IEEE P802.11
Wireless LANs

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| LB 200 Comment Resolution for Clause 8.3.5.1.5 |
| Date: 2013-11-11 |
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Abstract

This submission proposes resolutions for comments in clause 8.3.5.1.5 of TGah Draft 1.0 with the following CIDs:

1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726

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** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 1376 | 57.39 | 8.3.5.1.5 | NDP BlockAck frames are protected by a 4 bit CRC which does not fully protect the NDP frame leading to undetected errors in the bitmap. | Include a protection/recovery mechanism for NDP BA frames based on XOR protection. Will submit a document with the resolution. | Agree with the commenter.Revised – TGah editor to make changes shown in 11-13-1427r0 under the heading for CIDs 1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726. |
| 1377 | 58.04 | 8.3.5.1.5 | Similar to NDP ACK ID computation, also for NDP BlockAck it should be clearly stated that the BlockAck ID is set to the X LSBs of the Scrambler Initialization value "prior to descrambling". | Add the following text ", prior to descrambling, " immediately before "of the PSDU that carries the soliciting frame." of the last sentence of the Description field of the BlockAck ID in Tables 8-50 and 8-51. | Agree with the commenter. Revised – TGah editor to make changes shown in 11-13-1427r0 under the heading for CIDs 1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726. |
| 2276 | 58.04 | 8.3.5.1.5 | The size of the BlockAck ID does not allow for a sufficiently low false positive rate for the NDP Block ACK 1 MHz. | Change size of the BlockAck ID to 6 bits in Table 8-50 and add a mechanism to achieve a low false positive rate for the NDP BlockAck frames. | Partially agree with the commenter. Revised – TGah editor to make changes shown in 11-13-1427r0 under the heading for CIDs 1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726. |
| 2277 | 58.18 | 8.3.5.1.5 | The size of the BlockAckBitmap does not allow for a sufficiently low false positive rate for the NDP Block ACK 1 MHz. | Change size of the BlockAckBitmap to 4 bits in Table 8-50 and add a mechanism to achieve a low false positive rate for the NDP BlockAck frames. | Partially agree with the commenter. Revised – TGah editor to make changes shown in 11-13-1427r0 under the heading for CIDs 1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726. |
| 2278 | 59.04 | 8.3.5.1.5 | The size of the BlockAck ID does not allow for a sufficiently low false positive rate for the NDP Block ACK >= 2 MHz. | Change size of the BlockAck ID to 14 bits in Table 8-51 and add a mechanism to achieve a low false positive rate for the NDP BlockAck frames. | Partially agree with the commenter. Revised – TGah editor to make changes shown in 11-13-1427r0 under the heading for CIDs 1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726. |
| 2279 | 59.18 | 8.3.5.1.5 | The size of the BlockAckBitmap does not allow for a sufficiently low false positive rate for the NDP Block ACK >= 2 MHz. | Change size of the BlockAckBitmap to 8 bits in Table 8-51 and add a mechanism to achieve a low false positive rate for the NDP BlockAck frames. | Partially agree with the commenter. Revised – TGah editor to make changes shown in 11-13-1427r0 under the heading for CIDs 1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726. |
| 2725 | 58.04 | 8.3.5.1.5 | Scrambler Initialization value in the SERVICE field (as defined in 24.3.9.2 (SERVICE field)) is zero. | Change to "The BlockAck ID field is 2 bits in length and contains the identifier of the NDP BlockAck frame. It is set to the 2 LSBs of the bit sequence of the Scrambler Initialization value in the SERVICE field prior to descrambling (as defined in 24.3.9.2 (SERVICE field)) of the PSDU that carries the soliciting frame." | Agree with the commenter.Revised – TGah editor to make changes shown in 11-13-1427r0 under the heading for CIDs 1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726. |
| 2726 | 59.04 | 8.3.5.1.5 | Scrambler Initialization value in the SERVICE field (as defined in 24.3.9.2 (SERVICE field)) is zero. | Change to "The BlockAck ID field is 6 bits in length and contains the identifier of the NDP BlockAck frame. It is set to the 6 LSBs of the bit sequence of the Scrambler Initialization value in the SERVICE field prior to descrambling (as defined in 24.3.9.2 (SERVICE field)) of the PSDU that carries the soliciting frame." | Agree with the commenter.Revised – TGah editor to make changes shown in 11-13-1427r0 under the heading for CIDs 1376, 1377, 2276, 2277, 2278, 2279, 2725, and 2726. |

**Discussion***: The commenters of 1376, 2276-2279 are right. A protection mechanism for NDP BlockAck frames that are protected only with a 4 bit CRC should be included. The commenter of 2276-2279 additionally proposes reducing the BlockAck bitmap size which would impact both achievable throughput with BA and functionality of the Fragment Ack procedures defined for S1G. The use of NDP BlockAck frames is mandatory for these procedures. Hence solving the problem needs to account for the impact of reducing the BlockAck Bitmap size. The proposed resolution is to add a simple encoding mechanism prior to the transmission of the NDP BlockAck and a simple decoding mechanism applied after the reception of the NDP BlockAck frame. The mechanism does not modify the Bitmap sizes of the NDP BlockAck frame, hence not impacting the achievable throughtput during a BA session or the functionality of the Fragment Ack procedure.*

* **NDP BlockAck**

**Instruction to Editor: *Modify the subclause as follows:***

NDP MAC frame body of NDP BlockAck frame contains the information listed in Table 8-50 (NDP MAC frame body of NDP BlockAck (1 MHz)) and Table 8-51 (NDP MAC frame body of NDP BlockAck (≥2 MHz)).

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| * **NDP MAC frame body of NDP BlockAck (1 MHz)**
 |
| **Field** | **Size (bits)** | **Description** |
| NDP MACFrame Type | 3 | The NDP MAC Frame Type field is set to 4. |
| BlockAck ID | 2 | The BlockAck ID field is 2 bits in length and contains the identifier of the NDP BlockAck frame. It is set to the 2 LSBs of the bit sequence of the Scrambler Initialization value in the SERVICE field (as defined in 24.3.9.2 (SERVICE field)), prior to descrambling, of the PSDU that carries the soliciting frame. |
| Starting Sequence Control | 12 | The Starting Sequence Control field is 12 bits in length and contains the sequence number of the first MSDU or A-MSDU for which the NDP BlockAck frame is sent. The value of this field is defined in 9.21.7.5 (Generation and transmission of BlockAck by an HT STA) when the NDP BlockAck is used during a BlockAck session and is set to the sequence number of the MSDU being fragmented when it is used during a Fragment BA session (see 9.3.2.9a (Fragment BA procedure)).  |
| BlockAck Bitmap | 8 | The Block Ack Bitmap field of the NDP BlockAck frame is 8 bits in length and is used to indicate the received status of up to 8 MSDUs and A-MSDUs when the NDP BlockAck is used during a BlockAck session. Each bit that is equal to 1 in the NDP BlockAck bitmap acknowledges the successful reception of a single MSDU or A-MSDU in the order of sequence number, with the first bit of the NDP BlockAck bitmap corresponding to the MSDU or A-MSDU with the sequence number that matches the value of the Starting Sequence Control field.When the NDP BlockAck is used during a Fragment BA session (see 9.3.2.9a (Fragment BA procedure)) each bit that is equal to 1 in the BlockAck Bitmap acknowledges the successful reception of a single fragment of an MSDU, in the order of the fragment number, with the first bit of the BlockAck Bitmap corresponding to the MPDU with fragment number equal to 0 or 8. |

(#275,276)

The NDP MAC frame body of NDP BlockAck for ≥2MHz has the structure defined in Table 8-51 (NDP MAC frame body of NDP BlockAck (≥2 MHz)).

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| * **NDP MAC frame body of NDP BlockAck (≥2 MHz)**
 |
| **Field** | **Size (bits)** | **Description** |
| NDP MACFrame Type | 3 | The NDP MAC Frame Type field is set to 4. |
| BlockAck ID | 6 | The BlockAck ID field is 6 bits in length and contains the identifier of the NDP BlockAck frame. It is set to the 6 LSBs of the bit sequence of the Scrambler Initialization value in the SERVICE field (as defined in 24.3.9.2 (SERVICE field)), prior to descrambling, of the PSDU that carries the soliciting frame. |
| Starting Sequence Control | 12 | The Starting Sequence Control field is 12 bits in length and contains the sequence number of the first MSDU or A-MSDU for which the NDP BlockAck frame is sent. The value of this field is defined in 9.21.7.5 (Generation and transmission of BlockAck by an HT STA) when the NDP BlockAck is used during a BlockAck session and is set to the sequence number of the MSDU being fragmented when it is used during a Fragment BA session (see 9.3.2.9a (Fragment BA procedure)). |
| BlockAck Bitmap | 16 | The Block Ack Bitmap field of the NDP BlockAck frame is 16 bits in length and is used to indicate the received status of up to 16 MSDUs and A-MSDUs. Each bit that is equal to 1 in the NDP BlockAck bitmap acknowledges the successful reception of a single MSDU or A-MSDU in the order of sequence number, with the first bit of the NDP BlockAck bitmap corresponding to the MSDU or A-MSDU with the sequence number that matches the value of the Starting Sequence Control field.When the NDP BlockAck is used during a Fragment BA session (see 9.3.2.9a (Fragment BA procedure)) each bit that is equal to 1 in the BlockAck Bitmap acknowledges the successful reception of a single fragment of an MSDU, in the order of the fragment number, with the first bit of the BlockAck Bitmap corresponding to the MPDU with fragment number equal to 0. |

(#277, 278)

The transmitting (receiving) STA encodes (decodes) the BlockAck ID field and the Starting Sequence Control field of the NDP BlockAck frames applying the protection mechanism described in 9.52a (Bitmap Protection for NDP BlockAck frames).

**Instruction to TGah Editor: A*dd new subclause immediately after 9.52 as follows:***

**9.52a Bitmap Protection for NDP BlockAck frames**

The originator of a NDP BlockAck (1 or ≥ 2 MHz) frame (see 8.3.5.1.5 (NDP BlockAck)) shall protect the BlockAck Bitmap of the NDP BlockAck frame (shown in Figure 9.21.7.9x and Figure 9.21.7.9y) by using the encoding procedure defined in this subclause.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0    B2 | B3  B4 | B5 B16  | B17 B24 |
|  | NDP MAC Type | BlockAck ID | Starting Sequence Control | BlockAck Bitmap |
| Bits | 3 | 2 | 12 | 8  |

**Figure 9.21.7.9x –NDP BlockAck (1 MHz) frame structure**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0    B2 | B3  B8 | B9  B20  | B21 B36 |
|  | NDP MAC Type | BlockAck ID | Starting Sequence Control | BlockAck Bitmap |
| Bits | 3 | 6 | 12 | 16 |

**Figure 9.21.7.9y –NDP BlockAck (≥ 2MHz) frame structure**

Initially the bit sequences [B3: B10] for NDP BlockAck (1 MHz) and [B3:B18] for NDP BlockAck (≥ 2 MHz) frames are set as described in 9.21.7.5(Generation and transmission of BlockAck by an HT STA) or 9.3.2.9a(Fragment BA procedure).

Encoding Procedure:

For an NDP BlockAck (1 MHz) frame:

* [B3: B10] = XOR([B3: B10], [B17: B24]);

For an NDP BlockAck (≥ 2MHz) frame

* [B3: B18] = XOR([B3: B18], [B21: B36]);

Where XOR() indicates bitwise exclusive OR operation.

The intended recipient shall perform the same procedure to decode the bit sequences [B3: B10] for NDP BlockAck (1 MHz) and [B3:B18] for NDP BlockAck (≥ 2MHz) frames.