IEEE P802.11
Wireless LANs

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| Comment Resolution for Subclauses 9.32f.5 |
| Date: 2013-07-17 |
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Abstract

This document provides resolution for CIDs 68, 445, 676, 446, 447, 35, 232, 674, 449, 450, 451

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| **CID** | **P** | **L** | **Sub C.** | **Comment** | **Propose Change** | **Resolution** |
| 68 | 141 | 19 | 9.32f.5 | Include UL NDP Paging to make it symmetric | Will propose a comment resolution. See doc xyz | Revised: the concept is adopted.TGah editor to make changes shown in 11-13-xxxx-00-00ah |
| 445 | 141 | 33 | 9.32f.5 | 9.32f.4 in the sentence does not point to the setup procedure. The TWT setup procedure is described in 9.32f.1. | Change "9.32f.4 (TWT Grouping)" to "9.32f.1 (TWT overview)" | AcceptTGah editor to make changes as proposed in the comment CID445 |
| 676 | 141 | 36 | 9.32f.5 | have multiple questions to the paragraph in line 36 page 141:1). Can a non-AP STA have multiple AIDs or multiple Pairtial AIDs? Read through subsection 9.17b, could not find a clear answer, instead, still hold the understanding that AID is per STA.2). If so, how to decide which one is used in a NDP Paging Request? Any one or a specifical one?3). Is Paging set up per STA or per traffic flow? | Please provide clarificaitons to address the questions listed in this comment regarding AID / P-AID vs. per STA / per Flow. | Reject:The comment does not identify any issue.Response to the commenter:1. Yes it can. It can have MIDs and also AID per MAC Address.
2. STA decides if it needs to use this protocol for that stream or not.
3. per traffic flow
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| 446 | 141.00 | 52 | 9.32f.5 | In the sentence: "... element is set to 4 ...", to understand what the value "4" means in the sentence, a reader has to go back to clause 8 and look up the TWT element. Instead, it would be much easier for a reader if the meaning of the value "4" is added in the sentence. | Change the sentence "... element is set to 4 ..." to "... element is set to 4 (Accept TWT) ..." | AcceptTGah editor to make changes as proposed in the comment CID446 |
| 447 | 141.00 | 54 | 9.32f.5 | Add the meaning of "4" in the sentence. | Change the sentence "... set to 4 shall ..." to "... set to 4 (Accept TWT) shall ..." | AcceptTGah editor to make changes as proposed in the comment CID447 |
| 35 | 141.00 | 60 | 9.32.f5 | There is a section reference which is TBD | Include the correct clause number: 10.2.2.17 (TIM broadcast) | Revised: The concept is adopted.TGah editor to make changes shown in 11-13-xxxx-00-00ah |
| 232 | 141.00 | 60 | 9.32f.5 | TBD indicates the 10.43c.1. Correct it. | Change the TBD to "10.43c.1" | Revised: TBD is defined as both 10.43c.1 and 10.2.2.17TGah editor to make changes shown in 11-13-xxxx-00-00ah |
| 674 | 141.00 | 60 | 9.32f.5 | "There is critical update to the Beacon as defined in clause (TBD)" is missing a link. | Correct the link. | Revised: The concept is adoptedTGah editor to make changes shown in 11-13-xxxx-00-00ah |
| 449 | 142.00 | 34 | 9.32f.5 | The sentence "If the Action subfield is 1, the STA shall be in the Awake state starting at a time indicated by the Min Sleep Duration field after the end of reception of the NDP Paging frame." describes when the STA shall be in the Awake state but does not specify when the STA can go back to the Doze state. | Specify when the STA can go back to the Doze state. | Revised: The proposed resolution is adoptedTGah editor to make changes shown in 11-13-xxxx-00-00ah |
| 450 | 142.00 | 36 | 9.32f.5 | The sentence "If the Action subfield is 2, the STA shall be in the Awake state at the first TBTT that occurs after a time indicated by the Min Sleep Duration field in the NDP Paging Response after the end of reception of the NDP Paging frame." describes when the STA shall be in the Awake state but does not specify when the STA can go back to the Doze state. | Specify when the STA can go back to the Doze state. | Revised: The proposed resolution is adopted.TGah editor to make changes shown in 11-13-xxxx-00-00ah |
| 451 | 142.00 | 40 | 9.32f.5 | The sentence "If the Action subfield is 3, the STA shall be in the Awake state at the first DTIM that happens after a time indicated by the Min Sleep Duration field in the NDP Paging Response after the end of reception of the NDP Paging frame." describes when the STA shall be in the Awake state but does not specify when the STA can go back to the Doze state. | Specify when the STA can go back to the Doze state. | Revised: The proposed resolution is adopted.TGah editor to make changes shown in 11-13-xxxx-00-00ah |

**9.32f.5 NDP Paging Setup**

*Instruction to Editor: Please modify the sub-clause as follows:*

This section defines a protocol for power saving at a STA by using the TWT protocol to setup scheduled wakeup intervals and by defining an efficient signaling for the presence of BUs and synchronization.

For the purpose of this clause, a frame including a TWT element with NDP Paging field present is referred to as NDP Paging Request or NDP Paging Response as clarified later. A STA sending an NDP Paging Request is referred to as NDP Paging Requester. A STA sending a NDP Paging Response in a response to an NDP Paging Request is referred to as NDP Paging Responder.

A STA can request an NDP Paging TWT by sending an NDP Paging Request as described in this clause.

The setup procedure follows the protocol described in 9.32f.1 (TWT overview), unless otherwise described in this sub-clause.

A non-AP STA sending an NDP Paging Request to a NDP Paging Responder STA, shall set the P-ID field to one of the partial AIDs assigned to the STA (see 9.17b).

An AP sending an NDP Paging Request to a NDP Paging Responder should set the P-ID field of the NDP Paging Request to the Partial BSSID.

Upon receiving an NDP Paging Request, the recipient STA shall respond with an NDP Paging Response with an NDP Paging Field defined as follows:

* The P-ID should be set to the same value as the P-ID field in the NDP Paging Request.
* The Max NDP Paging period field shall be set to any value that is less than or equal to the Max NDP Paging period in the NDP Paging Request.
* The Action field shall be set to one of the values in Table 8-191c (Action field).
* The Partial TSF Offset field and Min Sleep Duration field are reserved.

The NDP Paging setup is successful if the TWT Command Reply field of NDP Paging Response TWT IE is set to 4 (Accept TWT), otherwise the setup is considered as failed.

A STA which has sent an NDP Paging Response frame with the TWT Command Reply field set to 4 (Accept TWT) shall schedule an NDP Paging frame as the first frame for transmission at the TWTs indicated by the NDP Paging Response, if any of the following conditions is satisfied:

* There are BUs for the Requesting STA
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* No NDP Paging frame was sent in the N consecutive preceding TWT(s), where N is equal to the value of the Max NDP Paging Period field in the NDP Paging Response.

The AP shall schedule an NDP Paging frame if there are critical updates to the (Short) Beacon as defined in clause 10.43c.1 (System information update procedure) and 10.2.2.17 (TIM Broadcast). An AP may additionally send an NDP Paging frame as the first frame for transmission at any of the TWT times indicated by the NDP Paging Response.

If any frame is sent by the AP to an NDP Paging Requester during its indicated TWT duration then the first frame sent shall be an NDP Paging frame with Direction field set to 1.

If any frame is sent by a non-AP STA to an NDP Paging Requester during its indicated TWT duration then the first frame sent shall be an NDP Paging framewith Direction field set to 0.

The P-ID field of the NDP Paging frame shall be set to the same value as P-ID field in the NDP Paging Response if and only if there are BUs for the STA identified by the Partial AID indicated in the P-ID field of the NDP Paging Request. . The value of the P-ID field shall be set to 0 to indicate the presence of group addressed BUs.

If the Direction field of the NDP Paging frame is set to 1, the APDI field of the NDP Paging frame shall be set as follows:

* The PTSF field is set to TSF[Partial TSF Offset+4: Partial TSF Offset+11] (inclusive), where TSF is the 8 bytes value of the TSF and Partial TSF Offset is the value of the Partial TSF Offset field in the NDP Paging Request.
* The Check Beacon field is initialized to 0 and incremented after each critical update to the Beacon frame; the value of the Check Beacon field shall be same as the LSB of the Check Beacon field in the most recent TIM Broadcast frame, if any was sent before the NDP Paging frame.

If the Direction field of the NDP Paging frame is set to 0, the PAID field of NDP Paging frame indicates the Partial AID of the STA transmitting the NDP Paging frame.

If no NDP Paging frame is received during the TWT, the TWT requester STA may transition to Doze state at the end of the Minimum Awake Duration for the TWT. If an NDP Paging frame is received, the TWT requester STA may transition to Doze state immediately after receiving the NDP Paging frame, unless Min Sleep Duration was set to 0 and Action field set to 1 in the NDP Paging Response frame that successfully completed the NDP Paging setup, in which the STA shall be in Active mode.

Upon reception of a NDP Paging frame with the P-ID field matching the value of the P-ID field in the NDP Paging Response, the NDP Paging Requester STA shall behave as follows:

* If the Action subfield of the NDP Paging Response is 0: If the NDP Paging Requester STA is a non-AP STA it shall send a (NDP) PS-Poll or uplink trigger frame addressed to the NDP Paging Responder If the NDP Paging Requester STA is an AP, it shall send an NDP CTS to self with the duration field set to zero.
* If the Action subfield of the NDP Paging Response is 1, the STA shall be in the Active state starting at a time indicated by the Min Sleep Duration field after the end of reception of the NDP Paging frame.
* If the Action subfield of the NDP Paging Response is 2, the STA shall be in the Awake state at the first TBTT occurs after a time indicated by the Min Sleep Duration filed in the NDP Paging Response after the end of reception of the NDP Paging frame to receive the (Short) Beacon.
* If the Action subfield of the NDP Paging Response is 3, the STA shall be in a the Awake state at the first DTIM that happens after a time indicated by the Min Sleep Duration field in the NDP Paging Response after the end of reception of the NDP Paging frame to receive the DTIM Beacon.

If the NDP Paging Requester is an AP, values 2-7 (inclusive) of the Action subfield are reserved.

A non-AP STA which has setup NDP Paging shall wake at the next TSBTT to attempt to receive the next expected Beacon or Short Beacon frame if it receives an NDP Paging frame with Direction field set to 1 and the Check Beacon field value different from the most recently received value.

Comment to the Editor: please change the Table 8-33o and 8-33p as follows:

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| **Table 8-33o—NDP MAC frame body of NDP Paging (1 MHz)** |
| Field | Size (bits) | Description |
| NDP MAC Frame Type | 3 | NDP MAC Frame Type field is set to 6 |
| P-ID | 9 | The P-ID field is the identifier of the NDP Paging Requester , as described in 9.32f.5 (NDP Paging Setup). |
| APDI/PAID | 9 | If the Direction field is set to 1, this field indicates the APDI (AP Direction Information). The8 MSBs of the APDI are set to the value of the PTSF field which stores the partial TSF of the transmitting STA as defined in 9.32f.5 (NDP Paging Setup).The LSB of the APDI is set to the Check Beacon bit that is an indicator of critical changes in the beacon as described in 9.32f.5 (NDP Paging Setup).If the Direction field is set to 0, this field indicates the PAID of the NDP Paging Responder STA. |
| Direction | 1 | The Direction field is set to 1, if the NDP Paging Responder is an AP, otherwise it is set to 0. |
| Reserved | 3 | All reserved bits are set to 1. |

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| **Table 8-33p—NDP MAC frame body of NDP Paging (1 MHz)** |
| Field | Size (bits) | Description |
| NDP MAC Frame Type | 3 | NDP MAC Frame Type field is set to 6 |
| P-ID | 9 | The P-ID field is the identifier of theNDP Paging Requester , as described in 9.32f.5 (NDP Paging Setup). |
| APDI/ PAID | 9 | If the Direction field is 1, this field is called APDI (AP Direction Information). The8 MSBs of the APDI are set to the value of the PTSF field which stores the partial TSF of the transmitting STA as defined in 9.32f.5 (NDP Paging Setup).The LSB of the APDI is set to the Check Beacon bit that is an indicator of critical changes in the beacon as described in 9.32f.5 (NDP Paging Setup).If the Direction field is set to 0, this field indicates the PAID of the NDP Paging Responder STA. |
| Direction | 1 | The bit is set to 1, if the NDP Paging Responder is an AP, otherwise the bit is set to 0. |
| Reserved | 15 | All reserved bits are set to 1. |