IEEE P802.11
Wireless LANs

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| LB 200 Comment Resolution for Subclause 9.42.3 and 9.42.4 |
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Abstract

This document provides resolutions for CID 1242, 1243, 1244, 1519, 2655, 2755, 2756, 1520, 1521, 1522, 2654, 2656, 2757, 2758, 2912.

The changes are in the following subclauses: 9.42.3 and 9.42.4.

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# 0 Revision Notes

R0: First draft

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Clause** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1242 | 9.42.3 | 187 | 54 | "A non-TIM S1G STA can send a (NDP) PS-Poll/trigger frame any time to its associated AP upon waking upwithout listening to the beacon." -- this conflicts with statements elsewhere in the baseline about waiting until a valid frame is heard that sets the NAV, or a timout. | 1. Modify this to a "may" statement.2. Locate the baseline that conflicts and add "except as described in 9.42.3" somewhere to it. | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 1242. |
| 1243 | 9.42.3 | 188 | 6 | "it shall be at the awake state." - grammar. States are something you are in. | "it shall be in the awake state." | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 1243. |
| 1244 | 9.42.3 | 188 | 12 | " S1G STA shall, wake " -- too many commas. | delete comma | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 1244. |
| 1519 | 9.42.3 | 187 | 48 | This subclause and the 9.42.4 describe similar procedures with some deltas here an there (and part of it with 10.2.2.6). Consider merging the two subclauses and clearly describe these procedures with as minimal overlap as possible. It seems that in this subclause the resposne to the PS-Poll (poll type field in this case seems to be 00 according to the field description in clause 8) may indicate a duration to the TBTT. But this is the same as the description to the Active polling procedure in the next subclause for poll type set to 2. And most of the second paragraph and third one are already described in subclause 10.2.2 in a more general case. | Merge text for 9.42.3 and 9.42.4 to remove any redundancy and clarify protocol behavior. | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 1519. |
| 2655 | 9.42.3 | 187 | 58 | Only NDP ACK frame and NDP (Modified) ACK frames are mentioned as the Control frames that may be sent as response to PS-Poll but it may also be a TACK frame. This is not stated here. | Include TACK in the list of Control frames that may be sent in response to PS-Poll frame. | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 2655. |
| 2755 | 9.42.3 | 187 | 57 | "Modified NDP ACK" should be changed to "NDP Modified ACK" | as commented | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 2755. |
| 2756 | 9.42.3 | 188 | 9 | Modified NDP ACK should be changed to "NDP Modified ACK" | as commented | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 2756. |

***Discussion:***

**CID 1242**

As subclause 10.2.2.8 in the draft 1.0 includes the same description, the second paragraph can refer to that subclause.

**CID 2655**

TACK frame can be used as the response frame to PS-Poll frame with Poll Type subfield equal to 1 and 2. It includes timestamp and change sequence fields as well as Next TWT which can be used to indicate the next TWT for a TWT STA.

**CID 1519**

Although Subclause 9.42.3 and 9.42.4 serve different purposes: rescheduling awake/doze cycle and active polling, there are some overlapping parts. We make the change accordingly to merge two subclauses together following the suggestion.

The following gives the clarification on how to use Poll Type subfield in PS-Poll frame.

The S1G AP shall send either a data or an (NDP) ACK frame as the response to a PS-Poll frame with the Poll Type subfield equal to 0 transmitted by a S1G STA. See 10.2.2.6 (AP operation during the CP).

The S1G AP shall send a TACK frame without the Next TWT field as the response to a PS-Poll frame with the Poll Type subfield equal to 1 transmitted by a STA that requests the information of Change Sequence and Timestamp. See 9.42.3 and 9.41 (Target Wake Time (TWT)).

The AP shall send a TACK frame with the Next TWT field as the response to a PS-Poll frame with the Poll Type subfield equal to 2 transmitted by a TWT STA that requests the Next TWT information . See 9.42.3 and 9.41 (Target Wake Time (TWT)).

The AP shall send either a buffered frame or an NDP ACK frame that may set the Duration Indication field to 1 and the Duration field to a value of the duration to a TBTT, as the response to a PS-Poll frame with the Poll Type subfield set to 2 transmitted by a non-TIM STA that is not a TWT STA and requests a Duration to a TBTT. Also see 10.2.2.6 (AP operation during the CP).

The AP shall send either a buffered frame or a NDP ACK frame that may set the Duration Indication field to 1 and the Duration field to a value of the deferred service period, as the response to a PS-Poll frame with the Poll Type subfield equal to 3 transmitted by a non-TIM STA that requests a deferred service period for the frame transmission. See 10.2.2.6 (AP operation during the CP) and 9.43.1 (Synch frame transmission procedure for uplink traffic).

If a STA sends a NDP PS-Poll frame, AP responds with either a buffered data frame or an NDP Modified ACK frame. See 10.2.2.6 (AP operation during the CP).

If a STA sends a trigger frame, AP responds with either a buffered data frame or an (NDP) ACK frame. See 10.2.2.6 (AP operation during the CP).

***Proposed changes:***

**Instruction to Editor: *Please make the following changes in clause 9.42.3:***

**9.42.3 Rescheduling of awake/doze cycle ~~non-TIM STAs~~**

This clause defines a procedure for the S1G AP ~~non-TIM STAs~~ to reschedule ~~its~~ non-TIM STAs’ awake/doze cycle.

~~A non-TIM S1G STA can send a (NDP) PS-Poll/trigger frame any time to its associated AP upon waking up without listening to the beacon.~~

~~Upon receiving the (NDP) PS-Poll/trigger frame, an S1G AP may respond with a control frame that includes~~

~~a timer. The control frame is either the NDP ACK frame in 8.3.5.1.3 or the Modified NDP ACK frame in 8.3.5.1.4, both of which use the Duration field to indicate the wakeup timer value when the Duration Indication field is set to 1. The S1G STA can re-synchronize to the beacon with the help of the wakeup timer value.~~

An S1G STA may set the Poll Type subfield in the Frame Control field to 0 in a transmitted PS-Poll frame if it requests the BU from the AP but without a request for rescheduling its doze/awake cycle.

An S1G STA may send a PS-Poll with the Poll Type subfield in the Frame Control field set to 1 to solicit the information of the beacon change sequence and the partial timestamp.

An S1G STA that is not a TWT STA may set the Poll Type subfield in the Frame Control field to 2 in a transmitted PS-Poll frame if it requests the BU from the AP with a request for rescheduling its doze/awake cycle by re-synchronizing to a TBTT.

A TWT STA may set the Poll Type subfield in the Frame Control field to 2 in a transmitted PS-Poll frame within the negotiated TWT SP if it requests the BU and the next TWT information from the AP.

An S1G STA may set the Poll Type subfield in the Frame Control field to 3 in a transmitted PS-Poll frame if it requests a deferred service period to reschedule its doze/awake cycle from the AP.

Upon receiving an NDP PS-Poll frame, trigger frame or PS-Poll frame with the Poll Type subfield equal to 0, the S1G AP responds as described in 10.2.2.6. Upon receiving a PS-Poll frame with the Poll Type subfield not equal to 0, the AP responds with different frames depending on the value of the Poll Type subfield in the Frame Control field of the PS-Poll frame that elicited the response as described in this sub-clause.

Upon reception of a PS-Poll with the Poll Type subfield equal to 1, the AP with dot11PollTACKResponseSupport set to true shall send a TACK frame without the Next TWT field. The S1G STA shall not send a PS-Poll with the Poll Type subfield equal to 1 to an AP unless the TACK Support as PS-Poll Response field of the most recent S1G Capabilities element received from that AP is set to 1.

Upon reception of a PS-Poll with the PS-Poll Type subfield equal to 2 sent by a TWT STA within the negotiated TWT SP, the AP sends a TACK frame in response to a PS-Poll frame as described in 9.41 (Target Wake Time (TWT)). A TWT STA shall not send a PS-Poll with the Poll Type subfield equal to 2 to an AP unless the TWT Support field of the most recent S1G Capabilities element received from that AP is set to 1.

The procedure of an S1G transmitting a PS-Poll with the Poll Type subfield set to 3 is described in 10.2.2.6 (AP operation during the CP). In addition, an S1G STA that has requested time slot protection for a TXOP duration after the expiration of a wakeup timer, as described in 9.43.1 (Synch frame transmission procedure for uplink traffic), may transmit to the UL-Synch capable AP a PS-Poll with the Poll Type subfield set to 3. The UL-Synch capable AP shall protect the TXOP duration following the expiration of the wakeup timer as described in 9.43.1 (Synch frame transmission procedure for uplink traffic).

The AP shall send either a buffered frame or an NDP ACK frame as the response to a PS-Poll frame with the Poll Type subfield equal to 2 transmitted by a STA that is not a TWT STA or a TWT STA that is not within the negotiated TWT SP. Upon receiving an NDP PS-Poll, trigger frame or PS-Poll frame with Poll Type subfield equal to 2 sent by an S1G STA that is not TWT STA or a TWT STA that is not within the negotiated TWT SP, an S1G AP may respond with a control frame that includes a timer. The control frame is either the NDP ACK frame in 8.3.5.1.3 or the NDP Modified ACK frame in 8.3.5.1.4, both of which use the Duration field to indicate a wakeup timer value when the Duration Indication field is set to 1. The S1G STA can re-synchronize to the beacon with the help of the wakeup timer.

The S1G AP shall set the More Data field to 1 in the responding control frame if there is BU buffered for the

non-TIM S1G STA. If the non-TIM S1G STA receives the responding control frame in which the Duration

Indication field is equal to 1 and the Duration field is a nonzero value, there is no frame transmission for the

STA in the indicated duration in which the S1G STA may go to sleep. After the amount of time that is equal

to the value in the Duration field, it shall be ~~at~~ in the awake state.

An S1G AP may set the wakeup timer (Duration field) as the duration to a TBTT in the responding control

frame (either NDP ACK or ~~Modified~~ NDP Modified ACK frame) and treat the non-TIM STA as a TIM STA starting from the TBTT. After the amount of time that is equal to the Duration field value in the responding control

frame from the S1G AP, the non-TIM S1G STA shall~~,~~ wake up to receive the beacon. Upon receiving the

beacon, the STA infers from the TIM element that it is treated as a TIM STA and operates as a TIM STA

from then on. The S1G STA returns to the non-TIM STA operation mode if the S1G AP indicates that there

is no more data buffered for the S1G STA and the S1G STA indicates to the S1G AP that there is no more

data to transmit. The S1G AP treats the S1G STA as a non-TIM STA if the STA indicates that there is no

more data to transmit and the S1G AP indicates that there is no more data buffered for the STA.

**Instruction to Editor: *Please add the following sentence to L25, Page182 of clause 9.41.2:***

A TWT STA awake for an Explicit TWT SP shall not transmit a PS-Poll with the Poll Type subfield set to any value other than 2.

**Instruction to Editor: *Please add the following sentence to L50, Page219 of clause 10.2.2.2:***

An S1G STA shall set the Poll Type subfield in the Frame Control field of the transmitted PS-Poll frame to 0 unless it is a non-TIM STA that follows the procedures described in 9.42.3. An S1G TIM STA shall not send a PS-Poll with the Poll Type subfield set to 1 to an S1G STA.

**Instruction to Editor: *Please make the following changes in subclause 10.2.2.6 g), L1, Page 221:***

An S1G AP that sends an (NDP) ACK frame in response to a PS-Poll/trigger frame or an NDP Modified ACK frame in response to a NDP PS-Poll frame received from an S1G STA shall set the More Data subfield of the (NDP) ACK frame to 0 when no BU is buffered for the S1G STA and to 1 otherwise.

A More Data subfield equal to 0 in an (NDP) ACK frame that is sent by an S1G AP in response to a PS-Poll/trigger frame or in an NDP Modified ACK frame in response to a NDP PS-Poll frame received from an S1G STA indicates to the S1G STA that no service period starts, which implies that the S1G STA may enter the doze state.

A More Data subfield equal to 1 in an (NDP) ACK frame that is sent by an S1G AP in response to a PS-Poll/trigger frame or in an NDP Modified ACK frame in response to a NDP PS-Poll frame received from an S1G STA indicates to the S1G STA that a service period starts, after which the S1G STA shall remain in the wake state until a frame is received from the S1G AP with the EOSP subfield equal to 1. If the response with the More Data subfield equal to 1 is an NDP ACK with a Duration Indication subfield equal to 1, the service period starts at a time T after the end of the NDP ACK frame, where T is the time value indicated in the Duration field of the NDP ACK; if the Duration Indication subfield is 0, the service period starts immediately after the end of the NDP ACK frame. If the response with the More Data subfield equal to 1 is an NDP Modified ACK with a Duration Indication subfield equal to 1, the service period starts at a time T after the end of the NDP Modified ACK frame, where T is the time value indicated in the Duration field of the NDP Modified ACK; if the Duration Indication subfield is 0, the service period starts immediately after the end of the NDP Modified ACK frame.

**Instruction to Editor: *Please add one capability bit into Figure 8-401dg S1G Capabilities Info field: TACK Support as PS-Poll Response.***

**Instruction to Editor: *Please add the following into Table 8-191d*—Subfields of the S1G Capabilities Info field*.***

|  |  |  |
| --- | --- | --- |
| TACK Support as PS-Poll Response | This bit indicates whether the AP supports the using of TACK as the response to a PS-Poll with the Poll Type subfield equal to 1 as described in 9.42.3.  | Set to 1 if dot11PollTACKResponseSupport is true.Set to 0 otherwise. |

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| **CID** | **Clause** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1520 | 9.43.4 | 188 | 20 | The term "active polling STA" is used in the subclause but its defnition is missing. Also the paragraph starting in line 26 describes the different types of polling frames that the STA can send to the AP. The types are differentiated via the Poll type field in the Frame Control of the PS-Poll. It would be better to have a clear list of the information that is solicited to the AP and eventually pointing to the additional procedures that are defined in their corresponding subclauses. For example the procedure for Poll type set to 0 is the described in 10.2.2. The Poll type (1 and 2) that solicit TACK/STACK frames can be only TWT STA as described in 9.41. Similar considerations for the paragraph that describes the control response frames (TACK /STACK /NDP ACK) in line 38. | Add definition of active polling STA and clearly list the information solicited by the AP. | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 1520. |
| 1521 | 9.43.4 | 188 | 40 | TACK can define the next TWT as well as the next wakeup for active polling non-TIM STAs. If the STA is also a TWT STA, what will be indicated by the TACK? | Clarify the confusion when the Active Polling non-TIM STA receives a TACK with the next TWT included. What will that indicate? or Indicate the meaning of Next TWT shall not be interpreted as the next TWT for TWT STAs under some conditions | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 1521. |
| 1522 | 9.43.4 | 188 | 46 | some of the values are in Binary (11) some are in decimal (2 or 3), please unify it through subclause | as in the comment | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 1522. |
| 2654 | 9.43.4 | 188 | 38 | When the "Poll Type" bits are set to any value other than b00, does the AP still transmit buffered BU if any to the STA or does it only send the solicited information? | Please clarify. | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 2654. |
| 2656 | 9.43.4 | 188 | 27 | Definition of "Active Polling STA' is missing. | Provide definition of "Active Polling STA" | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 2656. |
| 2757 | 9.43.3 | 188 | 38 | Refine the text | Change to "In response to the received polling message sent by an active polling STA, an AP may send a TACK frame in which the Next TWT Present field is set to 0 with the solicited information to the STA immediately. An APmay also send to the STA either an NDP ACK frame that includes a Duration field which is a wakeup timer and set to the duration to a TBTT or a TACK frame in which Next TWT field is set to the value of a TBTT, which the STAuses to derive the transmission time of a beacon." | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 2757. |
| 2758 | 9.43.3 | 188 | 47 | Change "11" to "3" | as commented | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 2758. |
| 2912 | 9.43.4 | 188 | 39 | It is not clear if the term "immediately" means within SIFS or some other value after EDCA channel access mechanism. It needs further clarification | As mentioned in the Comment. | RevisedTgah editor to make changes shown in 11-14-0054r0 under the heading for CID 2912. |

***Discussion:***

**CID 1520**

Agreed with the comment. However, an active polling STA is a STA that does not check the beacon for TIM information but it sends PS-Poll to solicit the information from the AP. In this case, an active polling STA is a non-TIM STA. Therefore, we need not to define the term of active polling STA.

The procedures for Poll Type subfield set to different values are described in the discussion for CID 1519. Please see the text in the subclause 9.42.3.

**CID 1521**

The following gives the clarification on the Next TWT field in the TACK frame. An non-TWT STA will not receive a TACK frame with the Next TWT field present that is the response to its PS-Poll frame with Poll Type subfield equal to 2.

In response to a PS-Poll frame with the Poll Type subfield equal to 2, an AP shall send to the STA that is not a TWT STA either a data frame or an NDP ACK frame that may include a Duration field which is a wakeup timer and set to the duration to a TBTT, which the STA uses to derive the transmission time of a beacon. In response to a PS-Poll frame with the Poll Type subfield equal to 2 within the negotiated TWT SP for the STA, an AP shall send to the STA that is a TWT STA a TACK frame in which the Next TWT field is set to the next TWT of the TWT STA.

**CID 2654**

When Poll Type subfield is set to a value other than 0 in a received PS-Poll frame, AP may send to the requesting STA with BU except the following cases:

The AP shall send a TACK frame without the Next TWT field as the response to a PS-Poll frame with the Poll Type subfield equal to 1 transmitted by a STA that requests the information of Change Sequence and Timestamp. See 9.42.3 and 9.41 (Target Wake Time (TWT)).

The AP shall send a TACK frame with the Next TWT field as the response to a PS-Poll frame with the Poll Type subfield equal to 2 transmitted by a TWT STA that requests the Next TWT information. See 9.42.3 and 9.41 (Target Wake Time (TWT)).

***Proposed changes:***

**Instruction to Editor: *Please delete subclause 9.42.4 and replace the reference to 9.42.4 with the reference to 9.42.3:***

**~~9.42.4 Active polling procedure for non-TIM STAs~~**

~~This clause defines the active polling procedure for a STA that can solicit information from AP upon waking up.~~

~~Upon waking up and without listening for a beacon, an active polling STA may solicit BSS change sequence and/or current timestamp information or other information(#257) from an AP by sending a polling message (PS-Poll). In this polling message, it indicates whether the STA solicits the information of BSS change sequence and/or current timestamp by setting Poll Type subfield to 1(#257), or whether the STA solicits the information of Next TWT or Duration to a TBTT by setting Poll Type subfield to 2(#257). In addition, a STA that has requested time slot protection for a TXOP duration after the expiration of a wakeup timer, as described in 9.43.1 (Synch frame transmission procedure for uplink traffic), may transmit to the UL-Synch capable AP a PS-Poll with the Poll Type subfield in the Frame Control field set to 3(#257).(#20)~~

~~(#258, 988)In response to the received polling message sent by an active polling STA, an AP may send a TACK in which the Next TWT Present field is set to 0 with the solicited information to the STA immediately. An AP may also send the STA either a NDP ACK that includes a Duration field which is a wakeup timer and set to the duration to a TBTT or TACK in which Next TWT field is set to the value of a TBTT, which the STA uses to derive the transmission time of a beacon. The STA shall listen to the beacon when the timer with the value as indicated by Duration field of NDP ACK expires or the time equal to Next TWT of TACK is due. An UL-Synch capable AP may respond with an NDP ACK frame to a PS-Poll with Poll Type subfield set to 11. The NDP ACK frame shall include a wakeup timer in the Duration field by setting the Duration Indication value to 1. The UL-Synch capable AP shall protect the TXOP duration following the expiration of the wakeup timer as described in 9.43.1 (Synch frame transmission procedure for uplink traffic). (#20)~~