IEEE P802.11
Wireless LANs

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| Proposed Resolution to Tgax D4.0 CR20268 |
| Date: 2019-18-07 |
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Abstract

As IEEE 802.11ax standard being developed, changes are being made to IEEE 802.11md draft. The changes in Tgax draft need to be consistent with the changes already made in the md draft. CR20268 asks the group to do this update. This document attempts to bring in all the changes that have been made to IEEE 802.11 standard until Draft 2.2.

**Interpretation of a Motion to Adopt**

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGax Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGax Editor: Editing instructions preceded by “TGax Editor” are instructions to the TGax editor to modify existing material in the TGax draft. As a result of adopting the changes, the TGax editor will execute the instructions rather than copy them to the TGax Draft.***

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| --- | --- | --- | --- |
| Change # | 11ax Draft 4.2 Referemce | 11md Draft 2.2 Reference | Issue/Outline of changes |
| Clause # | Page #, Line # | Clause # | Page, Line # |
| 1 | 3.2 | 37, 54 | 3.2 | 173, 9 | Add the artcicle “the” in front of “TXVECTOR parameter” on line 54 |
| 2 | 3.2 | 39, 15 | 3.2 | 174, 23 | Delete the extra “)” by replacing “CBW40))” with “CBW40)” |
| 3 | 3.2 | 41, 13 | 3.2 | 186, 16 | Replace “A-MPDU” with “aggregate MAC protocol data unit (A-MPDU)” |
| 4 | 8.3.5.2.2 | 68, 29 | 8.3.5.2.2 | 761, 20 | Replace “NOTE 1 at” with “NOTE for MU usage” |
| 5 | 8.3.5.12.2 | 70, 6 | 8.3.5.12.2 | 767, 11 | Issue: The editorial instructions need to be corrected as the current instructions identify the changes to Table 8-5 but does not display all rows. Resolution: Replace the editorial instruction “***Change Table 8-5 (The channel-list parameter elements) as follows:***” with “***Change the first four entries in Table 8-5 (The channel-list prameter elements) and add the entry for “per20bitmap” as shown below:”*** |
| 6 | 9.2.4.1.8 | 73, 36 | 9.2.4.1.8 | 783, 13 | Issue: insertion of a change carried from 11ah has been missed.Resolution: Replace “non-DMG non-HE” with “non-DMG non-S1G” |
| 7 | 9.2.4.1.10 | 74, 13 | 9.2.4.1.10 | 784, 45 | Issue: the phrasing in the first two items of the list have been changed in MDR2 and need to be brought in.Resolution: Incorporate the changes identified by **[#7]** below |
| 8 | 9.2.4.5.4 | 75, 43 | 9.2.4.5.4 | 794, 29 | Issue: Part of the description in the fifth column should be in a new paragraph. Also, PSMPUTT should be PSMP-UTTResolution: Replace “PSMPUTT” with “PSMP-UTT” and insert a line feed immediately after “PSMP-UTT.” |
| 9 | 9.2.4.5.6 | 76, 1 | 9.2.4.5.6 | 794, 58 | The two paragraphs are different and the instruction used in 11ax is replace. Furthermore from what I understand it only undoes an MBR2 action which may be acceptable. Seek input from others |
| 10 | 9.2.4.6.3 | 79, 64 | 9.2.4.6.3 | 802.15 | Replace “The format” with “In a non-SIG STA, the format” at the beginning of the paragraph |
| 11 | 9.2.5.2 | 91, 57 | 9.2.5.2 | 814, 5 | Issue: Some changes that were incorporated from 11ah have been brought forth.Resolution: Incorporate the changes identified by **[#11]** below |
| 12 | 9.2.5.7 | 93, 55 | 9.2.5.7 | 818, 7 | Issue: Four additional paragraphs brought in from 11ah are not present in the draft.Resolution: Change the editorial instuction from “Change as follows:” to “Change the first four paragraphs as follows:” |
| 13 | 9.3.1.2 | 94, 19 | 9.3.1.2 | 820, 8 | Issue: There is a discrepancy between the subclauses each of the drafts referred to. I believe both of them need to be referred and the best resolution to add both to both drafts. Resolution #1: Replace “see 10.3.2.8 (VHT and S1G RTS procedure)” with “see 10.3.2.7 (CMMG RTS procedure) and 103.2.8 (VHT and S1G RTS procedure)”Resolution #2: Request Tgmd to update their draft with both referencesResolution #3: Request Tgmd to delete “(11aj)” which appeared inadvarently |
| 14 | 9.3.1.3 | 94, 27 | 9.3.1.3 | 820, 31 | Issue: The first sentence in the pargraph is rephrased by Tgmd and should be brought into the draft.Resolution: Delete “the value of” |
| 15 | 9.3.1.5 | 94, 38 | 9.3.1.5 | 821, 47 | Issue: It appears that one 11ah change has been missed.Resolution; Replace “BSSID” with “BSSID (RA)” |
| 16 | 9.3.1.8.2 | 97, 51 | 9.3.1.8.2 | 829, 10 | Issue: A change in 11md draft needs to be brought into 11ax draft.Resolution: Insert the following sentence immediately after the end of the first sentence: “The Block Ack Starting Sequence Control subfield is shown in Figure 9-37 (Block Ack Starting Sequence Control subfield format)” |
| 17 | 9.3.1.8.2 | 97, 54 | 9.3.1.8.2 | 829, 13 | Replace “The value of this subfield is defined” with “This subfield” |
| 18 | 9.3.2.1 | 120, 29 | 9.3.2.1.2 | 840, 48 | Issue:The subclause has been restructured in 11md draft Resolution: Move the changes in 9.3.2.1 in 11ax draft to 9.3.2.1.2 |
| 19 | 9.3.3 | 120, 43 | 9.3.3 | 847, 24 | Issue: The subclause 9.3.3.1 in md draft has been deleted from 11md draftResolution: Renumber the subclauses under 9.3.3 to account for deletion, which is already done in 11md draft |
| 20 | 9.4.1.53 | 129, 14 | 9.4.1.53 | 958, 6 | Issue: MBR2 on md removed the phrase “the value of”Resolution: Replace the phrase “the value of this field” with “this field” |
| 21 | 9.4.1.53 | 129, 31 | 9.4.1.53 | 958, 10 | Issue: MBR2 on md removed the phrase “the value of”Resolution: Replace the phrase “the value of this field” with “this field” |
| 22 | 9.4.2.29 | 148, 57 | 9.4.2.29 | 1111, 61 | Issue: MBR2 has revised the first sentenceResolution: Delete the phrase “is a single bit and” |
| 23 | 9.4.2.29 | 148, 61 | 9.4.2.29 | 1112, 1 | Issue: MBR2 has revised the first sentenceResolution: Delete the phrase “is 4 bits in length and” |
| 24 | 9.4.2.29 | 149, 30 | 9.4.2.29 | 1112, 33 | Issue: MBR2 has revised the sentenceResolution: Delete the phrase “is 2 bits in length,” |
| 25 | 9.4.2.29 | 149, 49 | 9.4.2.29 | 1112, 50 | Issue: MBR2 has revised the paragraphResolution: Delete the sentence “The aggregation subfield is 1 bit in length.” |
| 26 | 9.4.2.29 | 149, 56 | 9.4.2.29 | 1112, 57 | Issue: MBR2 has revised the first sentenceResolution: Delete the phrase “is a single bit and” |
| 27 | 9.4.2.29 | 149, 59 | 9.4.2.29 | 1112, 60 | Issue: MBR2 has revised the first sentenceResolution: Delete the phrase “is 3 bits and” |
| 28 | 9.4.2.29 | 149, 64 | 9.4.2.29 | 1112, 64 | Issue: MBR2 has revised the first sentenceResolution: Delete the phrase “is 2 bits in length and” |
| 29 | 9.4.2.29 | 150, 21 | 9.4.2.29 | 1113, 21 | Issue: MBR2 has revised the first sentenceResolution: Delete the phrase “is 1 bit in length and” |
| 30 | 9.4.2.29 | 150, 55 | 9.4.2.29 | 1114, 30 | Issue: MBR2 revised the final sentenceResolution: Delete the phrase “value of the” |
| 31 | 9.4.2.45 | 153, 30 |  |  | No editorial instruction for the paragraph/sentence on this line. Could not find it anywhere else |
| 32 | 9.4.2.67 | 154, 26 |  |  | Typo: the subclause number must be 9.4.2.67 since the following subclauses are still a part of 9.4.2.67 |
| 33 | 9.4.2.157.3 | 156, 39 | 9.4.2.157 | 1331, 22 | Issue: The insertion made into 11ax draft is already present in 11md (may help to harmonize with 11md editor)Resolution: 1. Change the editorial instruction from “Insert the following at the end of this subclause” to “Replace the last paragraph of the subclasue with the following”
2. Delete the phrase “value of” on line 43
3. Delete the phrase “value of” on line 50
 |
| 34 | 9.4.2.160 | 157, 11 | 9.4.2.161 | 1335, 36 | Issue: The subclause numbers are differentResolution: Correct in 11ax draft to 9.4.2.160 |
| 35 | 9.4.2.160 | 157, 21 | 9.4.2.161 | 1335, 5 | Replace “The value of” with “Setting this field to” |
| 36 | 9.4.2.170 | 157, 64 | 9.4.2.170 | 1356, 45 | Issue: There is an error in the referred tableResolution: Replace Table 9-282 with 9-273 |
| 37 | 9.4.2.199 |  | 9.4.2.199 |  | Issue: The figure numbers are off by 4 (9-679 is 9-683 in 11md and 9-680 is 9-684 and so on)Resolution: Harmonize them |
| 38 | 9.4.2.199 | 167, 18 | 9.4.2.199 | 1384, 26 | Issue: M101 has made a change in md draft that needs to be reflectedResolution: Replace “that corresponds” with “corresponding” |
| 39 | 9.4.2.199 | 167, 28 | 9.4.2.199 | 1384, 31 | Issue: M101 has made a change in md draft that needs to be reflectedResolution: Replace “that corresponds” with “corresponding” |
| 39 | 9.4.2.199 | 168, 18 | 9.4.2.199 | 1386, 28 | Issue: MDR2 rephrased the sentenceResolution: Replace “A value of 1 in a bit position in the bitmap transmitted” with “Setting a position in the bitmap transmitted to 1” |
| 40 | 9.4.2.199 | 168, 19 | 9.4.2.199 | 1386, 29 | Issue: MDR2 rephrased the sentenceResolution: Replace “A value of 1 in a bit position in the bitmap transmitted” with “Setting a position in the bitmap transmitted to 1” |
| 41 | 9.6.7.36 | 208, 33 | 9.6.7.36 | 1540, 3 | Issue: 1. In the row corresponding to Vendor specific element, order should be 7 and not 6 per 11md draft. 2. There is no entry for Vendor Specific ElementResolution: Incoporate the changes identified by **[#41]** below |
| 42 | 9.6.7.36 | 209, 29 | 9.6.7.36 | 1543, 45 | Issue: The clause numbers for the PHY are incorrect and off by 1 for all PHYs except for HE |
| 43 | 9.6.7.36 | 210, 32 | 9.6.7.36 | 1546, 1 | Issue: The change made in 11md by M101 should be brought in.Resolution: Add “The” to the beginning of the paragrawph. |
| 44 | 9.6.12.4 | 212, 50 | 9.6.12.4 | 157, 49 | Issue: May not be an issue. The order number same as the one assigned to S1G Operation. They may be same, but VHT has an unique order number and also to avoid any future issues, best to assign its own order numberResolution: Replace 13 with 14 |
| 45 | 10.2.3.2 | 234, 18 | 10.2.3.2 | 1698, 60 | Issue: The paragraph that is being modified is not the 8th, but the 13th pargraph of the subclauseResolution: Correct the eeditorial instrution |
| 46 | 10.2.5 | 234, 40 | 10.2.5 |  | Issue: There is a typo in the claue number in the editorial instructionsReplace: 10.2.6 with 10.2.5 |
| 47 | 10.2.5 | 234, 42 | 10.2.5 | 1700, 43 | Issue: The changes made to 11md draft are significantly different. The changes to this subclause need to be rewritten.Resolution: Incorporate the changes identified by [#47] |
| 48 | 10.3.2.1 | 235, 47 | 10.3.2.1 | 1705  | Issue: Not all changes that have been brought in from 11ah into 11md reflect in the 11ax draftResolution: Incorporate the changes identified by [#48] |
| 49 | 10.3.2.4 | 237, 27 | 10.3.2.4 | 1711, 34 | Issue: Some of the text in earlier drafts has been removed due to removal of PCF in 11md.Resolution: Incorporate the changes identified by [#49] |
| 50 | 10.3.5 | 241, 40 | 10.3.5 | 1744, 44 | Issue: Editorial changes have been made to the paragraph in 11md draft. Also the reference to the figure is incorrectResolution: Inorporate the changes identified by [#50] |
| 51 | 10.3.5 | 241, 50 | 10.3.5 | 1744, 51 | Issue: Editorial changes have been made to the paragraph in 11md draft. Resolution: Inorporate the changes identified by [#51] |
| 52 | 10.3.8  | 242, 30 | 10.3.9 | 1748, 56 | Issue: The 11md draft has changed the phrase “TXVECTOR parameter” to “the TXVECTOR parameter” (two occurences)Resolution: Replace the phrase “TXVECTOR parameter” with “the TXVECTOR parameter” (two occurences) |
| 53 | 10.6.1 | 243, 8 | 10.6.1 | 1751, 43 | Issue: Not all changes have been brought into 11ax draftResolution: Incorporate the changes identified by [#53] |
| 54 | 10.6.5.1 | 243, 44 | 10.6.5.1 | 1753, 6 | Issue: A paragraph is missed in the 11ax draft.Resolution: Incorporate the changes identified by [#54] |
| 55 | 10.6.6.1 | 244, 8 | 10.6.6.1 | 1756, 49 | Issue: There are only items from a) to e) in the 11md draft, but the new insertion is adding item g)Resolution: Replace item “g)” with “f)” |
| 56 | 10.8 | 249, 43 | 10.8 | 1781, 29 | Issue: Some editorial changes in 11md are not yet reflected in 11ax draftResolution: Incorporate the changes identified by [#56] |
| 57 | 10.8 | 252 | 10.8 | 1782, 11 | Issue: Last paragraph in 11md is missing in 11ax draftResolution: Incorporate the changes identified by [#57] |
| 58 | 10.9 | 252, 38 | 10.10 | 1782, 28 | Issue: The subclause number needs to be updatedResolution: Update the subclause number to 10.10 |
| 59 | 10.24.1 | 255, 55 | 10.24.1 | 1805, 35 | Issue: The paragraph needs to be updated for 11ahResolution: Replace the paragraph with “HCCA is not used by DMT, S1G and HE STAs.” |
| 60 | 10.24.2.2 | 256, 1 | 10.24.2.2 | 1807, 3 | Issue: the 11ah update is missingResolution: Replace the phrase “VHT MU PPDU” with “VHT or S1G MU PPDU” |
| 61 | 10.24.2.2 | 256, 49 | 10.24.2.2 |  | Issue: item e) is removed from 11md draftResolution: Delete e) from the draft and renumber the item numbers in the list |
| 62 | 10.24.2.2 | 258, 11 | 10.24.2.2 | 1808, 10 | Issue: the final paragraph in the md draftResolution: Incorporate the changes identified by [#62] |
| 63 | 10.24.2.7 | 259, 60 | 20.24.2.7 | 1813, 40 | Issue: the first two paragraphs of the subclause have been significantly chagned by mdResolution: Incorporate the chagnes identified by [#63] |
| 64 | 10.24.2.8 | 260, 27 | 10.24.2.8 | 1814, 55 | Issue: “acknowledgement policy” has been corrected as “ack policy” in 11 md draft.Resolution: Replace “acknowledgement policy” with “ack policy” on 260, 27 |
| 65 | 10.24.2.8 | 260, 30 | 10.24.2.8 | 1815, 1 | Issue: Changes have been made by 11md draft.Resolution: Replace the item starting on line 30 with “A frame requiring immediate acknowledgment (such as an individually addressed frametransmitted with an ack policy that requires immediate acknowledgment) or an A-MPDUcontaining at least one such frame, followed after SIFS by a corresponding acknowledgment frame |
| 66 | 10.24.2.8 | 261, 15 | 10.24.2.8 | 1816, 21 | Issue: 11md has revised the paragraph.Resolution: Incorporate the changes identified in [#66] |
| 67 | 10.24.2.9 | 262, 23 | 10.24.2.9 | 1817, 29 | Issue: Not all changes to Note 2 from 11md are in 11ax draftResolution: Replace the note with the follwing: NOTE 2—This rule prevents the use of RD, BDT, and TXOP sharing when the TXOP limit is 0. |
| 68 | 10.24.2.9 | 262, 28 | 10.24.2.9 | 1818, 33 | Issue; 11md made several changes to this paragraphResolution: Incorporate the changes identfied in [#68] |
| 69 | 10.24.4.2.3 | 264,1 | 10.24.4.2.3 | 1832, 19 | Issue: Some changes made to the md draft need to be brought inResolution: Incoprorate the changes identified in [#69] |
| 70 | 10.26.2 | 265, 19 | 10.26.2 |  | Issue: Editorial instruction has cited the wrong paragraph. Should be 11 instead of 6Resolution: Change the paragraph number in the editorial instruction from 6 to 11  |
| 71 | 10.26.5 | 266, 1 | 10.26.5 | 1857, 43 | Issue;11md has revised the text significantly and needs to be brought in.Resolution: Only 2nd paragraph has any changes related to HE. Incorporate the changes identified by [#71] |
| 72 | 10.26.6.3 | 266, 30 | 10.26.6.3 | 1860, 5 | Issue: 11md has removed the reference to the subclause 10.26.3Resolution: Delete the phrase “as defined in 10.26.3” at the end of the first sentence |
| 73 | 10.26.6.5 | 266, 49 | 10.26.6.5 | 1862, 30 | Issue: 11md revised the first sentence.Resolution: Replace the phrase “received A-MPDUwith Ack Policy equal to Normal Ack (i.e., implicit block ack request)” with “received QoS Dataframe with Implicit BAR ack policy” |
| 74 | 10.26.6.5 | 267, 1 | 10.26.6.5 | 1862, 45 | Issue: 11md revised the first sentence.Resolution: Replace the phrase “received A-MPDUwith Ack Policy equal to Normal Ack (i.e., implicit block ack request)” with “received QoS Dataframe with Implicit BAR ack policy” |
| 75 | 10.30.3 | 270, 41 | 10.30.3 | 1890, 14 | Issue: 11md updated the list of frames that do not allow +HTC under certain conditionsResolution: Add, “Extended Compressed Block Ack” to the list |
| 76 | 10.30.3 | 270, 58 | 10.30.3 | 1890, 25 | Issue: Need to S1G to item 2Resolution: Replace “an HT STA” with “an HT STA or an S1G STA” |
| 77 | 10.30.4 | 272, 5 | 10.30.3 | 1891, 37 | Issue: A note introduced by 11md needs to be brought inResolution: Add the “NOTE—If the RD initiator's last PPDU contained an A-MPDU, the last frame is the last Data frame in the AMPDU.” Immediately after 7th paragraph of the subclause |
| 78 | 10.30.4 | 272, 7 | 10.30.4 | 1891, 43 | Issue: Need to add S1G MU PPDU to the paragraph/lineResolution: Replace “VHT MU PPDU or HE MU PPDU” with “VHT MU PPDU or an HE MU PPDU or an S1G MU PPDU” |
| 79 | 10.48.1 | 273, 44 | 10.48.1 | 2062, 59 | Issue: wrong capitalizationResolution: Replace “Doze” with “doze” |
| 80 | 11.4.3.4 | 281, 57 | 11.4.3.4 | 2142, 42 | Issue: Item #3 is missing in the 11ax draftResolution: Add the text between items 2a) and 3): “The STA is a member of a multiple BSSID set and the SSID in the Probe Request frame matches any of the SSIDs of the members of that multiple BSSID set.” |
| 81 | 11.2.3.6 | 283, 24 | 11.2.3.6 | 2166, 31 | Issue: md removed the word “single” as “a BU” implies one BUResolution: Delete the word “single” |
| 82 | 11.2.3.6 | 283, 23 | 11.2.3.6 |  | Issue: 11ah changes need to be brought inResolution: Incorporate the changes identified by [#82] |
| 83 | 11.2.3.8 | 284, 1 | 11.2.3.7 | 2168, 47 | Issue: Due to deletion of PCF, a subclause has been removed and the title of the subclause has been changedResolution: Change the subclause number and title to “11.2.3.7 Receive operation for STAs in PS mode” |
| 84 | 11.21.1 | 288,6 | 11.21.1 |  | Issue: The editing instruction is not clearResolution: Change the editing instruction to “Insert the following paragraph above the last paragraph” and remove the existing first paragraph in the changes shown  |
| 85 | 11.22.2 | 288, 25 | 11.22.2 | 2338, 28 | Issue: The subclause has been split further into subclauses.Resolution: Incorporate the new subclause immediately below the 11.22.2 heading as “11.22.2 Event request and event report**”** |
| 86 | 11.22.2 | 288, 26 | 11.22.2 | 2338, 41 | Issue: 11md rephrased the sentenceResolution: Replace the phrase, “dot11EventsActivated is true” with “dot11EventsActivated equal to true” |
| 87 | 11.22.7.1 | 289, 16 | 11.22.7.1 | 2363, 43 | Issue: 11md rephrased the sentenceResolution: Replace the phrase, “dot11BSSTransitionActivated is true” with “dot11BSSTransitionActivated equal to true” |
| 88 | 11.22.7.4 | 289, 46 | 11.22.7.4 | 2365, 55 | Issue: 11md rephrased second sentenceResolution: Incoporate the changes identified by [#88] |
| 89 | 14.2.4 | 293, 18 | 14.2.4 | 2746, 44 | Issue: 11md improved the language in the second paragraphResolution: Incorporate the changes identified by [#89] |
| 90 | B.4.3 | 703, 18 | B.4.3 | 3552, 1 | Issue: 11ah update to CFOFDM row of the table is missing.Resolution: Add “CFS1G:M” to Status Colum to the CFOFDM row of the table |
| 91 | B.4.4.1 | 704, 30 | B.4.4.1 |  | Issue: PC45 is already used in 11md.Resolution: Replace “PC45” with “PC46” in the table |
| 92 | B.4.4.2 | 705, 26 | B.4.4.2 |  | Issue: FT43 is already used in 11mdResolution: Replace “FT43” with “FT53” in the table |
| 93 | B.4.4.2 | 705 54 | B.4.4.2 |  | Issue: FR44 is already used in 11mdResolution: Replace “FR44” with “FR54” in the table |
| 94 | Annex D | 750, 65 | Annex D |  | Issue: dot11SMTbase14 is already used and needs to be supersededResolution: Replace all occurences of dot11SMTbase14 with dot11SMTbase16 (pages 750.65, 751.23. Replace SMTbase14 with SMTbase16 on page 751.6. Replace dot11SMTbase13 with dot11SMTbase15 on 751.23) |
|  |  |  |  |  |  |

* +HTC subfield

Tgax Editor: Make the changes in red color [#7]

Change this subclause as follows:

The +HTC subfield is 1 bit in length. The setting of the subfield is as follows:

* It is set to 1 in a QoS Data or Management frame transmitted with the FORMAT parameter of the TXVECTOR set to HT\_GF, HT\_MF, VHT, or S1G for to indicate that the frame contains an HT Control field.
* It is set to 1 in an RTS frame transmitted with the FORMAT parameter of the TXVECTOR set to S1G to indicate that the intended recipient of the frame has permission to extend the TXOP as described in 10.50.5.4 (Relay-shared TXOP protection mechanisms).
* It is set to 1 in a QoS Data or Management frame transmitted by a QoS CMMG STA to indicate that the frame contains a CMMG Control field.
* It is set to 1 in a QoS Data, QoS Null, or Management frame transmitted by an HE STA to another HE STA to indicate that the frame contains an HT Control field.(#20174, #21585)

Otherwise, the +HTC subfield is set to 0.

NOTE—The +HTC field is always set to 0 for frames transmitted by a DMG STA.

* Duration/ID field (QoS STA)
* Setting for single and multiple protection under enhanced distributed channel access (EDCA)

Tgax Editor: Make the changes in red color [#11]

Change the 2nd paragraph as follows:

The STA selects between single and multiple protection when it transmits the first frame of a TXOP. All subsequent frames transmitted by the STA in the same TXOP use the same class of duration settings. A STA always uses multiple protection in a TXOP that includes:

* Frames that have the RDG/More PPDU subfield equal to 1
* PSMP frames
* VHT/HE NDP Announcement frames ~~or~~, Beamforming Report Poll frames or BFRP Trigger frames
* S1G Beacon frames
* Frames transmitted by an S1G STA with the TXVECTOR parameter RESPONSE INDICATION equal to Long Response

For S1G STAs, Duration/ID field determination rules are further specified in 10.3.2.15 (NAV distribution).

* FILS Discovery frame format

Tgax Editor: Make the changes in red color [#41]

Change Table 9-381 (FILS Discovery frame format) as follows (only modified rows are shown):

|  |
| --- |
| * FILS Discovery frame format
 |
| Order | Information | Notes |
| ~~7~~ | ~~Vendor Specific element~~ | ~~One or more Vendor Specific elements are optionally~~~~present.~~ |
| 7 | TIM element | The TIM element is optionally present if dot11HEOptionImplemented is true, otherwise it is not present. |
| 8 | TWT element | The TWT element is optionally present if dot11HEOptionImplemented is true, otherwise it is not present. If present, the Broadcast field of the TWT element is 1 |
| 9 | OPS element | The OPS element is optionally present if dot11HEOptionImplemented is true, otherwise it is not present. |
| 10 | Vendor Specific element | One or more Vendor Specific elements are optionallypresent. |

* Combined use of DCF, ~~and~~ HCF, and TUA

Tgax Editor: Make the changes as shown below in red color [#47]

The DCF and the hybrid coordination function are defined so they may operate within the same BSS. Another access scheme, trigger based uplink access (TUA) may also operate within the same BSS. All access methods (controlled, contention and trigger based) operate sequentially. Sequential operation allows the polled, contention and trigger based access methods to alternate, within intervals as short as the time to transmit a frame exchange sequence, under rules defined in 10.24 (HCF) and 26.5.2 (UL MU Operation).

* CS mechanism

***Tgax Editor: Split 3rd paragraph into two paragraphs and make changes as shown below in red. Change the editorial instruction as shown. [#48]***

***Change the 3rd paragraph of the subclause as follows:***

A virtual CS mechanism, referred to as the NAV, shall be provided by all MAC entities. An additional second virtual CS mechanism, referred to as response indication deferral (RID), shall be provided by an S1G MACs.

The NAV maintains a prediction of future traffic on the medium based on duration information that is announced in RTS/CTS frames by non-DMG STAs, MU-RTS Trigger/CTS frames by HE STAs as defined in 26.2.6 (MU-RTS Trigger/CTS frame exchange procedure), and RTS/DMG CTS frames by DMG STAs prior to the actual exchange of data. The duration information is also available in the MAC headers of all frames sent during the CP other than PV1 MAC frames and PS-Poll frames and during the BTI, the A-BFT, the ATI, the CBAP, and the SP. The duration information in a frame transmitted by an S1G STA is also available in PS-Poll+BDT frames, in NDP CTS frames, in NDP Ack frames whose Idle Indication field value is 0, and in NDP\_2M PS-Poll-Ack frames whose Idle Indication field is 0.The duration information might also be available in the RXVECTOR parameter TXOP\_DURATION when an HE PPDU is received (see 26.11.5 (TXOP\_DURATION)).

***Tgax Editor: Replace the fourth paragraph with the following:***

***Change the 7th paragraph as shown below:***

The CS mechanism combines the NAV state, and in S1G STAs also the RID state, and the STA’s transmitter status with physical CS to determine the busy/idle state of the medium. The NAV and RID might be thought of as counters that count down to 0 at a uniform rate(#1085). In non-S1G STAs, when the NAV counter is 0, the virtual CS indication is that the medium is idle; when the counter is nonzero, the indication is busy. In S1G STAs, when both NAV and RID counters are 0, the virtual CS indication is that the medium is idle; when either the NAV counter or the RID counter is nonzero the indication is that the medium is busy. The virtual CS indication of medium for HE STAs with two NAVs is described in 26.2.4 (Updating two NAVs). If a DMG STA supports multiple NAVs as defined in 10.40.10 (Updating multiple NAVs) and all counters are 0, the virtual CS indication is that the medium is idle; when at least one of the counters is nonzero, the indication is busy. The medium shall be determined to be busy when the STA is transmitting.

* Setting and resetting the NAV

***Tgax Editor: Make the changes in red [#49]***

***Change 2nd paragraph as shown below:***

A STA that receives at least one valid frame in a PSDU can update its NAV with the information from any valid Duration field in the PSDU. When the received frame’s RA is equal to the STA’s own MAC address, the STA shall not update its NAV. Further, when the received frame is a DMG CTS frame and its TA is equal to the STA’s own MAC address, the STA shall not update its NAV. For all other received frames the STA shall update its NAV when the received Duration is greater than the STA’s current NAV value. Upon receipt of a PS-Poll frame, a STA, except for an S1G STA for which the RXVECTOR parameter RESPONSE\_INDICATION of the received PS-Poll frame is NDP Response, shall update its NAV settings as appropriate under the data rate selection rules using a duration value equal to the time, in microseconds, required to transmit one Ack frame plus one SIFS, but only when the new NAV value is greater than the current NAV value. If the calculated duration includes a fractional microsecond, that value is rounded up to the next higher integer. (Ed#65)When the NAV is reset, a PHY-CCARESET.request primitive shall be issued. This NAV update operation is performed when the PHY-RXEND.indication primitive is received, except when the PHY-RXEND.indication primitive is received before the end of the PPDU, in which case the NAV update is performed at the expected end of the PPDU.

* Individually addressed MPDU transfer procedure

***Tgax Editor: Make the changes in red [#50]***

Change 10.3.5 as follows:

~~A~~ If dot11TXOPDurationRTSThreshold is 1023 or not present, a STA using the DCF or EDCA shall use an RTS/CTS exchange to protect the transmission of ~~for~~ individually addressed Data or Management frames when the length of the PSDU is greater than the length threshold indicated by dot11RTSThreshold. If dot11TXOPDurationRTSThreshold is not 1023, a non-AP HE STA using EDCA shall use an RTS/CTS exchange as defined in 26.2.1 (TXOP duration-based RTS/CTS). A STA may also use an RTS/CTS exchange to protect the transmission of ~~for~~ individually addressed frames when it is necessary to distribute the NAV, or when it is necessary to establish protection (see 10.28 (Protection mechanisms)), or for other purposes.

***Tgax Editor: Make the changes in red [#51***

* If dot11RTSThreshold is 0, an RTS/CTS exchange shall precede all frame exchanges incluing an individually addressed Data or Management frame. Multirate support
* Overview

Tgax Editor: Make the changes shown in red [#53]

Change the last two paragraphs as follows:

For specific PHYs, the value of the Duration/ID field is determined using the PLME-TXTIME.request primitive and the PLME-TXTIME.confirm primitive. These specific PHYs are defined in:

* Clause 16 (High rate direct sequence spread spectrum (HR/DSSS) PHY specification) for HR/DSSS
* Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) for OFDM
* Clause 18 (Extended Rate PHY (ERP) specification) for ERP
* Clause 19 (High Throughput (HT) PHY specification) for HT
* Clause 20 (Directional multi-gigabit (DMG) PHY specification) for DMG
* Clause 21 (Very High Throughput (VHT) PHY specification) for VHT
* Clause 22 (Television Very High Throughput (TVHT) PHY specification) for TVHT
* Clause 24 (China directional multi-gigabit (CDMG) PHY specification(11aj)) for CDMG
* Clause 27 (High Efficiency (HE) PHY specification) for HE

The two PLME-TXTIME primitives are defined in the respective PHY specifications:

* 16.3.4 (HR/DSSS TXTIME calculation) for HR TXTIME calculation
* 17.4.3 (OFDM TXTIME calculation) for OFDM TXTIME calculation
* 18.5.3.2 (ERP-OFDM TXTIME calculations)
* 19.4.3 (TXTIME calculation) for HT TXTIME calculation
* 20.12.3 (TXTIME calculation) for DMG PLME TXTIME calculation
* 21.4.3 (TXTIME and PSDU\_LENGTH calculation) for VHT PLME TXTIME calculation
* 22.4.3 (TXTIME and PSDU\_LENGTH calculation) for TVHT PLME TXTIME calculation
* 25.14.3 (TXTIME calculation) for CMMG PLME TXTIME calculation
* 27.4.3 (TXTIME and PSDU\_LENGTH calculation) for HE PLME TXTIME calculation
* Rate selection for Data and Management frames
* Rate selection for non-STBC Beacon and non-STBC PSMP frames

Tgax Editor: Change the editorial instruction as shown in red and remove the now 3rd paragraph as it does not have any changes [#54]

Change the 2nd paragraph as follows:

If the BSSBasicRateSet parameter is not empty, a non-STBC PSMP frame or a non-STBC Beacon frame, ER beacon or HE SU beacon(#21163) shall be transmitted in a non-HT PPDU using one of the rates included in the BSSBasicRateSet parameter. An ER beacon is transmitted as defined 26.15.5 (Additional rules for ER beacons and group addressed frames) and an HE SU beacon(#21163) is transmitted as defined in 26.15.6 (Additional rules for HE SU beacons(#21163) in the 6 GHz band).(#20115, #20298, #20706, #21569, #21284, #21568)

* HT Control field operation

Tgax Editor: Change the first two paragraphs as shown (other paragraps not shown) in red [#56]

Change as follows:

If dot11HTControlFieldSupported is true, a STA shall set the +HTC-HT Support subfield of the HT Extended Capabilities field of the HT Capabilities element to 1 in HT Capabilities elements that it transmits. If the value of dot11VHTControlFieldOptionImplemented is true, a STA shall set the +HTC-VHT Support subfield of the VHT Capabilities Information field of the VHT Capabilities element to 1 in VHT Capabilities elements that it transmits. If dot11HEControlFieldOptionImplemented is true, a STA shall set the +HTC-HE Support subfield in the HE MAC Capabilities Information field to 1 of the HE Capabilities elements that it transmits.

A STA in which at least one of dot11RDResponderOptionImplemented, dot11MCSFeedbackOptionImplemented, and dot11AlternateEDCAActivated is true shall set dot11HTControlFieldSupported or dot11VHTControlFieldOptionImplemented or both to true. A STA that has at least one of dot11TRSOptionImplemented(#20043), dot11OMIOptionImplemented, dot11HEBSRControlImplemented, dot11HEBQRControlImplemented, dot11RDResponderOptionImplemented or dot11SRResponderOptionImplemented equal to true or has has dot11HEMCSFeedbackOptionImplemented greater than zero shall set dot11HEControlFieldOptionImplemented to true. An HE AP shall set dot11HEControlFieldOptionImplemented to true.

***Tgax Editor: Add the following paragraph to the end of the subclause[#57]***

An S1G shall not use an HT Control field other than a VHT variant HT Control field. An S1G STA shall not use a VHT variant HT Control field for any purpose other than link adaptation (see 10.33.3).

* EDCA backoff procedure

***Tgax Editor: Replace the final paragraph immediately above the newly inserted paragraph[#62]***

If the backoff procedure is invoked for reason c), d), ~~or e)~~, f), g) or h) above, the value of CW[AC] shall be updated as follows before invoking the backoff procedure:

* If QSRC[AC] is less than dot11ShortRetryLimit,
* QSRC[AC] shall be incremented by 1
* CW[AC] shall be set to the lesser of CWmax[AC] and

* Else
* QSRC[AC] shall be set to 0
* CW[AC] shall be set to CWmin[AC]
* When dot11RobustAVStreamingImplemented is true and either the QSDRC[AC] or the QLDRC[AC] has reached dot11ShortDEIRetryLimit or dot11LongDEIRetryLimit, respectively, CW[AC] shall be reset to CWmin[AC].

NOTE—An HE STA updates its local MIB variables related to CWmin and CWmax as defined in 26.2.7 (EDCA operation using MU EDCA parameters).

* Sharing an EDCA TXOP

Change the 1st three paragraphs as follows:

***Tgax Editor: Replace the current first paragraph with the following: [#63]***

The AC associated with the EDCAF that gains an EDCA TXOP is referred to as the primary AC. Frames from ACs other than the primary AC shall not be included in the TXOP, with the following exceptions (TXOP sharing):

* Frames from a higher priority AC may be included when at least one frame from the primary AC has been transmitted and all frames from the primary AC have been transmitted.
* When an AP supports DL-MU-MIMO or DL OFDMA, frames from a higher or lower priority AC may be included in a VHT or S1G or an HE MU PPDU with the TXVECTOR parameter(#2639) NUM\_USERS > 1 when these frames do not increase the duration of the VHT or S1G or HE MU PPDU beyond that required for the transmissions of the frames of the primary AC, targeting up to four STAs if it is transmitted in a VHT or S1G MU PPDU... Frames from the primary AC shall be transmitted first. The inclusion of secondary AC traffic in an HE MU PPDU is described in 10.24.2.8 (Multiple frame transmission in an EDCA TXOP). The inclusion of secondary AC traffic in an HE MU PPDU shall not cause the TXOP limit of the primary AC to be exceeded.
* Multiple frame transmission in an EDCA TXOP

***Tgax Editor: Replace the identified paragraph (currently paragraph #9)with the following paragraph [#66]***

If there is no RTS/CTS or MU-RTS Trigger/CTS frame exchange in non-HT duplicate format in a TXOP, and the TXOP includes at least one non-HT duplicate frame(#194) that does not include a PS-Poll, then the TXOP holder shall set the TXVECTOR parameter CH\_BANDWIDTH(#2628) of a PPDU sent after the first non-HT duplicate frame that is not a PS-Poll to be the same or narrower than the TXVECTOR parameter CH\_BANDWIDTH(#2628) of the initial frame in the first non-HT duplicate frame(#194) in the same TXOP.

* TXOP limits

***Tgax Editor: Make the changes to 7th paragraph as shown in red color [#68]***

The TXOP holder may exceed the TXOP limit only if it does not transmit more than one Data or Management frame in the TXOP, only if it does not transmit a DL-MU-MIMO PPDU in the TXOP, and only for the following situations:

* Retransmission of an MPDU, not in an A-MPDU consisting of more than one MPDU, where the size of the retransmitted MPDU is the same as the initially transmitted MPDU
* Transmission of an MSDU or MMPDU less than 600 octets by an S1G non-sensor STA
* Transmission of a fragment of an MSDU or MMPDU, the fragment being less than 256 octets, by an S1G non-sensor STA
* Initial transmission of an MSDU under a block ack agreement, where the MSDU is not in an A-MPDU consisting of more than one MPDU and the MSDU is not in an A-MSDU
* Transmission of a Control frame or a QoS Null frame, not in an A-MPDU consisting of more than one MPDU
* Initial transmission of a non-dynamic fragment of an MSDU or MMPDU (see 10.4 (MSDU and MMPDU fragmentation)), if a previous fragment of that MSDU or MMPDU was retransmitted
* Transmission of a non-dynamic fragment of an MSDU or MMPDU fragmented into 16 fragments
* Transmission of the 16th dynamic fragment of an MSDU or MMPDU
* Initial transmission of the first dynamic fragment of an MSDU or MMPDU, where the size of the first fragment is equal to the minimum fragment size specified by the receiver STA and the MSDU or MMPDU is not in an A-MPDU consisting of more than one MPDU
* Transmission of an A-MPDU consisting of the initial transmission of a single MPDU not containing an MSDU and that is not an individually addressed Management frame
* Transmission of a group addressed MPDU, not in an A-MPDU consisting of more than one MPDU
* Transmission of a null data data PPD (NDP)
* Transmission of a VHT NDP Announcement frame and NDP or transmission of a Beamforming Report Poll frame, where these fit within the TXOP limit and it is only the response and the immediately preceding SIFS that cause the TXOP limit to be exceeded.
* Transmission of one of the following sequences, provided that the sequence fits within the TXOP limit and it is only the response and the immediately preceding SIFS that causes the TXOP limit to be exceeded:
* An HE NDP Announcement frame and HE sounding NDP
* An HE NDP Announcement frame and HE sounding NDP and BFRP Trigger frame
* A BFRP Trigger frame
* Admission Control at the HC
* Contention based admission control procedures
* Procedure at non-AP STAs

Change the 8th paragraph as follows:

Tge Editor:Make the changes shown in red color [#69]

The MPDUExchangeTime equals the time required to transmit the MPDU sequence. For the case of an MPDU transmitted with Normal Ack ack policy and without RTS/CTS protection, this equals the time required to transmit the MPDU plus the time required to transmit the expected response frame plus one SIFS. Frame exchange sequences for Management frames and the HE TB PPDU are excluded from the used\_time update. If the used\_time value reaches or exceeds the admitted\_time value, the corresponding EDCAF shall no longer transmit QoS Data frames or QoS Null frames using the EDCA parameters for that AC as specified in the QoS Parameter Set element. However, a STA may choose to temporarily replace the EDCA parameters for that EDCAF with those specified for an AC of lower priority, if no admission control is required for those ACs.

* Selection of BlockAck and BlockAckReq variants

***Tgax Editor: Replace the entire contents of 10.26.5 from the Tgax draft with the following***

***Change the second paragraph of the subclause as shown below: [#71]***

The Multi-TID BlockAck variant shall be used for all BlockAck frames related to an HT-immediate agreement transmitted inside a PSMP sequence and shall not be used otherwise. For non-HE STAs, the Multi-TID BlockAckReq variant shall be used for all BlockAckReq frames related to an HT-immediate agreement transmitted inside a PSMP sequence and shall not be used otherwise. The Multi-TID BlockAckReq variant can be used between HE STAs to solicit a Multi-STA BlockAck frame for Multi-TID A-MPDUs.

The Multi-TID subfield of the BA Control field shall be set to 1 in all BlockAck frames related to an HT-immediate agreement transmitted inside a PSMP sequence and shall be set to 0 otherwise. For non-HE STAs, ~~T~~the Multi-TID subfield of the BAR Control field shall be set to 1 in all BlockAckReq frames related to an HT-immediate agreement transmitted inside a PSMP sequence and shall be set to 0 otherwise. The Multi-TID BlockAckReq variant can be used between HE STAs to solicit a Multi-STA BlockAck frame for Multi-TID A-MPDUs.

* AP operation

Change item g) in the 2nd paragraph as follows:

* When the AP receives a PS-Poll frame from a STA that is in PS mode, it shall forward to the STA a single buffered BU. The AP shall respond after a SIFS either with a Data or Management frame, or with an Ack frame; in which case the corresponding Data or Management frame is delayed. Until the transmission of this BU either has succeeded or is presumed failed (when maximum retries are exceeded), the AP shall acknowledge but ignore all PS-Poll frames from the same STA. This prevents a retried PS-Poll frame from being treated as a new request to deliver a buffered BU.

For a STA using U-APSD, the AP transmits one BU destined for the STA from any AC that is not delivery-enabled in response to PS-Poll frame from the STA. The AP should transmit the BU from the highest priority AC that is not delivery-enabled and that has a buffered BU. When all ACs associated with the STA are delivery-enabled, the AP transmits one BU from the highest priority AC that has a BU.

For a STA in PS mode and not using U-APSD, the AP shall set the More Data subfield of the response Data or Management frame to 1 to indicate the presence of further buffered BUs (not including the BU currently being transmitted) for the polling STA. For a STA using U-APSD, the AP shall set the More Data subfield to 1 to indicate the presence of further buffered BUs (not including the BU currently being transmitted) that do not use delivery-enabled ACs. When all ACs associated with the STA are delivery-enabled, the AP shall set the More Data subfield to 1 to indicate the presence of further buffered BUs (not including the BU currently being transmitted) using delivery-enabled ACs.

Upon receiving a PS-Poll frame, the S1G AP that intends to respond with immediate Data frame may use the RTS/CTS scheme to protect the transmission of the frame.

(An S1G AP that sends an acknowledgment frame of type (NDP) Ack or NDP PS-Poll-Ack in response to an (NDP)PS-Poll/trigger frame that is received from an S1G STA shall set the More Data subfield of the acknowledgment frame to 0 when no BU is buffered for the STA; otherwise, it shall set it to 1. The successful reception of the acknowledgment frame provides the following indications to the S1G STA:

* If the More Data subfield is equal to 0 it indicates that no service period starts for the STA and that it may enter the doze state,
* If the More Data subfield is equal to 1 it indicates that a service period starts for the STA after a time T, starting from the end of the acknowledgment frame, after which the S1G STA shall remain in the awake state until a frame is received from the S1G AP that has the EOSP subfield equal to 1. The time T is equal to one of the following:
* 0 if the acknowledgment frame is an Ack frame or is an NDP (PS-Poll-)Ack frame with the Idle Indication subfield equal to 0
* The value indicated in the Duration field of the frame if the frame is an NDP (PS‑Poll-)Ack frame with the Idle Indication subfield equal to 1.

For a STA in PS mode and not using U-APSD, the AP shall set the More Data subfield of the response Data or Management frame to 1 to indicate the presence of further buffered BUs (not including the BU currently being transmitted) for the polling STA.

For a STA using U-APSD, the AP shall set the More Data subfield to 1 to indicate the presence of further buffered BUs (not including the BU currently being transmitted) that do not use delivery-enabled ACs. When all ACs associated with the STA are delivery-enabled, the AP shall set the More Data subfield to 1 to indicate the presence of -further buffered BUs (not including the BU currently being transmitted) using delivery-enabled ACs.

If there are buffered BUs to transmit to the STA, the AP may set the More Data bit in a QoS +CFAck frame to 1 in response to a QoS Data frame to indicate that it has one or more pending BUs buffered for the PS STA identified by the RA in the QoS +CF-Ack frame. An AP may also set the More Data bit in an Ack frame to 1 in response to a QoS Data frame to indicate that it has one or more pending BUs buffered for the PS STA identified by the RA in the Ack frame, if that PS STA has set the More Data Ack subfield in the QoS Capability element to 1. An HE AP may also set the More Data bit in a BlockAck or Multi-STA BlockAck frame to 1 to indicate that it has one or more pending BUs buffered for the HE PS STA identified by the RA in the BlockAck or Multi-STA Blockack frame, if that HE PS STA has set the More Data Ack subfield in the QoS Capability element to 1. An HE AP indicates support of sending Ack, BlockAck, or Multi-STA BlockAck frames with a nonzero More Data subfield by setting the More Data Ack subfield to 1 in the QoS Info field of frames it transmits.

Unless indicated above, the AP shall set the More Data bit to 0.

* BSS transition management response

Change the 2nd paragraph as follows:

Tgax Editor: Make the changes shown in red [#88]

The STA’s SME may include the result of its BSS transition decision in the Target BSSID field and BTM Status Code field in the MLME-BTM.response primitive. A BTM Status Code field set to a value of 0 (i.e., Accept) indicates the STA will transition from the current BSS. If a non-HE STA’s SME receives an MLMEBTM.indication primitive indicating a BSS transition management request that it is unable to comply with, it may issue an MLME-BTM.response primitive with a status code indicating rejection

* MLME mesh procedures
* Mesh discovery
* Mesh STA configuration

Change as follows:

Tgax Editor: Incorporate the chagnes identified in red [#89]

The mesh STA configuration consists of the mesh profile (see 14.2.3 (Mesh profile)), the Supported Rates and BSS Membership Selectors element, the Extended Supported Rates and BSS Membership Selectors element, the HT Operations element (if present), ~~and~~ the VHT Operations element (if present), and the HE Operation element (if present).

Mesh STA configurations are identical if the following conditions hold:

* The mesh profiles are identical.
* The BSSBasicRateSet parameter of the MLME-START.request primitive is identical to the basic rate set indicated by the Supported Rates and BSS Membership Selectors element and Extended Supported Rates and BSS Membership Selectors element, if present, received in the MLMEMESHPEERINGMANAGEMENT.indication primitive.
* For HT mesh STAs, the Basic HT-MCS Set field of the HT Operation parameter of the MLMESTART.request primitive is identical to the HT Operation element received in the MLMEMESHPEERINGMANAGEMENT.indication primitive.
* For VHT mesh STAs, the Basic VHT-MCS and NSS fields in the VHT Operation element of the MLME-START.request primitive are identical to the Basic VHT-MCS and NSS fields in the VHT Operation element received in the MLME-MESHPEERINGMANAGEMENT.indication primitive.
* For HE mesh STAs, the Basic HE-MCS and NSS Set field in the HE Operation element of the MLME-START.request primitive are identical to the Basic HE-MCS and NSS Set field in the HE Operation element received in the MLME-MESHPEERINGMANAGEMENT.indication primitive.

**References:**