IEEE P802.11  
Wireless LANs

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| Comment Resolution for Subclauses 9.3.2 (Part 1) | | | | |
| Date: 2013-07-01 | | | | |
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Abstract

This document provides comment resolution for TGah Draft 0.1 Comment Collection 9 with these CIDs: 254, 303, 304, 305, 324, 363(Editor), 364, 745, 841, 961, 962, and 985.

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 “Instruction to 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** | **P.L** | **SC** | **Comment** | **Proposed Change** | **Resolution** |
| 961 | 122.6 | 9.3.2.1 | Need to consider (Modified) NDP ACK that also includes Duration field | Add the text of "as well as Duration field of (Modified) NDP ACK when Duration Indication is set to 0" | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CID 961. |

**Discussion:***Agree with the commenter that certain NDP MAC frames among which NDP ACK with Duration Indication field set to 0, but also NDP CTS frames have a duration field that can set the NAV. Proposed comment resolution is to specify that the NAV can be set by NDP ACK and NDP CTS as well.*

* CS mechanism

**Instruction to Editor: *Please modify the following paragraph of the subclause:***

~~A~~ Two virtual CS mechanisms shall be provided by the MAC. ~~This~~ The first mechanism is referred to as the NAV. The NAV maintains a prediction of future traffic on the medium based on duration information that is announced in RTS/CTS frames prior to the actual exchange of data. The duration information is also available in the MAC headers of all frames sent during the CP other than short MAC frames and PS-Poll frames with a Duration/ID field that contains an AID value. In addition, for S1G STAs, the duration information is also available in NDP CTS frames, and in NDP ACK frames with Duration Indication field set to 0. The mechanism for setting the NAV using RTS/CTS in the DCF is described in 9.3.2.4, use of the NAV in PCF is described in 9.4.3.3, and the use of the NAV in HCF is described in 9.19.2.2 and 9.19.3.4. Additional details regarding NAV usage and update appear in 9.3.2.5, 9.3.2.11, and 9.23.

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| **CID** | **P.L** | **SC** | **Comment** | **Proposed Change** | **Resolution** |
| 254 | 122.30 | 9.3.2.1 | In spec framework, the combinging prosess for virtual CS mechnasim has been accepted. Draft text regarding to it should be added. | accept the proposal "virtual CS combining process" | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CIDs 254, 841, 985. |
| 841 | 122.30 | 9.3.2.1 | """For S1G STAs, the CS mechanism combines the  NAV state, RID and the STA's transmitter status with physical CS to determine the busy/idle state of the  medium.""; the term ""combine"" is not well defiened" | define the exact behavior based on NAV + RID | Revised –  See comment resolution for CID 254 in 11-13-0821-00-00ah under the heading for CIDs 254, 841, 985. |
| 985 | 122.30 | 9.3.2.1 | "CS mechanism combines the NAV state, RID and the STA's transmitter status with physical CS to determine ...". The rule needs to be specified | need to specify rules when both RID and NAV available | Revised –  See comment resolution for CID 254 in 11-13-0821-00-00ah under the heading for CIDs 254, 841, 985. |

**Discussion:***All three commenters raise a similar the concern that the rules that allow STAs determine the busy/idle state of the medium are not clear since the addition of the Response Indication Deferal mechanism for S1G STAs. In order to clearly specify the rules, the proposed comment resolution is to adopt what is already included in the SFD and referred by CID 254 (which is missing in draft D0.1) that states that:*

*The Virtual CS mechanism should be based on both NAV and RID, and*

*1. If the STA obtains both ACK Indication and Duration from the single reception, the STA shall reset RID to zero.*

*2. The medium condition at the MAC is BUSY if PHY\_CS indicates BUSY or the NAV counter has a non-zero value or the RID counter has a non-zero value or STA transmitter status is equal to “transmitting”.*

*3. MediumBUSY = (PHY\_CS == BUSY) OR ( NAV != 0) OR (RID != 0) OR (STA transmitter status == transmitting).”*

* CS mechanism

**Instruction to Editor: *Please modify the following paragraph of the subclause:***

For non-S1G STAs, ~~T~~the CS mechanism combines the NAV state and the STA's transmitter status with physical CS to determine the busy/idle state of the medium. For S1G STAs, the CS mechanism combines the NAV state, RID state and the STA's transmitter status with physical CS to determine the busy/idle state of the medium. The NAV and RID may be thought of as counters, which count down to 0 at a uniform rate. For non-S1G STAs, when the NAV counter is 0, the virtual CS indication is that the medium is idle; when nonzero, the indication is busy. For S1G STAs, when both NAV and RID counters are 0, the virtual CS indication is that the medium is idle; when any of them is nonzero the indication is busy. The medium shall be determined to be busy when the STA is transmitting.

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| **CID** | **P.L** | **SC** | **Comment** | **Proposed Change** | **Resolution** |
| 303 | 122.14 | 9.3.2.1 | What so ACK and Blkack means in this paragraph? Where are they defined? | Harmonize with the related subclause in clause 8. | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CIDs 303, 304, 305, 324, 363, 364, 745, 962. |
| 304 | 122.23 | 9.3.2.1 | How to set the RID is not clear. What happens when a STA's RID is not 0 and it receives a new RID? | Use the NAV algorithm to solve the problem. | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CIDs 303, 304, 305, 324, 363, 364, 745, 962. |
| 305 | 122.14 | 9.3.2.1 | What happens when a STA's RID is not 0 and the STA receives frame with it as the frame's receiver? |  | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CIDs 303, 304, 305, 324, 363, 364, 745, 962. |
| 324 |  |  | "EIFS is calculated based on the ACK indication of the PPDU. This is not a robust solution: 1), When EIFS is not 0 and a RTS is received, the STA will respond with a CTS. 2), when a large EIFS is set and a PPDU is received from 3rd STA, EIFS is reset.  Redifne NAV based protection per ACK indication and Duration field." |  | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CIDs 303, 304, 305, 324, 363, 364, 745, 962. |
| 363 | 1.1 | 1 | better name - having commas embedded within a name is confusing! | Change "Not ACK, BlockAck or CTS" to "NOT\_ABC" everywhere in the amendment | Revised –  See comment resolution for CID 304 in 11-13-0821-00-00ah.  Note to EDITOR: Conflicts with resolution. |
| 364 | 122.17 | 9.3.2.1 | better wording, maybe - ok with "RID begins" and "RID continues" but "undergoing RID" is a bit odd - maybe "RID active" "RID continues to be active" "RID becomes inactive" and "if RID is active" | consider using alternative wording as suggested | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CIDs 303, 304, 305, 324, 363, 364, 745, 962. |
| 745 | 122.26 | 9.3.2.1 | RID reset rule is required | Need to provide RID reset rule | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CIDs 303, 304, 305, 324, 363, 364, 745, 962. |
| 962 | 122.14 | 9.3.2.1 | Need to consider the redefinition of ACK Indication bits in SIG | change to "The second virtual CS mechanism is referred to as Response Indication Deferral (RID), and this mechanism is only applicable to S1G STAs. RID begins immediately after the reception of a frame with RXVECTOR parameter ACK\_INDICATION that has a value of NDP Response,Normal Response and Long Response. If the value of ACK\_INDICATION is Long Response, RID continues for MAX\_PPDU + NDP ACK / ACK + 2 ├ù SIFS or until PHY-RXSTART.indication, whichever comes first. If the value of ACK\_INDICATION is Normal Response (Aggregation=0), RID continues for ACK + 2 ├ù SIFS or until PHY-RXSTART.indication, whichever comes first. If the value of ACK\_INDICATION is Normal Response (Aggregation=1), RID continues for BlockAck + 2 ├ù SIFS or until PHYRXSTART.indication, whichever comes first. A STA that is undergoing RID shall not initiate a nonresponse transmission." | Revised –  TGah editor to make changes shown in 11-13-0821-00-00ah under the heading for CIDs 303, 304, 305, 324, 363, 364, 745, 962. |

**Discussion:**

*CID 303 – Agree with the commenter that in the current D0.1 it is not clear what type of ACK and BlockAck frames are used to set the RID. In fact, S1G STAs can transmit versions of these frames that are NDP frames which have a different duration. The proposed comment resolution for this CID is to be inline with the ACK Indication defined in the SFD which allows to differentiate between NDP and normal responses (ACK\_Indication = NDP Response and Normal Response. The text in the new subclause “Setting and resseting the RID” is organized so so that control response type depends on ACK indication field (i.e., NDP or Normal ACK/BA). In addition, text to specify that an MPDU as a response can be interpreted as an ACK was added for Speed frame exchange.*

*CID 304 –RID is set according to the values of the RXVECTOR parameters of the received frame and its value id updated every time a new frame is received.*

*CID 305 – The STA resets its RID if it is the intended receiver of the frame.*

*CID 324 –* *Proposed resolution is to perform deferral exclusively based on RID. EIFS is set to DIFS for S1G (always smaller than or equal to RID+DIFS). Note that S1G also uses NDP Frame for which conditions such as FCS fails, or PHY-RXEND. Indication primitive in error which calls for EIFS do not exist.*

*CID 364 – Agree with the commenter. Proposed resolution is to use similar terminology for NAV setting and resetting: The RID is described as a counter and can be set and reset depending on the ACK\_Indication values.*

*CID 745 – See discussion and proposed resolution for CID 304.*

*CID 962 – Agree with the commenter that the setting the RID based on the new mapping of the ACK Indication field in the SIG field is missing in D0.1. Proposed comment resolution is to set the RID to:*

* *If ACK\_Indication value is “No Response” then RID = 0*
* *If ACK\_Indication value is “NDP Response” then RID = SIFS + NDPTxTime*
* *If ACK\_indication value is “Normal Response” then RID = SIFS + NormalTxTime*
* *If ACK\_Indication value is “Long Response” then SIFS + MAXPPDUTxTime*

*where SomeTxTime is calculated depending on other indications in the received RXVector parameter.*

* CS mechanism

**Instruction to Editor: *Please modify the following paragraph after the 3rd paragraph of the subclause:***

The second virtual CS mechanism is referred to as Response Indication Deferral (RID), and this mechanism is only applicable to S1G STAs. The mechanism for setting the RID is described in 9.3.2.4a (Setting and resetting the RID).

**Instruction to Editor: *Please add the following new subclause immediately after subclause 9.3.2.4:***

**9.3.2.4a Setting and resetting the RID**

This subclause describes the setting and resetting of the RID for S1G STAs.

A S1G STA that receives a frame shall update its RID counter based on the values of the RXVECTOR parameters’ PREAMBLE TYPE, ACK\_INDICATION, AGGREGATION, MCS, and CH\_BANDWITH of the received frame as described in this clause. The S1G STA shall reset its RID counter if it is the intended receiver of any of the frames within the received PSDU or it receives a valid Duration field in in at least one MPDU in the received PSDU.

The RID counter shall be updated at the moment the PHY-RXEND.indication primitive is issued for the current PPDU.

If the value of the ACK\_INDICATION is Long Response, the RID counter is set to MaxPPDUTxTime + aSIFSTime, where MaxPPDUTxTime is the maximum duration of a S1G PPDU in microseconds as defined in (24.4.4 PHY characteristics).

If the value of the ACK\_INDICATION is Normal Response, the RID counter is set to NormalTxTime + aSIFSTime. NormalTxTime is calculated based on the RXVECTOR parameters PREAMBLE\_TYPE, AGGREGATION, MCS and CH\_BANDWIDTH following the rules listed in Table 9.3.2.4a1 (NormalTXTime duration based on RXVECTOR’s parameters).

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| **Table 9.3.2.4a1 --** **NormalTXTime duration based on RXVECTOR’s parameters** |

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| **PREAMBLE TYPE** | **AGGREGATION** | **Expected Response Length (Type)** | **NormalTxTime** |
| 1MHz preamble | 0 | 14 Bytes MPDU (ACK) | The time, in microseconds, required to transmit one ACK frame, where the duration of the frame is calculated according to the rate selection rules described in 9.7.6.5 (Rate selection for control response frames) using its BSSBasicMCSSet parameter and with CH\_BANDWIDTH RXVECTOR value equal to CBW1 |
| 1 | 32 Bytes MPDU (BlockAck) | The time, in microseconds, required to transmit one BlocACK frame, where the duration of the frame is calculated according to the rate selection rules described in 9.7.6.5 (Rate selection for control response frames) using its BSSBasicMCSSet parameter and with CH\_BANDWIDTH RXVECTOR value equal to CBW1. |
| >= 2MHz short/long preamble | 0 | 14 Bytes MPDU (ACK) | The time, in microseconds, required to transmit one ACK frame, where the duration of the frame is calculated according to the rate selection rules described in 9.7.6.5 (Rate selection for control response frames) using its BSSBasicMCSSet parameter and channel width selection rules for control frames described in 9.7.6.6 (Channel Width selection for Control frames). |
| 1 | 32 Bytes MPDU (BlockAck) | The time, in microseconds, required to transmit one BlockACK frame, where the duration of the frame is calculated according to the rate selection rules described in 9.7.6.5 (Rate selection for control response frames) using its BSSBasicMCSSet parameter and channel width selection rules for control frames described in 9.7.6.6 (Channel Width selection for Control frames). |

If the value of ACK\_INDICATION is NDP Response, the RID counter is set to NDPTxTime + aSIFSTime. NDPTxTime is calculated based on the RXVECTOR parameter PREAMBLE\_TYPE and is equal to the time in microseconds, required to transmit either a 1MHz NDP MAC frame if PREAMBLE\_TYPE is a 1MHz preamble or a >=2MHz NDP MAC frame if PREAMBLE\_TYPE is a >= 2MHz short/long preamble.

If the value of the ACK\_INDICATION is No Response, the RID counter is set to 0.

If the received PPDU is an NDP MAC frame, the S1G STA shall set the RID counter by using the ACK INDICATION values per type of NDP MAC frame as described in Table 9.3.2.4a2 (Implicit ACK INDICATION for NDP MAC Frames).

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| **Table 9.3.2.4a2 –** **Implict ACK INDICATION for NDP MAC frames** |

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| **NDP MAC Frame type** | **ACK INDICATION** |
| NDP (Modified) ACK | * No Response if Duration Indication field value is 0 and Duration field value is 0 * Long Response if Duration Indication field value is 1 and Duration field value is 0 |
| NDP BA | * No Response |
| NDP CTS | * No Response |
| NDP PS-Poll | * NDP Response |
| NDP Beamforming Report Poll | * Long Response |
| NDP Paging | * No Response |
| NDP Probe Request | * NDP Response |

Note: NDP MAC frames, that include a Duration field which sets the NAV, have an Equivalent ACK INDICATION of No Response in order to reset the RID counter since they set the NAV anyways.

* **DCF timing relations**

**Instruction to Editor: *Please make the following changes in subclause 9.3.7 (Note: Based on D0.3 of REVmc):***

For non-S1G STAs, 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 (9-4).

(9-4) EIFS = aSIFSTime + DIFS + ACKTxTime

where

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

For S1G STAs, the EIFS is set to DIFS.

* **ACK procedure**
* **Instruction to Editor: *Please make the following changes in subclause 9.3.2.8:***

After transmitting an MPDU that requires an ACK frame as a response (see Annex G), the STA shall wait for an ACKTimeout interval, with a value of aSIFSTime + aSlotTime + aPHY-RX-START-Delay, starting at the PHY-TXEND.confirm primitive. If a PHY-RXSTART.indication primitive does not occur during the ACKTimeout interval, the STA concludes that the transmission of the MPDU has failed, and this STA shall invoke its backoff procedure upon expiration of the ACKTimeout interval. If a PHY-RXSTART.indication primitive does occur during the ACKTimeout interval, the STA shall wait for the corresponding PHYRXEND.indication primitive to determine whether the MPDU transmission was successful. The recognition of a valid ACK frame sent by the recipient of the MPDU requiring acknowledgment, corresponding to this PHYRXEND.indication primitive, shall be interpreted as successful acknowledgment, permitting the frame sequence to continue, or to end without retries, as appropriate for the particular frame sequence in progress. The recognition of anything else, including any other valid frame, shall be interpreted as failure of the MPDU transmission. In this instance, the STA shall invoke its backoff procedure at the PHY-RXEND.indication primitive and may process the received frame. An exception is that recognition of a valid data frame sent by the recipient of a PS-Poll frame shall also be accepted as successful acknowledgment of the PS-Poll frame. Other exceptions exist for S1G STAs as described in the following two paragraphs:

Under TXOP sharing relay operation as described in 9.32n.3 (Procedures TXOP Sharing): If an MPDU is transmitted by a STA associated with a relay AP under TXOP sharing relay operation, and the PARTIAL\_AID in the PHY-RXSTART.indication primitive that occurs within aPHY-RX-START-delay is identical to the PARTIAL\_AID corresponding to the BSSID of the root AP then the reception shall be accepted as a successful acknowledgement of the MPDU transmission. 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 aPHY-RX-START-delay is identical to the PARTIAL\_AID corresponding to the DA of the transmitted MPDU shall be accepted as a successful acknowledgement of the MPDU transmission.

Under Speed Frame Exchange operation as described in 9.32i (Speed Frame Exchange): If a data frame is sent as an immediate response to an MPDU requiring acknowledgement, the successful reception of the response frame shall be accepted as successful acknowledgement of the eliciting MPDU.

**24. Sub 1 GHz (S1G) PHY specification**

**Instruction to Editor: *Please make the following changes in clause 24:***

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| **Table 24-1 (TXVECTOR and RXVECTOR parameters)** | | | | |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
|  | … |  |  |  |
| ACK\_INDICATION | FORMAT is S1G | Set to 0 if No Response  Set to 1 if NDP Response  Set to 2 if Normal Response  Set to 3 if Long Response | Y | Y |
| FORMAT is S1G\_DUP\_2M | Set to 0 if No Response  Set to 1 if NDP Response  Set to 2 if Normal Response  Set to 3 if Long Response | Y | Y |
| FORMAT is S1G\_DUP\_1M | Set to 0 if No Response  Set to 1 if NDP Response  Set to 2 if Normal Response  Set to 3 if Long Response | Y | Y |
| Otherwise | Not present | N | N |
|  | …. |  |  |  |
| NOTE 1—In the “TXVECTOR” and “RXVECTOR” columns, the following apply:  Y = Present;  N = Not present;  O = Optional;  MU indicates that the parameter is present once for an S1G SU PPDU and present per user for an S1G MU PPDU. Parameters specified to be present per user are conceptually supplied as an array of values indexed by *u*, where *u* takes values 0 to NUM\_USERS-1. | | | | |

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| * Fields in the SIG field of short preamble | | | | | |
| Symbol | Bit | Field | Number of bits | Description | |
|  | … |  |  |  | |
|  | B10-B11 | ACK Indication | 2 | This field indicates the presence and type of frame a SIFS time after the current frame transmission.  Set to 0 for No Response  Set to 1 for NDP Response  Set to 2 for Normal Response  Set to 3 for Long Response | |
| … |  |  |  | |

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| * Fields in the SIG-A field of long preamble SU PPDU | | | | | |
| Symbol | Bit | Field | Number of bits | Description | |
|  | … |  |  |  | |
| B10-B11 | ACK Indication | 2 | This field indicates the presence and type of frame a SIFS time after the current frame transmission.  Set to 0 for No Response  Set to 1 for NDP Response  Set to 2 for Normal Response  Set to 3 for Long Response | |
|  | … |  |  |  | |
| Note-1: If beam-change indication bit is set to 0, the receiver may do channel smoothing. Otherwise, smoothing is not recommended.  Note-2: The Q matrix for Omni portion is  as defined in 24.3.7 (Mathematical description of signals). | | | | | |

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| * **Fields in the SIG-A field of long preamble MU PPDU** | | | | |
| Symbol | Bit | Field | Number of bits | Description |
|  | … |  |  |  |
|  | B11-B12 | ACKIndication | 2 | This field indicates the presence and type of frame a SIFS time after the current frame transmission.  Set to 0 for No Response  Set to 1 for NDP Response  Set to 2 for Normal Response  Set to 3 for Long Response |
|  | … |  |  |  |

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| * **Fields in the SIG field of 1MHz PPDU** | | | | |
| Symbol | Bit | Field | Number of bits | Description |
|  | … |  |  |  |
|  | B21-22 | ACK Indication | 2 | This field indicates the presence and type of frame a SIFS time after the current frame transmission.  Set to 0 for No Response  Set to 1 forNDP Response  Set to 2 forNormal Response  Set to 3 for Long Response |
|  | … |  |  |  |