Please clarify it | **Revised.**  Agree with the commenter. Added a new set of MIB variables to capture the parameters used for the Medium Sync Recovery procedure.  **TGbe editor:** Apply the changes tagged with #8350 in this document**.** |
| 4836 | 279.41 | 35.3.14.7.1 | An NSTR soft-AP has similar medium sync access recovery issue as a NSTR non-AP STA. 11be should define a mechanism to protect any on-going transmission due to operation of such an AP. | Extend the medium access rules defined for NSTR link pairs affiliated to non-AP MLD to also for the case of NSTR soft-AP MLD. | **Revised.**  We clarify that the NSTR Mobile AP follow similar rules as a non-AP STA except it uses the default parameters.  **TGbe editor:** Apply the changes tagged with #4836 in this document**.** |
| 4237 | 280.13 | 35.3.14.7.1 | The order of certain paragraphs in this subclause needs some improvement from a logistic perspective. Please reorganize the subclause so that singaling is defined first, and then the behaviors, with and without the signalign. | As in comment. | **Revised.**  The text has been reorganized to a large extent in draft 1.5. Further enhancements can be done in later drafts.  **TGbe editor: No further action needed.** |
| 7782 | 130.48 | 9.4.2.295b.2 | The current allowed value of dot11MSDOFDMEDthreshold is [-72,-62]. But it's obvious that the most safe adjusted ED value is -82dBm, with which STA can also set CCA busy for a PPDU with -81dBm when STA misses the PPDU's preamble. | Change the allowed range of the dot11MSDOFDMEDthreshold to be [-82, -62] | **Revised.**  During discussion on the range of this threshold, members pointed out that lowering the threshold too much may be too unfair for EMLSR STAs since this threshold is going to be used to detect non-wifi transmissions as well. Accordingly, -72dBm was found to be a good balance.  However, we make some text changes to clarify that this threshold is to be used for typical bands of interest for EHT STAs. Note that the current text restricts the usage of this mode incorrectly to the 3 GHz band.  **TGbe editor:** Apply the changes tagged with #7782 in this document |
| 5127 | 130.49 | 9.4.2.295b.2 | Considering CCA ED threshold change to -72 dBm in Europe, the Medium Synchronization OFDM ED Threshold subfield should be able to indicate a value less than -72 dBm as well. | As in comment | **Revised.**  During discussion on the range of this threshold, members pointed out that lowering the threshold too much may be too unfair for EMLSR STAs since this threshold is going to be used to detect non-wifi transmissions as well. Accordingly, -72dBm was found to be a good balance.  However, we make some text changes to clarify that this threshold is to be used for typical bands of interest for EHT STAs. Note that the current text restricts the usage of this mode incorrectly to the 3 GHz band.  **TGbe editor:** Apply the changes tagged with #7782 in this document |
| 5103 | 279.42 | 35.3.14.7.1 | An MLD may lose medium synchronization when the MLD operates in the EMLSR mode. | Add this case for the reason of losing medium synchronization. Then the MLD in the EMLSR mode can follow the medium access recovery procedure. | **Revised.**  The corresponding text has been added in draft 1.5. Please see P420L8-16.  **TGbe editor: No further action needed.** |
| 6657 | 279.42 | 35.3.14.7.1 | "A STA affiliated with ta non-AP MLD that belongs to a NSTR link pair is considered to have lost medium synchronization (due to UL interference) when the other STA, which is affiliated with the same MLD and belongs to that link pair, transmits a PPDU, except under the following condition: -- Both STAs ended a transmission at the same time. " Does the medium access recovery procedure apply to EMLSR and EMLMR operations too? There is an NSTR pair of EMSLR and EMLMR but they are not explicitly defined in this spec. Please clarify. | As in comment. | **Revised.**  The 11be draft 1.5 clarifies how the Medium Sync recovery procedure applies to EMLSR procedure. Please see P420L8-16.  **TGbe editor: No further action needed.** |
| 7869 | 279.41 | 35.3.14.7.1 | During a reception procedure of eMLSR, the other link(s) loses medium synchronization. After turning back to a listening mode from a eMLSR receiving mode, MediumSyncDelay shall be applied. | Define a procedure to apply MediumSyncDelay to eMLSR. | **Revised.**  The 11be draft 1.5 clarifies how the Medium Sync recovery procedure applies to EMLSR procedure. Please see P420L8-16.  **TGbe editor: No further action needed.** |

**Discussion for 4836:**

An NSTR Mobile AP will lose medium sync whenever it transmits only on the link in which it transmits beacons. Its mostly similar to how a non-AP STA loses medium sync. However, for NSTR Mobile AP we need to also account for the following aspects:

* For a non-AP STA the medium sync is lost due to UL traffic. Since UL traffic is typically smaller than DL, this means that the Mobile AP will likely loss medium sync more frequently and has larger potential to interfere with ongoing traffic when it has lost medium sync.
* Since the Mobile AP typically does not transmit Trigger frames, the probability of both the NSTR Mobile AP and a NSTR STA associated to it losing medium sync due to frame transmissions in the same TXOP is small.
* An NSTR Mobile AP will typically have few (e.g., 1) non-AP STA associated to it and hence interference problem caused to own BSS by those STAs losing medium sync is not as important. The interference will be mostly caused to other STAs in the same channel.
* Like an NSTR non-AP STA and unlike a regular STR AP MLD, the NSTR Mobile AP does not have a complete view of one of the links whenever it initiates transmission only on the link in which it transmits beacons.
* It cannot make use of AAR.

So, for medium sync recovery while the NSTR softAP can largely follow the same rules as a NSTR STA, we need to define how it sets the parameters: dot11MSDOFDMEDthreshold, MSD\_TXOP\_MAX, Medium Synchronization Duration.

**Option 0:** NSTR Mobile AP can set those fields to any feasible value in the ML element and use those fields for own channel access during Med sync recovery.

**Option 1:** NSTR Mobile AP and its STAs associated to it uses the default values specified in spec for channel access during med sync recovery.

**Option 2:** NSTR Mobile AP uses the default values specified in spec while STAs associated to it use the values advertised in ML element which can be different from default values for respective channel access during med sync recovery.

.

Option 0 is not really an option since it lets an **unmanaged** STA, which would cause interference problem to the rest of the network, choose its own parameters. Since the Mobile AP mostly worries about its own DL transmissions it is expected to always set those fields greedily to the most aggressive values (e.g., Med Sync Duration = 0). So, this is going to be effectively same as the Mobile AP not following any Med sync recovery procedure.

Between Option 1 and Option 2, even though Option 1 is logically consistent with not having a NSTR STA decide its own parameters, it may be okay to keep the current behavior for NSTR non-AP STAs since UL traffic is not the major source of interference to the network from this BSS.

So, we propose using Option 2.

***TGbe editor: revise the following clause as follows*:**

**35.3.16.8 Medium access recovery procedure  
35.3.16.8.1 General**

A STA affiliated with a non-AP MLD or an NSTR mobile AP MLD (#4836) that operates on (#7555)an NSTR link pair is considered to have lost medium synchronization (see definition in 3.2 (Definitions specific to IEEE 802.11)(#8208)) when the other STA, which is affiliated with the same MLD and operates on that link pair, transmits a PPDU, except when both STAs ended a transmission at the same time(#4754).

A STA that has lost medium synchronization as described above shall start a MediumSyncDelay timer at the  
end of that transmission if that transmission(#5450) is longer than aMediumSyncThreshold unless its  
previous MediumSyncDelay timer has not expired(#4837). The STA may not (re)start the MediumSyncDelay timer if the transmission event is shorter than or equal to aMediumSyncThreshold.  
(#4234)The aMediumSyncThreshold is set to 72 µs.  
(#4234)NOTE 1—The value of 72 µs is chosen to cover at least the PPDU lengths of RTS/CTS/ACK frames using nonHT or non-HT duplicated PPDU format with 6 Mbps data rate, as well as the PPDU lengths of most typical BlockAck  
frames.

(#6352)When a non-AP MLD is operating in the EMLSR mode, a STA affiliated with a non-AP MLD that is  
operating on one of the EMLSR links is considered to have lost medium synchronization if it is not able to  
perform CCA during frame exchanges that includes the link switch delays between an AP affiliated with an  
AP MLD and one of the other STAs operating on the other EMLSR links, which are affiliated with the same  
non-AP MLD. The STA that has lost medium synchronization shall start a MediumSyncDelay timer  
immediately after returning to the listening operation if the duration of the loss of medium synchronization  
is longer than aMediumSyncThreshold; otherwise, the STA may not start the MediumSyncDelay timer.

(#6352)NOTE 2—The link switch delays include the delay switching from the listening operation to the frame  
exchanges and the delay switching from the frame exchanges to the listening operation.

A STA shall not start any MediumSyncDelay timer unless it is not one of the following:

* a non-AP STA affiliated with a non-AP MLD operating on an NSTR link pair or
* a non-AP STA affiliated with a non-AP MLD operating on an EMLSR link or

an AP affiliated with an NSTR mobile AP MLD (#4836).

The MediumSyncDelay timer is a single timer, shared by all EDCAFs within a (#4836)STA, whose value is set to dot11MSDTimerDuration. The STA initializes dot11MSDTimerDuration (#8349, 8350) to aPPDUMaxTime defined in Table 36-70 (EHT PHY characteristics). A non-AP STA(#6775)  
shall update dot11MSDTimerDuration (#8349). with the value contained in the Medium Synchronization  
Information field, if present, of the (#6700)Basic Multi-Link element in the most recent frame received from  
its associated AP(#4414).

In addition, the timer resets to zero when any of the following events occur:  
— The STA receives a PPDU with a valid MPDU.  
— The STA receives a PPDU whose corresponding RXVECTOR parameter TXOP\_DURATION is not  
UNSPECIFIED.

(#4837)If a (#4836) STA that operates on a NSTR link pair has lost medium synchronization, due to  
transmission by another STA that is affiliated with the same MLD and operates on that link pair, and its  
previous MediumSyncDelay timer has not expired, then at the end of that transmission it shall continue the  
previous MediumSyncDelay timer except that the STA shall update the timer value as described above if  
that transmission is longer than aMediumSyncThreshold.

**35.3.16.8.2 MediumSyncDelay OFDM ED based recovery procedure(#6352)**

(#7781)(#5745) A (#4836)STA that is capable of obtaining a TXOP while the  
MediumSyncDelay timer has a nonzero value shall use dot11MSDOFDMEDthreshold instead of  
-62dBm in order to detect a channel busy condition in the primary 20 MHz channel channel (see 36.3.20.6 (CCA sensitivity) (#7782, 5127) if the MediumSyncDelay timer has a nonzero value.

(#4727)(#4235)If a (#4836) STA is capable of obtaining a TXOP while the MediumSyncDelay timer has a  
nonzero value, it shall perform the following when the timer has a nonzero value:  
— If it is a non-AP STA it shall (#4836) transmit an RTS frame to its associated AP as the initial frame an obtained  
TXOP(#4235)(#4416).

— If itis an AP it shall transmit an RTS frame to an associated non-AP STA as the initial frame in an obtained  
TXOP (#4836).  
— Shall not attempt to initiate more than MSD\_TXOP\_MAX TXOPs since the start of the  
timer(#4417).

Otherwise, it shall perform CCA until the MediumSyncDelay timer has expired before it initiates a  
transmission.

(#7779)A STA that has a nonzero MediumSyncDelay timer shall not transmit any PPDU using OBSS PDbased spatial reuse operation.

An AP affiliated with an MLD may include the Medium Synchronization Delay Information field in a  
(#6700)Basic Multi-Link element carried in an Association Response, Beacon, or Probe Response frame.

(#4002)A STA affiliated with a non-AP MLD shall not include the Medium Synchronization Delay

Information field in any (#6700)Basic Multi-Link element it transmits.

A (#4836) STA shall initialize dot11MSDOFDMEDthreshold to –72 dBm and dot11MSDTXOPMAX to 1,

respectively. A non-AP STA affiliated with a non-AP MLD shall set dot11MSDTXOPMAX and

dot11MSDOFDMEDthreshold to the most recent values in the Medium Synchronization Maximum Number

Of TXOPs and Medium Synchronization OFDM ED Threshold subfields, respectively, if they are present in

a (#6700)Basic Multi-Link element received from its associated AP(#4414).

NOTE—If either the intra-BSS NAV or the Basic NAV(#5106) is nonzero in the non-AP STA affiliated with the non-AP MLD when it starts the MediumSyncDelay timer, the non-AP STA does not initiate any TXOP and follow the same rules as an HE STA to respond to any RTS or MU-RTS frame until both NAVs expire.

During the aCCAtime (see 36.3.20.6.3 (CCA sensitivity for occupying the primary 20 MHz channel))

immediately following the end of the transmission event that caused loss of medium synchronization and

subsequent initiation of the MediumSyncDelay timer at the non-AP STA, if the received signal strength

exceeds the -62dBm (#7782)threshold for the primary 20 MHz channel and

no start of a PPDU is detected, the STA should defer for EIFS beginning when the received signal strength

falls below the (#7782, 5127)threshold.

***TGbe editor: Revise the following paragraph in P192L30 of draft 1.5 as*:**

The Medium Synchronization OFDM ED Threshold subfield indicates the value of dot11MSDOFDMEDthreshold to be used by a (#4836)STA during medium synchronization recovery and is defined in  
Table 9-401e (Medium Synchronization OFDM ED Threshold subfield).

***TGbe editor: Revise the following paragraph in P192L48 of draft 1.5 as*:**

The Medium Synchronization Maximum Number Of TXOPs subfield contains the value of the maximum  
number of TXOPs (dot11MSDTXOPMAX) (#8349) a (#4836) STA is allowed to attempt to initiate while the MediumSyncDelay timer is running at that (#4836)STA minus 1(#4817), except that the value 15 indicates any number  
of TXOPs as long as the MediumSyncDelay timer is nonzero.

***TGbe editor: Update the entries to Dot11EHTStationConfigEntry in P609L57 of draft 1.5 as*:**

Dot11EHTStationConfigEntry ::=

SEQUENCE {

dot11EHTPPEThresholdsRequired TruthValue,

dot11TIDtoLinkMappingActivated TruthValue,

dot11MSDTimerDuration Unsigned32,

dot11MSDTXOPMAX Unsigned32 (#8349, 8350)}

***TGbe editor: Add the following text to the end of dot11EHTStationConfig TABLE in draft 1.5*:**

(#8349, 8350)dot11MSDTimerDuration OBJECT-TYPE  
 SYNTAX Unsigned32 (0..8160)  
 UNITS "microseconds"  
 MAX-ACCESS read-write  
 STATUS current  
 DESCRIPTION  
 "This is a control variable.  
 It is written by an external management entity or by the MAC of a non-AP  
 EHT STA upon receiving a Basic Multi-link element containing a Medium Synchronization Duration field value from the EHT AP with which

it is associated. Changes take effect as soon as practical in the implementation.

This attribute indicates the duration of MediumSyncDelay timer when the timer is (re)-started."  
DEFVAL { 5484 }  
::= { dot11EHTStationConfigEntry ANA }

dot11MSDTXOPMAX OBJECT-TYPE  
 SYNTAX Unsigned32 (1..16)   
 MAX-ACCESS read-write  
 STATUS current  
 DESCRIPTION  
 "This is a control variable.  
 It is written by an external management entity or by the MAC of a non-AP  
 EHT STA upon receiving a Basic Multi-link element containing a Medium Synchronization Maximum Number Of TXOPs field value from the EHT AP with which

it is associated. Changes take effect as soon as practical in the implementation.

This attribute indicates the maximum number of TXOPs a STA is allowed to initiate when the MediumSyncDelay timer of the MAC has nonzero value except that the value 16 indicates the STA can initiate any number of TXOPs. "  
DEFVAL { 1 }  
::= { dot11EHTStationConfigEntry ANA }

***TGbe editor: Revise the following text in P792L47 of draft 1.5*:**

(#7574)dot11MSDOFDMEDthreshold OBJECT-TYPE  
SYNTAX Unsigned32(0..255)  
MAX-ACCESS read-write  
STATUS current  
DESCRIPTION  
"This is a control variable.  
Its value is written by an external management entity or (#8349, 8350)by the MAC of a non-AP EHT STA upon receiving a Basic  
Multi-Link element containing a medium synchronization OFDM ED threshold  
from the EHT AP with which it is associated.  
Changes take effect as soon as practical in the implementation. This  
attribute indicates the energy detect threshold being used by the OFDM PHY  
when the MediumSyncDelay timer of the MAC has nonzero value."  
::= { dot11PhyEHTEntry 22}

| **CID** | **Page** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 4268 | 136.52 | 9.4.2.295c.2 | AAR Support is missing in the figure. Please add it. | As in comment. | **Revised.**  AAR is an MLD level capability and hence its signaled in MLD Capabilities subfield. Please see Figure 9-1002I in P195L19 of 11be draft 1.5  **TGbe editor: No further action needed.** |
| 4733 | 137.48 | 9.4.2.295c.2 | Fig.9-788eu (EHT MAC Capabilities ...) doesn't have the AAR field, but the AAR support field appears in Table Table 9-322aq--Subfields of the EHT MAC Capabilities Information field. Need to resolve this inconsistency | As commented | **Revised.**  AAR is an MLD level capability and hence its signaled in MLD Capabilities subfield. Please see Figure 9-1002I in P195L19 of 11be draft 1.5. The recent version of Table 9-401k—Subfields of the EHT MAC Capabilities Information field does not contain AAR Support field.  **TGbe editor: No further action needed.** |
| 5131 | 136.52 | 9.4.2.295c.2 | The AAR Support subfield that is defined in Table 9-322aq is missing in the figure. | Define the AAR Support subfield in the figure. | **Revised.**  AAR is an MLD level capability and hence its signaled in MLD Capabilities subfield. Please see Figure 9-1002I in P195L19 of 11be draft 1.5. The recent version of Table 9-401k—Subfields of the EHT MAC Capabilities Information field does not contain AAR Support field.  **TGbe editor: No further action needed.** |
| 5354 | 136.50 | 9.4.2.295c.2 | The AAR Support field is not shown in Figure 9-788eu. | Please add AAR subfield to the Figure 9-788eu. | **Revised.**  AAR is an MLD level capability and hence its signaled in MLD Capabilities subfield. Please see Figure 9-1002I in P195L19 of 11be draft 1.5. The recent version of Table 9-401k—Subfields of the EHT MAC Capabilities Information field does not contain AAR Support field.  **TGbe editor: No further action needed.** |
| 5442 | 136.53 | 9.4.2.295c.2 | Reflect AAR Support in the figure | as in comment | **Revised.**  AAR is an MLD level capability and hence its signaled in MLD Capabilities subfield. Please see Figure 9-1002I in P195L19 of 11be draft 1.5. The recent version of Table 9-401k—Subfields of the EHT MAC Capabilities Information field does not contain AAR Support field.  **TGbe editor: No further action needed.** |
| 5835 | 137.41 | 9.4.2.295c.2 | "AAR support" is not in Figure 9-788eu--EHT MAC Capabilities Information field format | Add "AAR support" to Figure 9-788eu, or delete the row in Table 9-322aq--Subfields of the EHT MAC Capabilities Information field. | **Revised.**  AAR is an MLD level capability and hence its signaled in MLD Capabilities subfield. Please see Figure 9-1002I in P195L19 of 11be draft 1.5. The recent version of Table 9-401k—Subfields of the EHT MAC Capabilities Information field does not contain AAR Support field.  **TGbe editor: No further action needed.** |
| 5942 | 137.43 | 9.4.2.295c.2 | "For a non-AP STA, indi  cates support for generating a frame  with an AAR Control subfield" This is not necessary for an AP capability | delete the sentence | **Revised.**  The sentence no longer exists for the AAR Support bit. Please see Table 9-401i—Subfields of the MLD Capabilities field in P196L36 of 11be draft 1.5.  **TGbe editor: No further action needed.** |
| 6022 | 137.23 | 9.4.2.295c.2 | The support of TXOP sharing mode should be separately announced. | change the draft per comment | **Revised.**  In 11be draft 1.5 the two modes are signaled separately.  **TGbe editor: No further action needed.** |
| 4367 | 134.30 | 9.4.2.295b.2 | There is no description / figure for the NSTR Indication Bitmap field format | Please add a description and proper figure for the NSTR Indication Bitmap field format | **Revised.**  The description for this field is in P198L60-L65 in 11be draft 1.5. The location of the field is shown in Figure Figure 9-1002o—STA Info field. No additional figure is shown for this bitmap since its self-explanatory and follows same convention as other simple bitmaps (e.g., Figure 9-22g—Control Information subfield format in a BQR Control subfield).  **TGbe editor: No further action needed.** |
| 6214 | 134.33 | 9.4.2.295b.2 | In last sentence of the paragraph, the use of bit "Bi" is confusing here as the index j is use in the rest of the paragraph to designate a bit in the NSTR bitmap. | Instead of using "Bit Bi in the NSTR....", propose to use "For j=i, the bit Bj in the NSTR...." | **Reject.**  Since there is no ambiguity in understanding the current sentence, there is no need to change this. |
| 6389 | 134.30 | 9.4.2.295b.2 | Please clarify whether this paragraph applies as it is written to both cases when ﻿NSTR Bitmap Size subfield is 0 or 1. Particularly the range of i (0<=i<15) | Please clarify and amend if needed | **Revised.**  Since the value 15 corresponds to maximum range, the current text together with the text in P198L1-L8 defines the feasible bits. Added minor clarification to that text.  **TGbe editor:** Apply the changes tagged with #6389 in this document**.** |
| 6976 | 134.30 | 9.4.2.295b.2 | Need to specify how set a bit corresponding to a link that does not exist. | Clarify it. | **Reject.**  The text specifies that for those cases the value is set to 0:  “Each bit Bj in the NSTR Indication Bitmap subfield included in the Per-STA Profile subelement with Link ID subfield equals to i (where ) is set to 1 if the link pair corresponding to Link  IDs equal to <i, j> is NSTR and the (#6700)Basic Multi-Link element contains a Per-STA Profile subelement with Link ID value equals to j; otherwise it is set to 0.” |
| 7583 | 134.20 | 9.4.2.295b.2 | Don't see the need of having the NSTR bitmap size to be variable. The rule for the Link ID is just to be unique at the AP MLD and the values can be up to 15. The AP MLD can set the Link IDs from say 10 to 14. In that case, the bitmap needs to have 2 octets. If you want to adjust them to be expressed in 1 octet, the starting Link ID needs to be notified.  If the number of NSTR link pairs are limited to 2 for a link, as each Link ID only needs 4 bits, the expression of the corresponding NSTR link pairs to Link ID i can fit in 1 octet. Limiting to 2 here seems reasonable from the sense that operation related to NSTR link pairs can be under control. | Limit the number of NSTR link pairs to be 2 for a link at a non-AP MLD (when setting up links, the condition should be met). Prepare 2 4-bit Link ID fields to express NSTR link pairs to Link ID i. Each 4-bit Link ID subfield indicates Link ID j which is NSTR link pairs with Link ID i. Fill from the first Link ID field and if the second Link ID field is not used, assign a special number to indicate it. For instance, restrict the use of 15 for the Link IDs and use it in such purpose. Or set the same Link ID i for such purpose.  Or, use the Frequency Separation For STR subfield to signal the NSTR link pairs and delete all the other subfields. | **Reject.**  The current design of the bitmap keeps open the possibility of many link pairs for future releases without need to redesign the field. |
|  |  |  |  |  |  |
| 6215 | 134.32 | 9.4.2.295b.2 | The sentence "and the Basic...... with link ID j" means that the Per-STA Profile of all affiliated non-AP STAs having a NSTR link pair are systematically present in the Basic variant ML element. This prohibits cases where the Basic variant ML element could be shorten, for example by taking profit of symmetry of NSTR link pair signaling in the bitmap. | Removal of the part of the sentence "and the basic..... with link ID j". | **Reject.**  During the design of this field the group discussed this option. While it optimizes the length of the element a little it loses the self-contained design where the recipient of this element just needs to just look at a particular STA Info field to discover all the NSTR link pairs for that link. So, considering the tradeoff this change is not required. |
| 6590 | 74.4 | 9.2.5 | Current Single protection settings may have issue in Triggered TXOP Sharing procedure. For example, the MU-RTS TXS TF with Single protection settings couldn't protect the time duration shared with non-AP STA, and then the CTS transmitted by non-AP STA couldn't protect the time duration shared by AP either. | The Duration/ID field of MU-RTS TXS TF can be set to the time duration allocated to the non-AP STA. | **Reject.**  In draft 1.5 its clarified that TXS uses multiple frame protection rules. |
| 6591 | 74.23 | 9.2.5 | Current Multiple protection settings doesn't include the frames transmitted in Triggered TXOP Sharing procedure. | Multiple protection settings should consider the uplink pending MPDU(s) according to TXOP sharing mode 1 and 2, peer-to-peer pending MPDU(s) according to TXOP sharing mode 2, and an MU-RTS TXS Trigger/CTS frame exchange in Triggered TXOP Sharing procedure. | **Revised.**  Agree in principle but this has already been added in draft 1.5. Please see P113L23.  **TGbe editor: No further action needed.** |
| 7776 | 246.58 | 35.2.1.3.3 | It's not clear how STA will select between single and multiple protection for the Duration/ID field of its frames during the allocated time. | Require the STA shall use the same class of the duration setting as the MU-RTS TXS frame. And the STA may determine the class of the duration setting by comparing the Duration/ID filed of MU-RTS TXS and the allocted time. | **Revised.**  In draft 1.5 its clarified that TXS uses multiple frame protection rules. Please see P113L23.  **TGbe editor: No further action needed.** |
| 5362 | 99.12 | 9.2.4.6a | 11be has defined the Trigger TXOP TXS to grant a STA with an obtained TXOP, but the STA shall notify the duration or buffer length in advance to the AP. | BSR control frame is the best place to indicate the requested TXOP duration or the length of buffered traffic in granted TXOP case, but there is no reserved bit in BSR, we can consider to signaling these information in a new A-control frame. | **Reject.**  The group has discussed this and failed to reach consensus. |
| 6927 | 280.49 | 35.3.14.7.3 | It is unclear when non-AP STA transmits the AAR Control subfield in a frame. | Clarify when non-AP STA transmits the AAR Control subfield in a frame. | **Revised.**  This has been clarified in draft 1.5 P421L36:  “A STA affiliated with a non-AP MLD with dot11AAROptionImplemented equal to true and  that belongs to (#7555)an NSTR link pair shall transmit the AAR Control subfield in a frame that solicits an  immediate response to its associated AP affiliated with an AP MLD if it has received a Basic Multi-Link  element from the AP with the AAR Support subfield equal to 1 (#4755)and an assisted STA that belongs to  the NSTR link pair needs assistance in transmitting frames to its associated AP in the other link”  **TGbe editor: No further action needed.** |
|  |  |  |  |  |  |

**9.4.2.312 Multi-Link element**

**9.4.2.312.2 Basic Multi-Link element**

**9.4.2.312.2.3 Link Info field of the Basic Multi-Link element**

***TGbe editor: Modify the paragraph starting in P198L1 as below:***

If the Complete Profile subfield is equal to 1 and the NSTR Link Pair Present subfield is equal to 1  
in the STA Control field, then the STA Info field contains an NSTR Indication Bitmap subfield whose size  
is indicated in the NSTR Bitmap Size subfield; otherwise, the NSTR Indication Bitmap subfield is not present in the STA Info field. (#7392)The NSTR Bitmap Size subfield in a STA Control field is set to 1 if the  
length of the corresponding NSTR Indication Bitmap subfield is equal to 2 octet (#6389) and is set to 0 if the length of the corresponding NSTR Indication Bitmap subfield is equal to 1 octet (#6389). The NSTR Bitmap Size subfield in the STA Control field is reserved if the NSTR Link Pair Present subfield in that field is 0.

| **CID** | **Page** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 7666 | 245.20 | 35.3.1.3.2 | Change MU-RTS TX TF to MU-RTS TXS Trigger frame in figure 35-1 and 35-2. | See comment. | **Accept.** |
| 5143 | 245.20 | 35.3.1.3.2 | For lower collision probability and fairness, a STA that received the MU-RTS TXS Trigger frame can use the MU EDCA parameters. | As in comment | **Revised.**  MU-EDCA rules for the TXS Trigger frame has been added in draft 1.5. Please see P372L27-42.  **TGbe editor: No further action needed.** |
| 6556 | 246.5 | 35.2.1.3.3 | Why it is allowed to transmit UL frames on the 2 modes 1 and 2 ? The mode 2 introduces inconsistency for the AP: the AP is unable to identify the end of the transmission. | Add restriction in mode 2 to transmit only a UL frame only to end the transmission of the non-AP STA. | **Reject.**  The group discussed this and failed to reach sufficient support. |
| 5241 | 244.45 | 35.2.1.3.2 | Those conditions need to be consistent with "10.23.2.8 Multiple frame transmission in an EDCA TXOP", e.g., because it has described "All other channel access functions at the STA shall treat the medium as busy until the expiration of the TXNAV timer." | As in the comment, those conditions need to be consistent with baseline | **Reject.**  The commenter failed to identify any specific issue that makes the current text inconsistent with baseline. |
| 5242 | 244.57 | 35.2.1.3.2 | This paragraph seems to be overlapped with above conditions, especially, third condition. Please make it clear | As in the comment | **Revised.**  Agreed in principle. The third condition is now merged with the paragraph below for better clarification. Also, aligned the text on when the AP concludes transmission of the TXS frame is successful with the baseline MU-RTS rules.  **TGbe editor:** Apply the changes tagged with #5242 in this document**.** |
| 5965 | 244.57 | 35.2.1.3.2 | This paragraph should be one of the bullet of the previous paragraph and combined with bullet 3. | As in comment | **Revised.**  Agreed in principle. The third condition is now merged with the paragraph below for better clarification.  **TGbe editor:** Apply the changes tagged with #5965 in this document**.** |
| 8319 | 244.58 | 35.2.1.3.2 | This paragraph overlaps the paragraph above. Both the two paragraphs describes transmits frames at TxPIFS slot boundary. | Please clarify it | **Revised.**  Agreed in principle. The third condition is now merged with the paragraph below for better clarification.  **TGbe editor:** Apply the changes tagged with #8319 in this document**.** |
| 4191 | 244.43 | 35.2.1.2.2 | I guess for the third condition baseline rules would apply, i.e., PIFS or EDCA backoff? Also the whole paragraph says that the AP may transmit, which means that the AP may chose to not transmit. I guess the case here is that the AP follows baseline truncation rules if it has nothing more to transmit. I.e., send a CFEnd. | As in comment. | **Revised.**  Agreed in principle. The third condition is now merged with the paragraph below for better clarification.  **TGbe editor:** Apply the changes tagged with #4191 in this document**.** |
| 4192 | 244.57 | 35.2.1.2.2 | I think it reads better if this paragraph is merged with the previous one. Note that this condition here is very similar (at least in part) to the third condition of the prev. paragraph. | As in comment. | **Revised.**  Agreed in principle. The third condition is now merged with the paragraph below for better clarification.  **TGbe editor:** Apply the changes tagged with #4192 in this document**.** |
| 6357 | 244.43 | 35.2.1.3.2 | 1) "within the" is missed in this sentense 2) rewrite the sentense for better wording | Suggested text:  "If the EHT AP receives a CTS frame from the non-AP STA in response to a transmitted MU-RTS TXS Trigger frame that was within the allocated time in that Trigger frame, then the AP may transmit a PPDU after the end of the allocated time and before its TXNAV timer has expired if any of the following conditions are satisfied:" | **Reject.**  Its clarified in section 35.2.1.2.3 that the CTS transmission can only happen within the allocated time:  “After a non-AP EHT STA(#8315) receives an MU-RTS TXS Trigger frame from its associated AP that  contains a User Info field that is addressed to it, the STA may(#4194) transmit one or more non-TB PPDUs  within the time allocation signaled in the MU-RTS TXS Trigger frame. The first PPDU of the exchange  shall be a CTS frame transmitted per the rules defined in 26.2.6.3 (CTS frame response to an MU-RTS  Trigger frame)”. Hence, adding additional text is redundant. |
| 6358 | 245.8 | 35.2.1.3.2 | label in the figure 35-1 and 35-2 should be fixed. "S" in "TXS" is missed. Please change it to below.  "Time allocated in MU-RTS TXS TF" | as in comment | **Revised.**  The label has been fixed in draft 1.5.  **TGbe editor: No further action needed.** |
| 6978 | 244.57 | 35.2.1.3.2 | The AP can not invoke a new backoff procedure because the previous transmission of the AP was successful. (AP received CTS frame in response)  -Only a TXOP holder that fails transmission of an MPDU can invoke backoff procedure during the TXOP following 10.23.2.2 | It is recommended to add a new condition(item) to allow backoff invoking of the AP. | **Reject.**  The text in question itself is a new addition on top of the baseline rules. Hence, the value of adding another condition is not clear. |
| 7774 | 244.61 | 35.2.1.3.2 | For the AP operation in Triggered TXOP sharing, it's said " AP might transmit at TxPIFS slot boundary as described above  or invoke the backoff procedure as described in 10.23.2.2 (EDCA backoff procedure)" . For the case that AP invokes the backoff without waiting the TXNAV timer expires, it's not clear which kind of invoking backoff procedure should be used, as there are mulitple ways to invoke backoff procedure in 10.23.2.2 (EDCA backoff procedure) | Please clarify in the case that AP invokes the backoff without waiting the TXNAV timer expires, the reason e.) in 10.23.2.2 (EDCA backoff procedure) is used to invoke the backoff procedure.  The reason e.) in 10.23.2.2 (EDCA backoff procedure) is as follow, " For the EDCAF that is the TXOP holder, the transmission by the TXOP holder of an MPDU in a non-initial PPDU of a TXOP fails, as defined in this subclause." | **Reject.**  Adding this text is not needed since this text is adding a new normative text on top of baseline rules. |
| 8184 | 244.50 | 35.2.1.3.2 | "The last PPDU transmission by the AP ended less than aSIFSTime before the end of the allocated time in which case it may transmit SIFS after the end of the last PPDU transmission". It could use a time threshold that larger than aSIFSTime as long as the non-AP STA didn't has enough time to transmit any PPDU within this time threshold. | relex aSIFSTime to "aSIFSTime + T" in which T is shorter than the shortest potential PPDU. | **Reject.**  While the suggested text is reasonable, defining the “shortest potential PPDU” duration requires more discussion. |
| 8326 | 245.48 | 35.2.1.3.2 | Change "MU-RTS TX TF" to "MU-RTS TXS Trigger frame" | as in comment. | **Accept.** |
| 5599 | 243.61 | 35.2.1.3.1 | Subject-verb agreement issue | Change "equals" to "equal" | **Revised.**  This has been fixed in draft 1.5.  **TGbe editor: No further action needed.** |
| 6531 | 243.59 | 35.2.1.3.1 | The section 35.2.1.3 Triggered TXOP sharing procedure (and sub-sections) does not specify the parameters to be used for transmission (e.g. BW, what is the allocated duration) | Please define the transmission parameters from the TF to be used | **Revised.**  The BW to be used has been clarified in draft 1.5 P373L1.  **TGbe editor: No further action needed.** |
|  |  |  |  |  |  |

**35.2.1.2 Triggered TXOP sharing procedure**

**35.2.1.3.2 AP behavior**

***TGbe editor: Modify the text starting in P370L31 as below:***

If the EHT AP determines that its transmission of an MU-RTS TXS Trigger frame to a non-AP  
EHT STA with the TXOP Sharing Mode subfield equal to 1 is successful (see 26.2.6.2 MU-RTS Trigger frame transmission) (#4191,5242), then the AP shall not transmit any PPDU within  
the allocated time specified in the MU-RTS TXS Trigger frame unless:  
— The PPDU carries an immediate response that is solicited by the non-AP STA(#4188).  
— The CS mechanism indicates that the medium is idle at the TxPIFS slot boundary after the end of  
either the transmission of (#7714)an immediate response frame sent to that STA or the reception of  
(#7714)a frame from that STA that did not require an immediate response.

If the EHT AP determines that the transmission of an MU-RTS TXS Trigger frame to a non-AP  
EHT STA(#8315) with the TXOP Sharing Mode subfield equal to 2 is successful (#4191,5242), then the AP shall not transmit any  
PPDU(#7328) within the allocated time specified in the MU-RTS TXS Trigger frame unless the PPDU  
carries an immediate response that is solicited by the non-AP STA(#4190)(#5152).

If the EHT AP determines that the transmission of an MU-RTS TXS Trigger frame is successful (#4191,4192, 8319, 5242, 5965), then the AP may transmit a PPDU after the end of the  
allocated time and before its TXNAV timer has expired if any of the following conditions are satisfied:  
— The medium is determined to be idle by the CS mechanism at the end of the allocated time in which  
case it may transmit (#7809)a PIFS after the end of the allocated time.  
— The last PPDU transmission by the AP ended less than aSIFSTime before the end of the allocated  
time in which case it may transmit (#7810)a SIFS after the end of the last PPDU transmission.  
 (#4191, 8319, 5965)

If the EHT AP determines that the transmission of the MU-RTS TXS Trigger frame is successful (#4191)and the CS mechanism indicates that the medium is  
busy at the end of the allocated time, then the AP might transmit after the CS mechanism indicates that the medium is idle at the TxPIFS slot boundary or invoke the backoff procedure as described in 10.23.2.2 (EDCA backoff procedure) or wait for the  
TXNAV timer to expire and invoke the backoff procedure (#4191,4192, 8319, 5242, 5965).