IEEE P802.11
Wireless LANs

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| LB 205 Comment Resolution for 9.3.2.3, 9.3.2.6, 9.3.2.9, 9.3.2.10, 9.3.2.15, 9.3.7, and 9.42h.5.2 |
| Date: 2014-11-01 |
| Author(s): |
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Abstract

This submission proposes resolutions for comments in 9.3.2.3, 9.3.2.6, 9.3.2.9, 9.3.2.10, 9.3.2.15, 9.3.7, and 9.42h.5.2 of TGah Draft 3.0 with the following CIDs (TOT 23 CIDs):

* 5205, 5206, 5217, 5218, 5219, 5220, 5287, 5288, 5289, 5290, 5291, 5379
* 5103, 5387, 5388, 5406, 5417, 5418, 5419, 5456, 5382, 5389, 5457

Revisions:

- Rev 0: Initial version of the document

- Rev 1: Minor changes for clarification (in green)

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 TGah Draft. This introduction is not part of the adopted material.

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

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

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5205 | Liwen Chu | 233.17 | 9.3.2.3.3 | Change the first paragraph to "The SIFS shall be used prior to transmission of an (NDP) Ack frame, TACK frame, STACK frame, NDP PS-Poll Ack, a (NDP) CTS frame, a PPDU containing a (NDP) BlockAck, BAT frame that is an immediate response...." | As in comment. | Revised –Agree with comment. Proposed resolution accounts for the suggested changes, including in the list the BAT frame as well.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5205. |
| 5206 | Liwen Chu | 233.01 | 9.3.2.3 | Add NDP PS-Poll under AIFS rules | As in comment. | Revised –Agree with comment. Proposed resolution accounts for the suggested changes. In addition the proposed resolution includes in the list the Ps-Poll+BDT frame as well.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5206. |
| 5379 | Mitsuru Iwaoka |  | 9.3.2.3.6 | According to 10.2.2.2 (P340L16) and 9.3.2.9 (P241L25), an S1G AP is allowed to send an RTS frame as a response to a PS-Poll(+BDT) frame. The SIFS shall be used instead of the AIFS. | Modify the first paragraph of subclause 9.3.2.3.6 (AIFS) by inserting a following text after the item "RTS".--(when not transmitted as a response to an PS-Poll or PS-Poll+BDT frame for an S1G STA) | Revised –Agree with comment. Proposed resolution accounts for the suggested changes adding the exception in SIFS subclause as well.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5379. |

**Discussion:** *None.*

**9.3.2.3.3 SIFS**

**TGah Editor: *Change the paragraph below as follows (#5205, 5379):***

The SIFS shall be used prior to transmission of an (NDP) Ack frame, a TACK frame, a STACK frame, NDP PS-Poll-Ack frame, a (NDP) CTS frame, a PPDU containing a BlockAck, NDP BlockAck or BAT frame that is an immediate response to either a BlockAckReq frame or an A-MPDU, a DMG CTS frame, a DMG DTS frame, an SSW-Ack frame, a Grant Ack frame, a response frame transmitted in the ATI, the second or subsequent MPDU of a fragment burst, and by a STA responding to any polling by the PCF. The SIFS shall be used by an S1G AP to separate the frames within a series of NDP sector training frames after a sector training announcement and for transmitting an RTS frame that is sent as an immediate response to a PS-Poll(+BDT). The SIFS may also be used by a PC for any types of frames during the CFP (see 9.4 (PCF)). The SIFS is the time from the end of the last symbol, or signal extension if present, of the previous frame to the beginning of the first symbol of the preamble of the subsequent frame as seen at the air interface.

**9.3.2.3.6 AIFS**

**TGah Editor: *Change this subclause as follows (#5206, 5379):***

The AIFS shall be used by QoS STAs that access the medium using the EDCAF to transmit: all Data frames (MPDUs) except during the ATI or an SP, all Management frames (MMPDUs) except during the ATI or an SP, all extension frames except for the DMG Beacon frame, and the following Control frames:

— PS-Poll(+BDT)

— SSW (if first transmission by an initiator in a CBAP)

— Poll (if first transmission and when in a CBAP)

— Grant (if first transmission and when in a CBAP and not transmitted in response to a SPR frame)

— SPR (when in a CBAP and not transmitted as a response to a Poll)

— RTS (when not transmitted as a response to a PS-Poll(+BDT) frame by an S1G STA)

— CTS (when not transmitted as a response to an RTS frame)

— DMG CTS (when not transmitted as a response to an RTS frame)

— BlockAckReq

— BlockAck (when not transmitted as a response to a BlockAckReq frame)

— NDP PS-Poll

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5287 | Alfred Asterjadhi | 237.64 | 9.3.2.6 | How can an RTS be carried in a 2 MHz PPDU with TXVECTOR parameter FORMAT set to S1G\_DUP\_2M? | Replace "an RTS carried in a 2 MHz PPDU" with "an RTS frame carried in a >2 MHz PPDU". | Revised –Agree with comment. Proposed resolution accounts for the suggested changes.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5287. |

**Discussion:** *None.*

**9.3.2.6 VHT and S1G RTS procedure**

**TGah Editor: *Change the paragraph below as follows (#5287):***

An S1G STA using dynamic bandwidth operation (see 9.3.2.7 (CTS and DMG CTS procedure)) that transmits an RTS carried in a greater than 2 MHz PPDU with TXVECTOR parameter FORMAT set to S1G\_DUP\_2M shall set the Dynamic Indication field in the Frame Control field of the RTS frame to 1. Otherwise, the S1G STA shall set the Dynamic Indication field in the Frame Control field of the RTS carried in any other PPDUto 0 to indicate that it shall not use dynamic bandwidth operation (see 9.3.2.7 (CTS and DMG CTS procedure)).

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
|  |  |  |  |  |  |  |
| 5217 | Liwen Chu | 241.14 | 9.3.2.9 | "In addition, when an AP transmits an MPDU to a relay STA under TXOP sharing relay operation and the PARTIAL\_AID in the PHY-RXSTART.indication primitive that occurs within aRxPHYStartDelay is identical to the PARTIAL\_AID corresponding to the DA of the transmitted MPDU shall be accepted as a successful acknowledgment of the MPDU transmission."Bad sentence. | Rewrite the sentence. | Revised –Agree with the comment. Proposed resolution is to re-write this item because it is not inline with the description in 9.42h.5, it is unclear and does not include sufficient description for the UPLINK\_INDICATION field and the COLOR field when the frame is DL (this last statement is true for the subclause 9.42h.5 as well and the proposed resolution updates that subclause as well to be inline with this description).TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5217. |
| 5218 | Liwen Chu | 241.19 | 9.3.2.9 | This bullet is about an AP, why shall the STA consider the MPDU as successful acknowledgement only...? | Rewrite the sentence. | Revised –Partially agree with the comment in the sense that it is understandable that the way it is written it is confusing. Proposed resolution is to re-write this item because it is not inline with the description in 9.42h.5, it is unclear and it does not include sufficient description for the UPLINK\_INDICATION field and the COLOR field when the frame is DL (this last statement is true for the subclause 9.42h.5 as well and the proposed resolution updates that subclause as well to be inline with this description). TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5218. |
| 5219 | Liwen Chu | 241.45 | 9.3.2.9 | "The control response frame shall be carried in a 32 Octet PSDU if the eliciting PPDU contains a VHT Single MPDU."With this restriction, STACK is not necessary. With this restriction TACK can't be transmitted. | Correct the problems. | Rejected –The comment does not identify a technical issue. As a response to the comment: Please note that with this restriction:A STACK is not allowed as a response to a VHT Single MPDU because a TACK is transmitted as a response to these frames as described in 9.42a.2(TWT acknowledgement procedure) when Response Indication is Normal Response). The only restriction here would be that the TACK frame has to be a 32 Octet PSDU (but that is already the case for a TACK frame that contains the Next TWT Info/Suspend Duration field). |
| 5288 | Alfred Asterjadhi | 240.39 | 9.3.2.9 | During a TWT SP NDP Ack and Ack frames can be used because it depends whether the acknowledgement originator is a TWT requester or a TWT responder. Replace "is used in place of the Ack frame" with "can be used in place of the (NDP) Ack frame". | As in comment. | Revised –Agree with the comment. TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5288. |
| 5289 | Alfred Asterjadhi | 241.37 | 9.3.2.9 | A frame should be identified by the "frame" classifier that follows it. Append "frame" after the name of the frame "TACK". Perform the same change throughout the draft for TACK, STACK, Ack, BAT, PS-Poll, NDP Ack, NDP PS-Poll-Ack, NDP CTS, NDP CF-End, NDP BlockAck, NDP Paging, NDP Probe Request, and other frames. | As in comment. | Accepted –Note to the TGah Editor: This is an inline instruction. |

**Discussion:** *None.*

**9.3.2.9 Ack procedure**

**TGah Editor: *Change the paragraph below as follows (#5288):***

The cases when an Ack frame can be generated are shown in the frame exchange sequences listed in Annex G. During a TWT SP, either the STACK or TACK frame can be used in place of the (NDP) Ack frame, according to the procedure described in 9.42a (Target wake time (TWT)) and otherwise, shall not be used.

**TGah Editor: *Change item 1) below as follows (#5217, 5218):***

Additional exceptions exist for S1G STAs for accepting a valid frame as successful acknowledgment as described in the following three paragraphs:

1) A STA that has enabled the implicit Ack procedure (see 9.42h.5.2 (Implicit Ack procedure) shall consider a received S1G\_SHORT/S1G\_LONG PPDU as successful acknowledgement of a previously transmitted MPDU that was carried in an S1G\_SHORT/S1G\_LONG PPDU only in the following two cases:

a) The STA is a non-AP STA associated to a relay AP and all the conditions below are satistifed:

* A PHY-RXSTART.indication primitive that corresponds to the received PPDU is detected within the ACKTimeout interval that started as a result of the previously transmitted MPDU
* The RXVECTOR parameter PARTIAL\_AID is either equal to the PARTIAL\_AID that corresponds to the BSSID of the root AP or the PARTIAL\_AID is equal to 0 and the PPDU contains an RTS frame with RA equal to the BSSID of the root AP
* The RXVECTOR parameter UPLINK\_INDICATION is equal to 1.

b) The STA is an AP that has a relay STA associated to it and all the conditions below are satisfied:

* A PHY-RXSTART.indication primitive that corresponds to the received PPDU is detected within the ACKTimeout interval that started as a result of the previously transmitted MPDUThe RXVECTOR parameter PARTIAL\_AID is equal to the 6 LSBs of the PARTIAL\_AID that corresponds to the DA of the non-AP STA or the RXVECTOR parameter PARTIAL\_AID is equal to 0 and the received PPDU contains an RTS frame with RA equal to the DA of the non-AP STA
* The RXVECTOR parameter UPLINK\_INDICATION is equal to 0 and the RXVECTOR parameter COLOR is equal to the COLOR value of the relay AP.

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5290 | Alfred Asterjadhi | 242.44 | 9.3.2.10 | During a TWT SP NDP BlockAck and BlockAck frames can be used because it depends whether the block acknowledgement generator is a TWT requester or a TWT responder. Replace "is used in place of the BlockAck frame" with "can be used in place of the (NDP) BlockAck frame". | As in comment. | Revised –Agree with the comment. TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5290. |

**Discussion:** *None.*

**9.3.2.10 Block ack procedure**

**TGah Editor: *Change the paragraph below as follows (#5290):***

During a TWT SP, the BAT frame can be used in place of the (NDP) BlockAck frame, as described in 9.24 (Block acknowledgment (block ack)) and otherwise, is not used.

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5220 | Liwen Chu | 246.36 | 9.3.2.15 | QoS + CF-Ack is not control response frame, it is one of data frame | fix the problem. | Revised –Agree in principle with the comment. Since QoS+CF-Ack frames are sent under HCCA which is not supported in S1G the proposed resolution is to remove this frame and the reference.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5220. |

**Discussion:** *None.*

**9.3.2.15 Response Indication procedure**

**TGah Editor: *Change the table below as follows (#5220, 5382):***

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| * Setting the TXVECTOR's parameter RESPONSE\_INDICATION
 |
| RESPONSE\_INDICATION | Solicited Immediate Response |
| No Response | No immediate response. The Ack Policy subfield in any included QoS Control field or in the Frame Control field of the first MPDU in the PPDU is equal to No Ack or Block Ack (see 8.2.4.5.4 (Ack Policy subfield) and 8.8.3.1 (Frame Control field)).  |
| NDP Response  | The addressed recipient returns an individual NDP CMAC(#3027) frame:* NDP Ack frame, as described in 9.3.2.9 (Ack procedure),
* NDP CTS frame, as described in 9.3.2.7 (CTS and DMG CTS procedure),
* NDP BlockAck frame, as described in 9.24.7 (HT-immediate block ack extensions) and 9.3.2.10a (Fragment BA procedure).

The Ack Policy subfield (if any) in the QoS Control field or in the Frame Control field is equal to Normal Ack or Implicit Block Ack Request. |
| Normal Response | The addressed recipient returns an individual control response frame:* Ack frame, as described in 9.3.2.9 (Ack procedure),
* BlockAck or BAT frame, as described in 9.3.2.10 (Block ack procedure) and 9.42a (Target wake time (TWT))(#11-14/1140r1, Ed).
* TACK or STACK frame as described in 9.42a (Target wake time (TWT)).

The Ack Policy subfield (if any) in the QoS Control field or in the Frame Control field is equal to Normal Ack or Implicit Block Ack Request. |
| Long Response | The addressed recipient may return a response frame which is not an individual control response frame. More details are provided in 9.42d (Bidirectional TXOP), 9.28 (Reverse direction protocol), 9.32.3 (Explicit feedback beamforming), and 9.42h.5.1 (Explicit Ack procedure). |

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5291 | Alfred Asterjadhi | 249.04 | 9.3.7 | Broken reference of the equation. | Fix it. | Revised –Agree with comment. This seems to be a problem that has occurred more than once in the draft. Proposed resolution accounts for the suggested change and instructs the editor to review all the equation references and ensure that they are not broken and their format is inline with that of REVmc D3.0.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5291. |

**Discussion:** *None.*

**TGah Editor: *Review all the equations in the draft and their respective references ensuring that each equation has a reference number which is inline with the format of the equations in REVmc D3.0. Make the appropriate changes to the draft to fix these broken references or to add the missing references to the equations that do not have one (#5291).***

**9.3.7 DCF timing relations**

**TGah Editor: *Change this subclause as follows (#5291):***

For non-S1G STAs, w~~W~~hen dot11DynamicEIFSActivated is false or not defined, the EIFS is derived from the SIFS and the DIFS and the length of time it takes to transmit an Ack frame at the lowest PHY mandatory rate by Equation 9-10.

EIFS = aSIFSTime + DIFS + ACKTxTime (9-10)

where

ACKTxTime is the time expressed in microseconds required to transmit an Ack frame, including pream­ble, PHY header and any additional PHY dependent information, at the lowest PHY mandatory rate.

For an S1G STA the EIFS is equal to DIFS if the PPDU that causes the EIFS gives a PHY-RXEND.indication primitive that does not contain FormatViolation. Otherwise, the EIFS for the S1G STA is derived by the Equation 9-10, where ACKTxTime is equal to NDPTxTime as defined in 9.3.2.4a.1 (RID update).

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5103 | Yangseok Jeong | 322.00 | 9.42h.5 | There are several variations of "Explicit/Implicit Ack" through the text, ie.- Explicit/Implicit "Ack"- Explicit/Implicit "ACK"- Explicit/Implicit "ack" | Correct or unify the capitalizing policy for text of "ACK". | Revised –Agree with the comment. Proposed resolution accounts for the suggested change and uses lower case for explicit/implicit as it is the name of the procedure. TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5103. |
| 5387 | Mitsuru Iwaoka | 322.12 | 9.42h.5 | The TXOP sharing is performed on a PPDU for relay. If A-MSDU or A-MPDU is used, multiple Short Data frames can be forwarded in a relay-shared TXOP. | Modify the last sentence of the first paragraph as follows:---The S1G STA may use TXOP sharing to transmit to the relay (relay AP or relay STA) either one PPDU or the last PPDU of the TXOP | Revised –The TXOP sharing is performed on a PPDU that carries an MPDU or VHT Single MPDU, where the acknowledgement is either an NDP Ack (explicit Ack) or is implicit (implicit Ack). For better clarity the proposed resolution is to specify that the Short Data frame is carried in an MPDU or in a VHT Single MPDU. And it is already clear that the Short Data frame can carry an A-MSDU this is already specified in 9.12 (A-MSDU operation). TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5387. |
| 5388 | Mitsuru Iwaoka | 322.07 | 9.42h.5 | For explicit Ack procedure, an NDP BlockAck fame cannot be used as it cannot indicate a Response indication of Long Response. For implicit Ack procedure, no Block Ack bitmap can be provided. So, a relay cannot perform TXOP sharing if a received PPDU contains A-MPDU including QoS Data frames with the Ack Policy field equal to Implicit Block Ack Request or Block Ack.The TXOP sharing is not used for a PPDU that requires Block Ack. | Insert a following text as the second paragraph of 9.42h.5:---The S1G STA shall not use TXOP sharing to transmit a PPDU other than a non-A-MPDU frame or VHT single MPDU with the Ack Policy field equal to 0. The S1G STA shall not TXOP sharing to transmit PPDUs with Fragment BA procedure. | Revised –For explicit Ack procedure only an NDP Ack frame can be sent (i.e., the eliciting PV1 MPDU’s Ack Policy field is equal to 0) and as per CID 5387 the Short Data frame shall be carried in an MPDU or in a VHT Single MPDU (so no A-MPDU i.e., no BlockAck). Similar observations for the implicit Ack (inline with the discussion of CID 5387) where the frame is implicitly acknowledged by the relayed frame.Hence the proposed resolution is to clarify that the Ack Policy field is equal to 0 for the Short Data frame.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5388. |
| 5406 | Mitsuru Iwaoka | 322.31 | 9.42h.5 | A channel width is "narrower", not "lower". | Replace "lower" by "narrower". | Revised –Agree with the comment. Proposed accounts for the suggested change.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5406. |
| 5417 | Shusaku Shimada | 322.12 | 9.42h.5 | "The S1G STA may use TXOP sharing to transmit to the relay (relay AP or relay STA) either one Short Data frame or the last Short Data frame of the TXOP." is not clear enough as normative condition or not. | change to "The S1G STA may use TXOP sharing to transmit to the relay (relay AP or relay STA), and if TXOP sharing is used either one Short Data frame or the last Short Data frame of the TXOP burst shall only transmitted after single contention and TXOP setting." | Revised –The requested normative behaviour suggested in the proposed change can already be found in 9.22.2.4(Obtaining an EDCA TXOP). Hence the proposed resolution is to clarify that the TXOP is obtained as described in 9.22.2.4 (Obtaining an EDCA TXOP)TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5417. |
| 5418 | Shusaku Shimada | 322.05 | 9.42h.5 | A comprehensive caliculation procedure for TXOP sharing duration has to be included, because the time duration for multiple bursts after one contention is including an intermidiate period between burst. | As in comment. | Revised –Note that by default the TXOP owner does not have an estimate of the duration of the frame that will be transmitted by the relay to the next hop STA (different MCS/BWs can be used for the second frame). However if the TXOP holder wants to limit the duration of the TXOP it can either use a default EDCA TXOP which limits are defined in 9.22.2.8(TXOP limits) or can use the protection mechanisms defined in 9.42h.5.3 (Relay-shared TXOP protection mechanisms) which enables the TXOP responder to expand the TXOP within certain limits that are defined in the same subclause.Note to the commenter: It is not clear what an intermediate period means in the comment.Proposed resolution is clarify in 9.42h.5.3 that the relay-shared TXOP duration is constrained as described in the subclause of interest. TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5418. |
| 5419 | Shusaku Shimada | 322.05 | 9.42h.5 | In case of TXOP sharing duration is caliculated, a maximum time restriction of the intermidiate period between multiple burst has to be defined. | Set the maximum value. | Rejected –The comment fails to identify a specific issue to be addressed. It fails to identify changes in sufficient detail so that the specific wording of the changes that will satisfy the commenter can be determined.Note to the commenter: It is not clear what an intermediate period means in the comment. |
| 5456 | David Hunter | 322.35 | 9.42h.5 | The CRC's resolution to CID3499 indicated that the statement "A relay can use either..." is not confusing because the related normative statement ("relay may acknowledge .. using either..") follows. But this means that the "can use" statement is not only confusing (using "can" in a possibly normative way) but redundant. | Delete "A relay can use either: -- Explicit Ack procedure -- Implicit Ack procedure". (which, by the way, also included incorrect English.) | Revised –Proposed resolution accounts for the suggested change.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5456. |

**9.42h.5 Procedures of TXOP sharing for relay operation**

**TGah Editor: *Change the paragraphs below as follows (#5387, 5388, 5417):***

An S1G STA that supports TXOP sharing procedure may set the Relayed Frame field in the Frame Control field of Short Data frames (defined in 8.8 (MAC frame format for PV1 frames)), the Relayed Frame field in NDP Ack frames, and the Order field in the Frame Control field of an S1G RTS frame to 1. Otherwise, it shall set the Relayed Frame field or Order field in any frame to 0 unless the frame is an NDP Ack frame used for flow control as described in 9.42o (Flow control). The S1G STA may use TXOP sharing to transmit to the relay (relay AP or relay STA) either one Short Data frame in the TXOP or the last Short Data frame of the TXOP where the TXOP is obtained as described in 9.22.2.4 (Obtaining an EDCA TXOP) and the Short Data frame has the Ack Policy field equal to 0 and is carried in an MPDU or in a VHT Single MPDU.

**TGah Editor: *Change the paragraph below as follows (#5103):***

An S1G STA indicates support of TXOP sharing with implicit Ack using the TXOP Sharing Implicit Ack Support subfield of the S1G Capabilities Info field in the S1G Capabilities element. If dot11TXOPSharingImplicitACKSupportImplemented is true, the S1G STA shall set the TXOP Sharing Implicit Ack Support subfield to 1 in transmitted frames containing the S1G Capabilities element. Otherwise, the S1G STA shall set the TXOP Sharing Implicit Ack Support subfield to 0.

A non-S1G STA shall not perform TXOP sharing.

**TGah Editor: *Change the paragraph below as follows (#5406):***

A relay entity shall not perform TXOP sharing if the relay STA and relay AP are operating in different primary channels for the duration of the TXOP. A relay that performs TXOP sharing shall use a channel width that is the same or narrower than the channel width indicated by the STA that initiated the TXOP.

**TGah Editor: *Change the paragraph below as follows (#5456):***

The sequence of frames exchanged over the first hop and second hop during a relay-shared TXOP depends on the acknowledgement procedure used by the relay.

**TGah Editor: *Change the paragraph below as follows (#5103):***

When a relay (relay STA or relay AP) receives a valid Short Data frame with the Relayed Frame field in the Frame Control field equal to 1, the relay may acknowledge the received Short Data frame using the implicit or explicit Ack procedure. The relay shall not acknowledge the received valid Short Data frame using either implicit or explicit Ack procedure if the Relayed Frame field in the Frame Control field is equal to 0 in the received Short Data frame.

NOTE—The frames transmitted over the first hop and second hop can be sent at two different MCSs.

For error recovery purposes, during a relay-shared TXOP, the TXOP owner may transmit its next PPDU when the CS mechanism (see 9.3.2.1 (CS mechanism)) indicates that the medium is idle at the TxPIFS slot boundary (defined in 9.3.7 (DCF timing relations)) (this transmission is a continuation of the current TXOP or SP).

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5382 | Mitsuru Iwaoka | 322.57 | 9.42h.5.1 | The signaling of No Response for NDP Ack specified in the first paragraph of 9.42h.5.1 differs from the Table 9-1a (RESPONSE\_INDICATION value for NDP MAC frames) in the subclause 9.3.2.4a (Setting and resetting the RID). | "Modify the first paragraph of 9.42h.5.1 as follows:---Throughout this subclause, a Response Indication of Long Response is signaled in an NDP Ack frame by setting the Idle Indication field to 1 and the Duration field to 0. A Response Indication of No Response is signaled in an NDP Ack frame by setting either the Idle Indication field to 0 or the Duration field to a nonzero value (see 9.3.2.4a (Setting and resetting the RID))." | Revised –Do not generally agree with the comment. The values indicated in Table 9-1a (RESPONSE\_INDICATOIN value for NDP CMAC frames) are used by third party STAs to set their RID counter. The signalling that this subclause refers to is that specified in Table 9-4a (Setting the TXVECTOR’s parameter RESPONSE\_INDICATION) of Subclause 9.3.2.15 (Response Indication procedure). Proposed resolution is to add the reference to the Explicit Ack procedure in the Table for Long Response so that this is clear.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5382. |

**9.42h.5.1 Explicit Ack procedure**

Throughout this subclause, a Response Indication of Long Response is signaled in an NDP Ack frame by setting the Idle Indication field to 1 and the Duration field to 0 and a Response Indication of No Response is signaled by setting the Idle Indication field to 0 and the Duration field to 0 (see 9.3.2.15 (Response Indication procedure)).

**TGah Editor: *Change the paragraph below as follows (#5103):***

A non-AP STA (AP) that intends to start a relay-shared TXOP starts it by sending a Short Data frame addressed to the relay AP (relay STA) with the Relayed Frame field equal to 1. The relay AP (relay STA), addressed by an RTS frame, that intends to use the explicit Ack procedure, shall respond with an NDP CTS frame with the Duration field set as described in 9.42h.5.3 (Relay-shared TXOP protection mechanisms).

**TGah Editor: *Change the paragraph below as follows (#5103):***

When using the explicit Ack procedure, the relay AP (relay STA) shall signal a Response Indication of Long Response in the NDP Ack frame that is transmitted as an acknowledgement to the non-AP STA (AP). In addition it shall set the Relayed Frame field of the NDP Ack frame to 1. Otherwise, it shall signal a Response Indication of No Response in the NDP Ack frame and shall set the Relayed Frame field to 0.

**TGah Editor: *Change the paragraph below as follows (#5103):***

When using the explicit Ack procedure, the relay STA (relay AP) shall forward the previously received Short Data frame to the AP (non-AP STA), SIFS after the relay AP (relay STA) sent the NDP Ack frame to the non-AP STA (AP). In addition, the relay STA (relay AP) may protect the forwarded frame with a protection mechanism such as RTS/CTS exchange. Upon successful receipt of the relayed Short Data frame, the AP (non-AP STA) shall transmit an NDP Ack frame to the relay STA (relay AP), which shall signal a Response Indication of No Response terminating this relay-shared TXOP.

NOTE—The description above applies to both uplink and downlink procedures with the non-AP STA (AP), i.e., either the non-AP STA or the AP is the TXOP owner for the TXOP sharing session.

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5389 | Mitsuru Iwaoka | 324.01 | 9.42h.5.2 | The last two paragraphs say that "An AP to which the relay STA is associated may use the implicit ack procedure.." or "A non-AP STA associated to a relay AP may use the implicit ack procedure...". However, there are no procedure for an AP or non-AP STA to control use of the implicit ack. Only a relay entity can control use of the implicit ack. | Modify the last two paragraphs as follows:---An AP to which the relay STA is associated needs to know a partial AID of a non-AP STA associated to the relay AP to use the implicit ack procedure to transmit a downlink frame to the non-AP STA. Before the relay entity use the implicit ack procedure for downlink traffic, the relay STA shall indicate an associated STA's AID to the AP by sending a STA Information Announcement frame including an AID Announcement element when the non-AP STA becomes associated or the non-AP STA's AID is changed.A non-AP STA associated to a relay AP need to know the BSSID of the AP to which the relay STA of the relay is associated. The relay AP shall indicate the BSSID of the AP to newly associated non-AP STAs by using RootAP BSSID field in the Relay element in Beacon frame, Probe Response, or Short Probe Response frame. | Revised –Agree with the comment. Proposed resolution accounts for the suggested change but also suggests to move these modified paragraphs at the beginning of the subclause as these paragraphs indicate when the implicit Ack procedure is enabled from the AP or non-AP STA.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5389. |
| 5457 | David Hunter | 323.49 | 9.42h.5.2 | The phrase "permitting the frame sequence to continue" seems to indicate a normative permission, when the overall sentence only appears to be informative. | Replace "permitting" with the more generic "allowing" both here and on line 59. (Yes, there are similar confusions in 11mc -- those too need clarification.) | Revised –Agree with the comment. Proposed accounts for the suggested change.TGah editor to make the changes shown in 11-14/1468r1 under all headings that include CID 5457. |

**9.42h.5.2 Implicit Ack procedure**

**TGah Editor: *Change the paragraph below as follows (#5103, 5389):***

A STA that supports implicit Ack procedure and intends to transmit a frame to a next hop STA via a relay (relay STA or relay AP) using the implicit Ack procedure needs to enable the implicit Ack procedure (and acquire the required information to operate using implicit Ack) with the relay. The implicit Ack procedure is enabled between the STA and the relay (relay STA or relay AP) if:

* The STA is an AP to which the relay STA of the relay is associated and the relay STA has successfully transmitted to the AP a STA Information Announcement frame containing the AID that the relay AP of the relay has assigned to the next hop non-AP STA.
* The relay STA may transmit a STA Information Announcement frame to its associated AP that supports the implicit Ack procedure when the relay AP either assigns an AID to the next hop non-AP STA during association or changes the AID of the non-AP STA as described in 10.44a (Dynamic AID assignment).
* The AP shall determine the PARTIAL\_AID of the next hop non-AP STA as described in 9.20a (Group ID, partial AID, Uplink Indication and COLOR in S1G PPDUs) using the BSSID of the relay AP and the AID of the next hop non-AP STA to be able to use the implicit Ack procedure.
* The STA is a non-AP STA that is associated to the relay AP and the relay AP has transmitted to the STA a Relay element with the RootAP BSSID field containing the BSSID of the next hop AP to which the relay STA of the relay is associated.
* The non-AP STA shall determine the PARTIAL\_AID and the COLOR of the next hop AP as described in 9.20a (Group ID, partial AID, Uplink Indication and COLOR in S1G PPDUs) using the BSSID and COLOR values used by the next hop AP to be able to use the implicit Ack procedure.

**TGah Editor: *Change the paragraph below as follows (#5103, 5389):***

After the implicit Ack procedure is enabled and all the required information is acquired as described above, the implicit Ack may be used to acknowledge eliciting Short Data frames carried in S1G\_SHORT/S1G\_LONG PPDUs (i.e., that contain a PARTIAL AID, UPLINK\_INDICATION, and COLOR in their PLCP header). .

**TGah Editor: *Change the paragraph below as follows (#5103):***

A STA that intends to share the TXOP with the relay may start the TXOP by sending to the relay an S1G RTS frame with the Order field set to 1 or a Short Data frame that has the Relayed Frame field set to 1. A relay (relay STA or relay AP) that is the intended receiver of the S1G RTS frame which intends to use the implicit Ack procedure shall respond with an NDP CTS frame with the Duration field set as described in 9.42h.5.3 (Relay-shared TXOP protection mechanisms).

When a relay receives a Short Data frame during a relay-shared TXOP, the relay may directly forward the received frame without sending back an acknowledgement frame to the transmitter of the frame. If the Short Data frame was preceded by an RTS frame then the relay should protect the forwarded frame by sending an RTS frame to the intended receiver as described in 9.42h.5.3 (Relay-shared TXOP protection mechanisms).

**TGah Editor: *Change the paragraph below as follows (#5457, 5218):***

If the MPDU is transmitted by a non-AP STA, which is associated to a relay AP, to the AP, then the relay AP forwards the received MPDU to the AP to which it is associated, using SIFS. After transmitting the MPDU, the non-AP STA shall wait for an ACKTimeout interval to detect a PPDU that would acknowledge the reception of the MPDU as described in 9.3.2.9 (Ack procedure). An indication of successful reception allows the frame sequence to continue, or to end without retries, as appropriate for the particular frame sequence in progress.

**TGah Editor: *Change the paragraph below as follows (#5103, 5457, 5218):***

If the MPDU is transmitted by an AP to a relay STA, then the relay STA forwards the received MPDU to the non-AP STA that is associated to the relay AP, using SIFS. After transmitting the MPDU, the AP shall wait for an ACKTimeout interval to detect a PPDU that would acknowledge the reception of the MPDU as described in 9.3.2.9 (Ack procedure). An indication of successful reception allows the frame sequence to continue, or to end without retries, as appropriate for the particular frame sequence in progress. If the RA of the forwarded MPDU is different from the DA of the MPDU transmitted by the AP, then the relay STA shall use the explicit Ack procedure.

**TGah Editor: *Change the paragraphs below as follows (#5389):***

**9.42h.5.3 Relay-shared TXOP protection mechanisms**

**TGah Editor: *Replace “implicit ack” with “implicit Ack” (twice) and “explicit ack” with “explicit Ack” in in 9.42h.3 and replace “implicit ACK” with “with implicit Ack” (twice) in Annex C (#5103).***

**TGah Editor: *Change the first paragraph of this subclause as follows (#5418).***

An S1G STA that supports TXOP sharing should initiate a relay-shared TXOP by sending an S1G RTS frame as the first frame in the exchange under EDCA. The S1G STA may set the Order field of the RTS frame to 0 to indicate that the duration of the initiated TXOP is limited as described in 9.22.2.8 (TXOP limits) and that it expects an NDP CTS whose Duration field is set as described in 9.3.2.6 (CTS and DMG procedure). Otherwise, it may set the Order field to 1 to indicate that the duration of the initiated TXOP can be extended (i.e., it is not necessarily limited as described in 9.22.2.8 (TXOP limits)) and that it expects an NDP CTS whose Duration field is set as described in this subclause.