IEEE P802.11  
Wireless LANs

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| Resolution for comments received for CC on D0.1 for subclause 37.11.3 | | | | |
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Abstract

This document contains proposed resolutions to comments received on 802.11bn D0.1.

3086 3963 1288 1596 2218 3895 3958 2201 3394 3089 3430 426 659 726 754 801 1068 1289 1290 1555 2406 2607 3702 639 660 727 802 2158 3395 640 2159 3088 427 428 641 642 728 729 755 1556 1557 2160 2161 2407 2608 3429 3087 2202 3220 661 803 1558 1291 2192 2194 2197 2498 2609 3662 3768 1292 3090 1559 2610 3767 3092 512 652 1293 3775 3093 1294 2611 2682 3771 2455 2499 2612 3396 3397 1295 1296 1297 1298 1299 1300 1301 1302 1560 3191 730 877 1815 2613 3398 3663 3769 3095 3094 268 1303 1304 3664 3770 1305 1306 3665 3772 269 1307 2500 3666

1288 1596 2218 3394 3089 3430 426 659 726 754 801 1068 1289 1290 1555 2406 2607 3702 639 660 727 802 2158 3395 640 2159 3088 427 428 641 642 728 729 755 1556 1557 2160 2161 2407 2608 3429 3087 1558 1291 2498 2609 3662 3768 1292 3090 1559 2610 3767 3092 512 652 3093 1294 2611 2682 2455 2499 2612 3396 3397 1295 1296 1297 1298 1299 1300 1301 1302 1560 3191 730 877 2613 3398 3663 3095 3094 1303 1304 1305 1306 269 2500 3666

R1: some more CIDs resolved.

R3: offline comments received

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| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 3086 | Mark RISON | 0.00 | "unavailability period of time" -- it can't be of anything else | Delete "of time" (2x) |  |
| 3963 | Muhammad Kumail Haider | 0.00 | Baseline TWT operation defines a mode of operation (Responder PM Mode set to 1) where an AP may become unavailable even if it has negotiated TWT (or other) agreements with a STA. This may lead to interrupted service for STAs and affect adversely low latency traffic and STA's power saving (refer to 26.8.3.2). AP PUO mode in UHR should ensure that if existing schedules like iTWT, other bTWT/R-TWT or other schedules/SPs like SCS negotiations are in place, AP doesn't become unavailable | As in comment |  |
| 1288 | Hong Won Lee | 82.52 | The term 'Periodic Unavailability Operation,' which can be represented as an abbreviation, should be capitalized | Change from "periodic unavailability operation" to "Periodic Unavailability Operation" | Revised – feature names don’t have upper case. Apply the changes marked as #1288 in this document. |
| 1596 | Yuchen Guo | 82.52 | During PUO, the non-AP STA may still be able to do communication with the AP since the traffic of another trchnology may not be exact periodic. Complete unavailability during the SP is not necessary. | Define a mode where the AP can check the non-AP's availability during the unavailability SP | Reject – by definition, when the STA is unavailable it is not reachable. |
| 2218 | kaikai huang | 82.52 | PUO module is inefficiency for off channel scan(out of TXOP, aperiodic) | Define one announcement frame to signal unavailability and measurement info | Reject – in this case, there’s also DUO that is defined |
| 3895 | Muhammad Kumail Haider | 82.52 | Enhancements to P2P TWT procedure or PUO modes in UHR should encompass methods where a STA may indicate to the AP that it may be unavailable only on a subset of frequencies of its operating bandwidth during indicated times | As in comment |  |
| 3958 | Muhammad Kumail Haider | 82.52 | The NOTE should also include the expectation that AP may always initiate transmissions with a control frame e.g., RTS. We should consider, as part of enhancements to P2P TWT/PUO operation in UHR that STA is able to signal and request always initiating transmissions (if AP decides to do so) with an ICF. | As in comment |  |
| 2201 | Brian Hart | 82.54 | PUO mode is vastly more efficient than DUO mode, in terms of frames sent, TXOPs initiated, and power consumed; and its use should be preferentially encouraged. Note that a stream of DUO requests for an underlying PUO flow can be easily discerned by an AP (e.g., it is very close to the DFS detection problem) | Where a non-AP STA does not have the compute (or for other reasons) to ascertain its periodic unavailability schedule, but assoc AP does discern a pattern from the STA's DUO requests, allow the AP to send an "unsolicited PUO request" (e.g., with same/similar format as a more capable STA might send to AP) so that the AP can notify the STA that the AP will abide by that determined unavailability schedule (until proven stale by any STA activity in an expected-unavailability window). The STA need not do anything or (preferentially) may suspend sending of DUO frames in order to save power / reduce congestion etc |  |
| 3394 | Zhenpeng Shi | 82.54 | Here the definition of PUO is only about non-AP STA, but AP also has PUO mode as defined in 37.11.4. To make it clear, non-AP STA PUO and AP PUO can be defined separately in the corresponding subclauses (37.11.3 and 37.11.4). | Change "periodic unavailability operation (PUO) allows a non-AP STA ..." to "Non-AP STA periodic unavailability operation (PUO) mode allows a non-AP STA ...". | Accept |
| 3089 | Mark RISON | 82.57 | "set the PUO Supporting AP field of the UHR MAC Capabilities Information" -- no such field. Ditto PUO Support field at 83.1 | As it says in the comment | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 3430 | Yue Zhao | 82.57 | The name of "PUO Supporting AP" is misleading, especially when considering it together with the AP PUO mode in 37.11.4 | Replace "PUO Supporting AP" with "PUO Assisting AP". Coorespondingly, "PUO supporitng AP field" should be "PUO assisting AP field". | Accept |
| 426 | Shuang Fan | 82.58 | There is no 'PUO Supporting AP ' field defined in the UHR MAC Capabilities Information in clause 9.4.2.aa2.2, please add it. | as in comment | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 659 | Jaheon Gu | 82.58 | Suggest changing text from "... shall set the PUO Supporting AP field" to "... shall set the PUO supported field", to ensure consistency in the sentence | As in comment. | Revised – agree with the commenter. Apply the changes marked as #3430 in this document. |
| 726 | Chien-Fang Hsu | 82.58 | "PUO Supporting AP field" is not defined in UHR MAC Capabilities Information field | Add a "PUO Supported" in UHR MAC Capabilities Information field. Use "Supported" to align with the naming as DUO | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 754 | Junbin Chen | 82.58 | "A UHR AP that supports PUO is called a PUO Supporting AP and shall set the PUO Supporting AP field of the UHR MAC Capabilities Information field of the UHR Capabilities that it transmits to 1." the "PUO Supporting AP field" shall be "PUO Support field". | as commented | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 801 | Seongho Byeon | 82.58 | Suggest changing text from "... shall set the PUO Supporting AP field" to "... shall set the PUO supported field", to ensure consistency in the sentence | As in comment. | Revised – agree with the commenter. Apply the changes marked as #3430 in this document. |
| 1068 | Matthew Fischer | 82.58 | missing PUO supported field and PUO Supporting AP in UHR MAC Capabilities Information | A UHR AP that supports PUO is called a PUO Supporting AP and shall set the PUO Supporting AP field of the UHR MAC Capabilities Information field of the UHR Capabilities that it transmits to 1. - PUO Supporting AP is missing in 9.4.2.aa2.2  In the next page, same about "PUO Support field" of the STA as well | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 1289 | Hong Won Lee | 82.58 | PUO for non-AP STA should be distinguished from PUO for AP | Change from "PUO" to "Non-AP PUO" | Revised – agree with the commenter. Define an APPUO capability. Apply the changes marked as #1294 in this document |
| 1290 | Hong Won Lee | 82.58 | The PUO Supporting AP field is not defined in the UHR MAC Capabilities Information field of the UHR Capabilities element | The PUO Supporting AP field should be defined in the UHR MAC Capabilities Information field of the UHR Capabilities element or another proper container | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 1555 | yajun CHENG | 82.58 | The field "PUO Supporting AP" should be added in Figure 9-aa5 --UHR MAC Capabilities Information field format. | As in comment. | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 2406 | Yuki Fujimori | 82.58 | PUO Supporting AP field of the UHR MAC Capabilities Information field doesn't exist in the Figure 9-aa5 --UHR MAC Capabilities Information field format. | Please add the field into the figure. | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 2607 | Minyoung Park | 82.58 | Define 'PUO Supporting AP field' in the UHR MAC Capabilities Information field in Clause 9. | As in the comment | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 3702 | Sherief Helwa | 82.58 | Same comment as for DUO. A terminology unification with DPS will be better. DPS uses "Assisting", so one term or the other or even a new term would be fine. | Explained in the comment | Revised – Agree with the commenter. Apply the changes marked as #3430 in this document |
| 639 | Jaheon Gu | 82.59 | The current text reads: "... the UHR MAC Capabilities Information field of the UHR Capabilities that it transmits to 1." Replace with "... the UHR MAC Capabilities Information field of the UHR Capabilities element that it transmits to 1." | As in comment. | Revised – apply the changes marked as #3395 in this document |
| 660 | Jaheon Gu | 82.59 | Suggest changing text from "... of the UHR Cpapabilities" to "... of the UHR Capabilities element", to ensure consistency in the sentence | As in comment. | Revised – apply the changes marked as #3395 in this document |
| 727 | Chien-Fang Hsu | 82.59 | "element" is missed in "... of the UHR Capabilities that it transmits to 1." | add the "element" | Revised – apply the changes marked as #3395 in this document |
| 802 | Seongho Byeon | 82.59 | Suggest changing text from "... of the UHR Cpapabilities" to "... of the UHR Capabilities element", to ensure consistency in the sentence | As in comment. | Revised – apply the changes marked as #3395 in this document |
| 2158 | Vishnu Ratnam | 82.59 | The current text reads: "... the UHR MAC Capabilities Information field of the UHR Capabilities that it transmits to 1." Replace with "... the UHR MAC Capabilities Information field of the UHR Capabilities element that it transmits to 1." | As in comment. | Revised – apply the changes marked as #3395 in this document |
| 3395 | Zhenpeng Shi | 82.59 | "UHR Capabilities" should be "UHR Capabilities element". | As in comment. | Accept |
| 640 | Jaheon Gu | 82.61 | The current text reads: "... and shall set the Peer-to-peer TWT Support field in the Extended Capabilities elements that the AP transmits to 1." Suggest to replace with "... and shall set the Peer-to-peer TWT Support field in the Extended Capabilities element that the AP transmits to 1." | As in comment. | Accept |
| 2159 | Vishnu Ratnam | 82.61 | The current text reads: "... and shall set the Peer-to-peer TWT Support field in the Extended Capabilities elements that the AP transmits to 1." Suggest to replace with "... and shall set the Peer-to-peer TWT Support field in the Extended Capabilities element that the AP transmits to 1." | As in comment. | Revised – apply the changes marked as #640 in this document |
| 3088 | Mark RISON | 82.61 | " that the AP transmits to 1." should be "... that it transmits ..." | As it says in the comment | Accept |
| 427 | Shuang Fan | 83.01 | There is no 'PUO Support ' field defined in the UHR MAC Capabilities Information in clause 9.4.2.aa2.2, please add it. | as in comment | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 428 | Shuang Fan | 83.01 | UHR STA that support...' should be 'UHR non-AP STA that...' | as in comment | Accept |
| 641 | Jaheon Gu | 83.01 | The current text reads: "A UHR STA that supports PUO is called a PUO non-AP STA and shall ..." Suggest to replace with "A UHR non-AP STA that supports PUO is called a PUO non-AP STA and shall" | As in comment. | Revised – apply the changes marked as #428 |
| 642 | Jaheon Gu | 83.01 | Since PUO mode can also be used by an AP, suggest to generalize the capabilities fields "PUO Supporting AP" and "PUO Support" with "PUO Assistance Capable" and "PUO Capable", respectively. | As in comment. | Reject – only applicable for non-AP STA. |
| 728 | Chien-Fang Hsu | 83.01 | "PUO Supporting field" is not defined in UHR MAC Capabilities Information field | Add a "PUO Supported" field in UHR MAC Capabilities Information field. Use "Supported" to align with the naming as DUO | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 729 | Chien-Fang Hsu | 83.01 | "a UHR STA" should be "a UHR non-AP STA" | as the comment | Revised – apply the changes marked as #428 |
| 755 | Junbin Chen | 83.01 | "A UHR STA that supports PUO is called a PUO non-AP STA and ......" The "A UHR STA" here should be specifically limited to "A non-AP UHR STA that supports PUO...". | as commented | Revised – apply the changes marked as #428 |
| 1556 | yajun CHENG | 83.01 | The field "PUO Support" should be added in Figure 9-aa6 --UHR MAC Capabilities Information field format | As in comment. | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 1557 | yajun CHENG | 83.01 | I believe it's sufficient to use one field in the UHR MAC Capbilities Information field for PUO supporting indication, such as PUO Support field, for both AP and non-AP STA instead of defining "PUO Supporting AP field" and "PUO Support field" separately. | Defining "PUO Support field" in the UHR MAC Capbilities Information field for PUO supporting indication, but having different meanings for AP and non-AP STA respectively. | Revised – apply the changes marked as #1294 in this document |
| 2160 | Vishnu Ratnam | 83.01 | The current text reads: "A UHR STA that supports PUO is called a PUO non-AP STA and shall ..." Suggest to replace with "A UHR non-AP STA that supports PUO is called a PUO non-AP STA and shall" | As in comment. | Revised – apply the changes marked as #428 |
| 2161 | Vishnu Ratnam | 83.01 | Since PUO mode can also be used by an AP, suggest to generalize the capabilities fields "PUO Supporting AP" and "PUO Support" with "PUO Assistance Capable" and "PUO Capable", respectively. | As in comment. | Reject – only applicable for non-AP STA |
| 2407 | Yuki Fujimori | 83.01 | PUO Support field of the UHR MAC Capabilities Information field doesn't exist in the Figure 9-aa5 --UHR MAC Capabilities Information field format. | Please add the field into the figure. | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 2608 | Minyoung Park | 83.01 | PUO Supporting field is missing in UHR MAC Capabilities Information field in Clause 9. Please define this. | As in the comment | Revised – Agree with the commenter. Apply the changes marked as #1067 in document 25/437r18 |
| 3429 | Yue Zhao | 83.01 | "A UHR STA" can be either AP or non-AP. According to the context, it is "a UHR non-AP" | Replace "A UHR STA" with "A UHR non-AP". | Revised – apply the changes marked as #428 |
| 3087 | Mark RISON | 83.02 | "A PUO non-AP STA shall support the channel usage procedure in 11.21.15" -- why doesn't it have to have dot11ChannelUsageActivated equal to true, as for the AP? | As it says in the comment | Reject – this I how P2P TWT is supported. |
| 2202 | Brian Hart | 83.03 | Channel Usage in 11.21.15 is actually a collection of like 3-5 quite different but entangled procedures, not all of which are required / desired here. | Rewrite 11.21.15 to dis-entangle these features (subsections would be helpful!) and only cite the relevant features. E.g., condition specific paras on (new) MIB variables / introduce more granular capability signaling, etc. Might benefit from coordination with 11mf, but the work needs to happen (such as at 11bn if nowhere else) |  |
| 3220 | Qi Wang | 83.07 | "To be unavailable during specific service periods, a PUO non-AP STA shall follow the rules defined in 11.21.15 (Channel Usage Procedures) to report its periodic unavailability to its associated PUO Supporting AP. A PUO Supporting AP that intends to exchange frames with the PUO non-AP STA shall follow the rules defined in 11.21.15 (Channel Usage Procedures) related to the P2P TWT procedure." The start time of the periodical unavailability can drift due to the drift of internal clocks. 11bn should specify a machanism to handle the issue. | As in comment. |  |
| 661 | Jaheon Gu | 83.08 | If the 802.11bn Draft is based on that of 11be, the Channel Usage Procedure may not be fully fitted into the PUO. The target functionality is defined in the Channel Usage Procedure of P802.11REVme under the following conditions: "Channel Usge Request frame with the Usage Mode field of the Channel Usage element set to 3 and without a Channel Entry field to inform the AP about its unavailability during the peer-to-peer TWT agreement." Therefore, a clear description and discussion of the reference are required. | As in comment. |  |
| 803 | Seongho Byeon | 83.08 | If the 802.11bn Draft is based on that of 11be, the Channel Usage Procedure may not be fully fitted into the PUO. The target functionality is defined in the Channel Usage Procedure of P802.11REVme under the following conditions: "Channel Usge Request frame with the Usage Mode field of the Channel Usage element set to 3 and without a Channel Entry field to inform the AP about its unavailability during the peer-to-peer TWT agreement." Therefore, a clear description and discussion of the reference are required. | As in comment. |  |
| 1558 | yajun CHENG | 83.11 | It better to use "peer-to-peer TWT schedule" or "peer-to-peer TWT SP" instead of "P2P TWT", to be consistent with the description in 11.21.15 (Channel Usage Procedures). | As in comment. | Accept |
| 1291 | Hong Won Lee | 83.13 | TBD should be resolved | Enhancements procedure should be defined or TBD should be removed if there is no enhancements procedure | Revised – agree with the commenter. If there are changes to P2P TWT, those will be inserted later in this subclause. Apply the changes marked as #3662 in this document |
| 2192 | Brian Hart | 83.13 | AP needs to be able to enable/disable its PUO IDC service - BSS wide (e.g., during an active P2P-related breach, banking, defense, automated warehousing and manufacturing, etc) - Per STA (e.g. can serve N coex sessions, so needs to be able to reject N+1th request without disabling Coex for the whole BSS / disassociating the client) (e.g., reject absurd/unachievable requests - e.g., TWT allows a request to be sent with 1 usec gaps between unavailabiilty windows) | Define how an AP advertises a) BSS-wide PUO policy (PUO IDC service is enabled / disabled). Define how an AP may accept/reject/counter an PUO request (likely with a reason code and/or a counter offer that would be acceptable to the AP). The counter offer might to be require priority signaling / a non-absurd unavailability schedule (as well, AP shold be able to advertise a minimum availability time between unavailability SPs), etc. See 25/0076 for extra insights into the problem and its solutions. |  |
| 2194 | Brian Hart | 83.13 | Expecting an IDC service at APs enables non-AP devices to externalize their costs, and thence incentivizes a race to the bottom (e.g., different radios using the same antennas and no filtering and no hope of simultaneous operation). This is an unwise choice for 802.11 use cases. | Define how an AP advertises a) BSS-wide PUO policy that the AP only provides PUO service on at most N-1 of the non-AP STA's N active links (or similar) and/or b) AP can cancel a PUO agreement with a non-AP STA if the non-AP STA's use of PUO is degrading 802.11 performance (e.g., AP is challenged to meet the agreed SCS(QC) SLA, etc). Likely a reason code should be part of the cancel message. See 25/0076 for extra insights into the problem and its solutions. |  |
| 2197 | Brian Hart | 83.13 | AP may have a policy of not accepting a PUO request unless it positively knows that the related emissions do not create extra / unknown interference to the AP's BSS, but a) cannot disclose this policy and b) may not be informed of the IDC channel or (if the same channel as the AP) the STA's intent to use TXOP Sharing for its IDC traffic. | Allow an AP to indicate it has a IDC policy that must be met before an assoc STA can benefit from the AP's IDC service: disallowed / allowed under constraints / allowed without constraints. If set to allowed under constraints, enable the P2P TWT request for PUO service to indicate, in relation to its IDC traffic, a) conformance to Channel Usage elements sent by the AP for its (typically) off-channel resources, or not, and/or b) a commitment to solicit (almost?) all on-channel resources via TXS. Related, the STA request should be redefined to allow the STA to report its IDC operating channels. |  |
| 2498 | Laurent Cariou | 83.13 | Define enhancements to P2P TWT or remove this TBD. | as in comment | Revised – agree with the commenter. If there are changes to P2P TWT, those will be inserted later. Apply the changes marked as #3662 in this document |
| 2609 | Minyoung Park | 83.13 | It is not clear what enhancements are considered for the P2P TWT procedure. | As in the comment | Revised – agree with the commenter. If there are changes to P2P TWT, those will be inserted later. Apply the changes marked as #3662 in this document |
| 3662 | Alfred Asterjadhi | 83.13 | What enhancements are TBD. Explicitly call them out (if any) and remove the TBD. | As in comment. | Revised – agree with the commenter. If there are changes to P2P TWT, those will be inserted later. Apply the changes marked as #3662 in this document |
| 3768 | Yongho Seok | 83.13 | "Enhancements to the P2P TWT procedure are TBD." Please specify how the DUO and STA PUO can work together. | As in the comment | Revised – agree with the commenter. If there are changes to P2P TWT, those will be inserted later. Apply the changes marked as #3662 in this document |
| 1292 | Hong Won Lee | 83.15 | Typo | Change from "an" to "a" | Accept |
| 3090 | Mark RISON | 83.15 | "An PUO" should be "A PUO" | As it says in the comment | Revised – apply the changes marked as #1292 in this document |
| 1559 | yajun CHENG | 83.17 | "P2P TWT" shouled replaced by "peer-to-peer TWT agreement" to be consistent with the description in 11.21.15 (Channel Usage Procedures), since there is no "P2P TWT" phrase in the baseline. | As in comment | Accept |
| 2610 | Minyoung Park | 83.18 | Is there a definition for 'transmission PPDUs'? Please clarify. | As in the comment | Revised – apply the changes marked as #2610 in this document |
| 3767 | Yongho Seok | 83.18 | "the PUO Supporting AP should not schedule for transmission PPDUs containing frames addressed to the PUO non-AP STA that overlaps with its unavailability service period and if the AP still transmits, the PUO non-AP STA is not expected to receive the PPDUs." The PUO Supporting AP should not schedule the transmission of PPDUs that solicit a response PPDU (including TB PPDU) from the STA if they overlap with its unavailability period. | As in the comment | Revised – apply the changes marked as #3767 in this document |
| 3092 | Mark RISON | 83.22 | This NOTE needs to be more like the NOTE in the previous subclause, i.e. just "the AP" and "the STA" | As it says in the comment | Revised – apply the changes marked as #3092 in this document |
| 512 | Peshal Nayak | 83.24 | The reference to EDCA function is very vague. More details should be provided. | As in comment | Revised – apply the changes marked as #512 in this document |
| 652 | Jaheon Gu | 83.24 | The reference to EDCA function is very vague. More details should be provided. | As in comment | Revised – apply the changes marked as #512 in this document Revised – apply the changes marked as #512 in this document |
| 1293 | Hong Won Lee | 83.27 | The preceding paragraphs do not include the full form of the term "AP PUO" | Change from "AP PUO mode" to "AP Periodic Unalienability Operation(PUO) mode" to align with another term such as "Non-AP STA Periodic Unavailability Operation (PUO) mode " |  |
| 3775 | Yongho Seok | 83.28 | Please specify how the STA can associate with the AP operating in PUO mode. | As in the comment |  |
| 3093 | Mark RISON | 83.29 | "AP PUO mode allows a UHR AP to manage activity in the BSS, composed of STAs that support this feature," not clear. Do all the STAs in the BSS have to support this feature? Line 32 talks of "UHR STAs", which further confuses matters | As it says in the comment | Revised – apply the changes marked as #3093 in this document |
| 1294 | Hong Won Lee | 83.30 | Need to be aligned with preceding subsection - Non-AP STA Periodic Unavailability Operation(PUO) | Change from "AP PUO" to "AP Periodic Unalienability Operation(PUO) mode" | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 2611 | Minyoung Park | 83.30 | Shouldn't this be for the case when all associated STAs support this feature?  Replace 'STAs' with 'all associated STAs' | As in the comment | Accept |
| 2682 | Xiaofei Wang | 83.30 | Does it imply that the AP PUO mode can only be supported if all STAs in the BSS support it? If so, it is better to state that clearly. | as in comment, for example, by stating "composed solely of STAs that support this feature". | Reject – this is clarified later in the subclause |
| 3771 | Yongho Seok | 83.30 | The enablement/disablement procedure of AP PUO mode is missing. Please clarify the enablement/disablement procedure. | As in the comment |  |
| 2455 | Klaus Doppler | 83.33 | AP STA supporting Periodic Unavailability Operation do not need a special name. | remove the part of the sentence "is called a (name TBD) AP" | Revised – Apply the changes marked as #1294 in this document |
| 2499 | Laurent Cariou | 83.33 | Define the capability as a new UHR capability and if that capability is set to 1, then the STA shall support Broadcast TWT and some other mechanisms. And define the name of the STA. | as in comment | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 2612 | Minyoung Park | 83.33 | Resolve the TBDs in this paragraph | As in the comment | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 3396 | Zhenpeng Shi | 83.33 | "(name TBD) AP" can be "PUO AP", and "TBD Supporting non-AP STA" in the next sentence can be "PUO Supporting non-AP STA", similar to the names of PUO non-AP STA and PUO Supporting AP in 37.11.3. | As in comment. | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 3397 | Zhenpeng Shi | 83.33 | The capability indication for AP PUO can be located in UHR MAC Capabilities Information field of the UHR Capabilities element, following the same design for DUO and non-AP STA PUO capability indication. | Change "TBD field in TBD Capabilities element" to "UHR MAC Capabilities Information field of the UHR Capabilities element". | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1295 | Hong Won Lee | 83.34 | Need to be aligned with preceding subsection - Non-AP STA Periodic Unavailability Operation(PUO) | Change from "supporting AP" to "that supports" | Revised – apply the changes marked as #1295 in this document |
| 1296 | Hong Won Lee | 83.34 | Need to be aligned with preceding subsection - Non-AP STA Periodic Unavailability Operation(PUO) | Change from "AP periodic unavailability operation mode" to "AP PUO mode" | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1297 | Hong Won Lee | 83.34 | TBD should be resolved | Change from "(name TBD) AP" to "AP PUO Supporting AP" | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1298 | Hong Won Lee | 83.34 | TBD should be resolved | Change from "TBD field" to "AP PUO Supporting AP field" | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1299 | Hong Won Lee | 83.34 | UHR Capabilities element can be one of the good option for AP PUO Supporting AP field | The AP PUO Supporting AP field should be defined in the UHR Capabilities | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1300 | Hong Won Lee | 83.36 | TBD should be resolved | Change from "TBD Supporting non-AP STA" to "AP PUO Supporting non-AP STA" | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1301 | Hong Won Lee | 83.36 | UHR Capabilities element can be one of the good option for the AP PUO Supporting non-AP STA field | The AP PUO Supporting non-AP STA field should be defined in the UHR Capabilities | Revised – apply the changes marked as #3430 in this document |
| 1302 | Hong Won Lee | 83.36 | TBD should be resolved | Change from "TBD field" to "AP PUO Supporting non-AP STA field" | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1560 | yajun CHENG | 83.36 | The sentence "shall set the TBD field of the TBD Capabilities element that the AP transmits to 1" is confusing. The UHR STA shall set the TBD field. Why the TBD Capabilities element is transmitted by the AP. It should probably be changed to "and shall set the TBD field of the TBD Capabilities element that the non-AP STA transmits to 1." | As in comment | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 3191 | Yunbo Li | 83.36 | "the AP transmits" -->"the non-AP STA transmits" | as in comment. | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 730 | Chien-Fang Hsu | 83.37 | ..."that the AP transmits to 1" is incorrect. The element is transmitted by the UHR non-AP STA. | Change to "...that it transmits to 1." | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 877 | kaikai huang | 83.37 | A UHR STA supporting operation with a (name TBD) AP is called a TBD Supporting non-AP STA and shall set the TBD field of the TBD Capabilities element that the AP transmits to 1. AP transmits should be STA transmits here. | AP should be changed to STA. Updated as below: A UHR STA supporting operation with a (name TBD) AP is called a TBD Supporting non-AP STA and shall set the TBD field of the TBD Capabilities element that the STA transmits to 1. | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1815 | Guogang Huang | 83.39 | For using TWT element (i.e. periodic availability SPs) to indirectly indicate non-AP STA or AP periodic unavailability SPs, there is some ambiguity on the starting time of the first unavailability SP. Because there are two possible cases, which are listed as follows. This part should be clarify.  Case 0. Starting Time of the first unenviability SP = Target Wake Time - (TWT Wake Interval-TWT Wake Duration)  Case 1. Starting Time of the first unenviability SP = Target Wake Time + TWT Wake Duration | There are two options. Option 1 is to use one bit to indicate which case it is. Option 2 is to add a rule or the formula to clarify the starting time of the first unavailability SP, e.g. Starting time of the first Unavailable window = Target Wake Time + TWT Wake Duration. |  |
| 2613 | Minyoung Park | 83.39 | Resolve the TBDs in this paragraph | As in the comment | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 3398 | Zhenpeng Shi | 83.39 | For AP to be unavailable outside of broadcast TWT SPs, do associated STAs need to support AP PUO mode as defined in 11bn, or broadcast TWT operation as defined in current spec? I think one motivation of reusing broadcast TWT for AP PUO is to support legacy STAs, so here STAs only need to support broadcast TWT operation. | Pleaes clarify the meaning of "mechanism" that needs to be supported by associated STAs. For example, change "all associated STAs support the mechanism" to "all associated STAs support broadcast TWT operation". | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 3663 | Alfred Asterjadhi | 83.39 | Fix these TBDs. Use as much as possible from the baseline behaviors (starting from 11ax) and if there is anything that is exclusive to UHR STAs, please define it and if defined then make sure that it is transparent to non-UHR STAs. | As in comment. | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 3769 | Yongho Seok | 83.39 | "To be unavailable outside of broadcast TWT SPs, a TBD AP shall ensure that all associated STAs support the mechanism" If a STA that does not support the AP PUO mode is associated, the AP shall disable the AP PUO mode. | As in the comment |  |
| 3095 | Mark RISON | 83.42 | "an NDP Paging Indicator/Unavailability Mode subfield that is set to either 0 or 1" -- it's a 1-bit field so it can't be set to anything else! | Delete the cited text | Revised – add declarative statement explaining how this field is used. Apply the changes marked as #3095 in this document. |
| 3094 | Mark RISON | 83.43 | "a Responder PM Mode subfield equal to 1" should be "... set to 1" | As it says in the comment | Accept |
| 268 | Zhanjing Bao | 83.44 | When an AP is unavailable, one or more STAs may have transmission demands. To avoid transmission failures of low-latency traffic due to the inability to serve associated STAs in the AP PUO mode, seamless roaming opportunities should be provided for its associated STAs after the AP PUO notification. | As in comment. The commenter will bring a contribution to address this comment and provide more detailed solutions. |  |
| 1303 | Hong Won Lee | 83.44 | TBD should be resolved | Change from "(name TBD)" to "AP PUO" | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 1304 | Hong Won Lee | 83.45 | TBD should be resolved | Change from "(name TBD) AP" to "AP PUO Supporting AP" | Revised – To avoid confusion, define the term APPUO for AP PUO and keep PUO for non-AP PUO. Reflect that in the name of the capability. Define the capability bit in the UHR capabilities element and ensure that if AP PUO is supported then Broadcast TWT is also supported. Apply the changes marked as #1294 |
| 3664 | Alfred Asterjadhi | 83.45 | Suggest adding two figures for this mode of operation, one that shows how a periodic operation is signaled and one that shows how a one time event operation is signaled. And describe the settings of the B-TWT element and parameter sets that aid STAs determine the expected behaviors. | As in comment. |  |
| 3770 | Yongho Seok | 83.45 | "A (name TBD) Supporting non-AP STA that intends to exchange frames with the (name TBD) AP shall follow the rules defined in 26.8.3.3 (Rules for TWT scheduled STA)." Please specify how the DUO and AP PUO can work together. | As in the comment |  |
| 1305 | Hong Won Lee | 83.47 | "the STA" should be changed to align with preceding paragraphs | Change from "the STA" to "the AP PUO Supporting non-AP STA" | Revised –Apply the changes marked as #1305 in this document |
| 1306 | Hong Won Lee | 83.47 | "the AP" should be changed to align with preceding paragraphs | Change from "the AP" to "the AP PUO Supporting AP" | Revised –Apply the changes marked as #1305 in this document |
| 3665 | Alfred Asterjadhi | 83.47 | Are there any interdependencies between this mode of operaiton and multilink operation? E.g, how do other APs of the same MLD signal that another AP is in scheduled PS mode? Perhaps add a paragraph exemplifying this too. | As in comment. |  |
| 3772 | Yongho Seok | 83.47 | "NOTE--If the STA transmits PPDUs containing frames addressed to the AP during the AP's unavailability period, then the expectation is that the STA does not take into account the failed reception of the frames contained in the PPDUs for its rate selection algorithm nor for its EDCA function for the AC used to transmit these frames, unless required by regulatory rules."" The statement should not be presented as a NOTE. To apply the different EDCA rules, the specification should explicitly state that there is an exception. " | As in the comment |  |
| 269 | Zhanjing Bao | 83.52 | Considering that the AP cannot serve its associated STAs during periods of being unavailable, it should be allowed to perform periodic power saving operations by either becoming completely doze or maintaining a lower capability mode. In other words, the AP should be permitted to periodically enter a lower capability mode. | Indicate the AP's periodic lower capability mode power saving operation through the TWT element. | Reject - this is what is described in this subclause. When the AP is unavailable it can save power. |
| 1307 | Hong Won Lee | 83.52 | Enhancements to the AP PUO procedure should be provided for multiple AP PUO and/or AP PSM schedules | As in the comment. The commenter can provide a resolution proposal for this comment(The enhancements may be covered by the contribution, DCN 24/1777) |  |
| 2500 | Laurent Cariou | 83.52 | Remove the note | as in comment | Accept |
| 3666 | Alfred Asterjadhi | 84.33 | Finalize the TBD parameters, focusing on parameters that can today, for example, be signaled in OM Control (avoids sending both) and be signaled cross link/multilink (avoids sending multiples). | As in comment. | Revised – apply the changes marked as #1294 in this document |

* Non-AP STA periodic unavailability operation (PUO) mode

Non-AP STA[#3394] periodic [#1288] unavailability operation (PUO) allows a non-AP STA to indicate, to its associated AP, that the STA will be unavailable during periodic service periods.

A UHR AP that supports PUO is called a PUO Assisting [#3430] AP and shall set to 1 the PUO Support [#3430] field of the UHR MAC Capabilities Information field of the UHR Capabilities element [#3395]that it transmits. [#3430] A UHR AP that does not support PUO shall set to 0 the PUO Support field of the UHR Capabilities element that it transmits. A PUO Assisting [#3430] AP shall have dot11ChannelUsageActivated equal to true and shall set to 1 the Peer-to-peer TWT Support field in the Extended Capabilities element that it [#3088] transmits.

A UHR non-AP [#428] STA that supports PUO is called a PUO non-AP STA and shall set to 1 the PUO Support field of the UHR MAC Capabilities Information field of the UHR Capabilities element that it transmits. [#428] A UHR non-AP STA that does not support PUO shall set to 0 the PUO Support field of the UHR Capabilities element that it transmits. A PUO non-AP STA shall support the channel usage procedure defined in 11.21.15 (Channel Usage Procedures) and shall set to 1 the TWT Requester Support subfield in the HE Capabilities element that it transmits.

To be unavailable during specific service periods, a PUO non-AP STA shall follow the rules defined in 11.21.15 (Channel Usage Procedures) to report its periodic unavailability to its associated PUO Assisting [#3430] AP. A PUO Assisting [#3430] AP that intends to exchange frames with the PUO non-AP STA shall follow the rules defined in 11.21.15 (Channel Usage Procedures) that are related to the peer-to-peer [#1559] TWT procedure.

[#3662]Enhancements to the P2P TWT procedure are described in this subclause.

When a [#1292] PUO Supporting AP considers a PUO non-AP STA as being unavailable during a service period after having received a periodic unavailability indication through peer-to-peer [#1558] TWT as described below, the PUO Assisting [#3430] AP should not schedule for transmission any PPDU [#2610] containing frames addressed to the PUO non-AP STA if this PPDUs [#3767] overlaps with the PUO non-AP STA’s unavailability service period and if the AP still transmits a PPDU that overlaps with the PUO non-AP STA’s unavailability service period then the PUO non-AP STA is not expected to receive the PPDUs.

NOTE—If a [#3092] PUO Assisting [#3430] AP transmits PPDUs containing frames addressed to a [#3092] PUO non-AP STA during the PUO non-AP STA's unavailability service period, then the expectation is that the PUO Supporting AP does not take into account the failed reception of the frames contained in the PPDUs for its rate selection algorithm nor for incrementing the QSRC[C] in the [#652] EDCA function for the AC used to transmit these frames, unless required by regulatory rules.

* AP PUO mode

AP PUO mode allows a UHR AP to manage activity in the BSS, composed of associated [#2611] STAs that support this feature, by defining service periods, and to either save power or use internal resources elsewhere by allowing the [#3093]AP to be unavailable to all associated [#3093] STAs outside of these service periods. A UHR AP that supports [#1295] AP periodic unavailability operation mode is called a APPUO [#1294] AP and shall set the AP PUO Support[#1294] field in the UHR MAC Capabilities Information field of the UHR [#1294] Capabilities element it transmits to 1. A UHR AP that does not support AP periodic unavailability operation mode shall set the AP PUO Support field to 0 in the UHR Capabilities element that it transmits. An APPUO AP shall have dot11TWTOptionActivated equal to true and shall set the Broadcast TWT Support field in the HE Capabilities element it transmits to 1. [#1294] A UHR STA supporting operation with a APPUO[#1294] AP is called a APPUO Assisting [#1294]non-AP STA and shall set the APPUO Support [#1294] field of the UHR MAC Capabilities Information field of the UHR[#1294] Capabilities element that it [#1294]transmits to 1. An APPUO Assisting non-AP STA shall have dot11TWTOptionActivated equal to true and shall set the Broadcast TWT Support field in the HE Capabilities element it transmits to 1. [#1294]

To be unavailable outside of broadcast TWT SPs, an APPUO [#1294]AP shall ensure that all associated STAs support the mechanism and shall follow the rules defined in 26.8.3.2 (Rules for TWT scheduling AP) by advertising a TWT element that carries one or more Broadcast TWT Parameter Set fields with a Broadcast TWT ID field set to 0, a Responder PM Mode subfield set [#3094] to 1. The NDP Paging Indicator/Unavailability Mode subfield is set to 0 to indicate that the AP is unavailable outside of these broadcast TWT SPs, except within any other TWT SP that is setup with the AP or that is advertised by the AP (see baseline subclause). The NDP Paging Indicator/Unavailability Mode subfield is set to 1 to indicate that the AP is unavailable outside of these broadcast TWT SPs, even if that time falls within any other TWT SP that is setup with the AP or that is advertised by the AP (see baseline subclause). [#3095] An APPUO Assisting [#1294] non-AP STA that intends to exchange frames with the APPUO [#1294] AP shall follow the rules defined in 26.8.3.3 (Rules for TWT scheduled STA).

NOTE—If a APPUO Assisting non-AP [#1305] STA transmits PPDUs containing frames addressed to an APPUO [#1305] AP during the AP's unavailability period, then the expectation is that the STA does not take into account the failed reception of the frames contained in the PPDUs for its rate selection algorithm nor for its EDCA function for the AC used to transmit these frames, unless required by regulatory rules.

**9.4.2.aa2.2 UHR MAC Capabilities Information field**

***TGbn editor: please add a PUO Support field and an AP PUO Support field in Figure 9-aa5 —UHR MAC Capabilities Information field format and add the following rows in table 9-130a (Table 9-130a— Subfields of the UHR MAC Capabilities Information field). [#3430]***

|  |  |  |
| --- | --- | --- |
| * Subfields of the UHR MAC Capabilities Information field | | |
| Subfield | Definition | Encoding |
| PUO Support | Indicates whether or not PUO is supported for a non-AP STA.  Indicates whether or not an AP supports being a PUO assisting AP. | For a non-AP STA, set to 1 if dot11PUOOptionImplemented is true (see 37.11.3 (Non-AP STA periodic unavailability operation (PUO) mode) and set to 0 otherwise.  For an AP, set to 1 if the AP supports being a PUO Assisting AP (see 37.11.3 (Non-AP STA periodic unavailability operation (PUO) mode)0 and set to 0 otherwise. |
| AP PUO Support | Indicates whether or not AP PUO is supported for an AP.  Indicates whether or not a non-AP STA supports being an AP PUO assisting non-AP STA. | For a non-AP STA, set to 1 if the non-AP STA supports being an AP PUO Assisting non-AP STA (see 37.11.4 (AP periodic unavailability operation (PUO) mode) and set to 0 otherwise.  For an AP, set to 1 if dot11APPUOOptionImplemented is true (see 37.11.4 (AP periodic unavailability operation (PUO) mode) and set to 0 otherwise. |