IEEE P802.11
Wireless LANs

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| LB1000 CID5963 BA Overflow Signaling |
| Date: 2015-05-12 |
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Abstract

This document proposes a resolution for CID 5963 of LB1000 (the first sponsor ballot of the TGmc draft), a comment on TGm Draft 4.0 suggesting the addition of a bit in the BA Control field to indicate a RX Buffer overlow condition has occurred at the Block Ack recipient (not the recipient of the BlockAck frame, but the recipient in a Block Ack session).

**REVISION NOTES:**

R0: initial

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

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

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

**CID LIST:**

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| --- | --- | --- | --- | --- | --- | --- |
| 5963 | Matthew Fischer | 602.25 | 8.3.1.9.1 | Just as the DMG STA exchange can include information about the current RX buffer status, non-DMG STAs would benefit by similar information. | Include a bit in the BA frame that signals a buffer FULL condition at the recipient. | Revise - generally agree with commenter, TGmc editor to execute proposed changes from 11-15-1023r0 found under all headings which include CID5963 |

**Discussion:**

As per the comment, some STAs can benefit by providing immediate RX Buffer status information.

If an RX Buffer Overflow event occurs during the reception of an AMPDU, the recipient will discard any MPDUs that exceed the existing resources and return a BA that indicates failed receipt of a potentially large number of MPDUs. The AMPDU transmitter will not be able to reliably determine whether the missing acknowledgements are due to interference, poor MCS choice, or resource unavailability. Having an RX OFLO bit would provide a strong indicator of the source of the missing acknowledgements in this case, allowing the AMPDU transmitter to avoid making a costly error by attributing the loss to some other cause.

One possible option to deal with an RX Overflow problem is for the AMPDU recipient to negotiate a smaller BA window during the BA setup negotiation, but such a proposal does not effectively resolve the problem of highly dynamic resource availability, especially where there is a high variance in that availability.

There are multiple mechansisms that could be considered to provide RX Overflow information as part of the BA:

As an example, note that the DMG introduced the Extended Compressed Block Ack frame that includes an additional octet in the BA Information field that carries the RBUFCAP field, which includes an unsigned integer that represents the current RX buffer capacity at the time of transmission of the BA frame. The RBUFCAP field adds one octet to the BA frame, making it different in octet count as compared to the only commonly used BA variant today, the Compressed Block Ack. But using the Extended Compressed Block Ack frame in 2.4 GHz and 5 GHz spectrum could introduce issues with legacy STA based on the different length and the different encoding used to signal the different format. I.e. a combination of the Multi-TID, Compressed Bitmap and GCR bit fields is used to indicate the Extended Compressed format, with the Multi-TID bit being set to 1 and the Compressed Bitmap subfield being set to 0. This bit field combinationcould confuse a legacy STA. Additional issues could arise from EIFS value calculations based on either PHY or MAC information. (see dot11DynamicEIFSActivated). DMG STAs operate in a greenfield environment where backwards compatibility and coexistence are not an issue and therefore, the use of the Extended Compressed Block Ack frame is currently only allowed to be negotiated during ADDBA exchanges between DMG STAs.

The BA frame and its BA Control Field were first defined by TGe and finalized in the approved 802.11e amendment in 2005. At that time, there were 12 reserved bits in the BA Control field. In the intervening 8 years, 4 of those reserved bits have been assigned new definitions to accommodate new protocol features and 8 bits remain unused. It seems appropriate to propose the placement of an RX Buffer Overflow signalling into one of the remaining reserved bit locations of the BA Control field to avoid the complexities of introducing a new frame format structure into the 2.4 and 5 GHz bands.



**Proposed changes**

Note that the document of reference is REVmc Draft 4.1.

**CID 5963**

**8.3.1.9.1 Overview**

***TGmc editor: in Figure 8-32 BA Control field found within subclause 8.3.1.9.1 Overview, replace the reserved bit in position B4 of the BA Control field with a new bit RXOFLO and add a new paragraph in the subclause as shown:***

The RXOFLO subfield is used to indicate if any of the MPDUs received in the AMPDUs to which this BA is a response were discarded at the recipient due to a lack of receive buffer space. A value of 1 in the RXOFLO subfield indicates that some or all of the MPDUs received in the AMPDUs to which this BA is a response were discarded due to a lack of receive buffer space. A value of 0 in the RXOFLO subfield indicates that none of the MPDUs received in the AMPDUs to which this BA is a response were discarded due to a lack of receive buffer space.

**9.24.7.5 Generation and transmission of BlockAck frames by an HT STA or DMG STA**

***TGmc editor: add a new paragraph at the end of subclause 9.24.7.5 Generation and transmission of BlockAck frames by an HT STA or DMG STA as shown:***

When responding with a BlockAck frame to a received A-MPDU with Ack Policy equal to Normal Ack (i.e., implicit block ack request), if one or more of the received MPDUs was discarded due to a lack of receive buffer resources, the RXOFLO subfield may be set to 1 if dot11RXOFLOSignalingOptionImplemented is true and the originator indicated support of RXOFLO signaling in the RXOFLO support subfield of the Extended Capabilities element. Otherwise, the RXOFLO subfield of the BlockAck frame shall be set to 0.

**8.4.2.26 Extended Capabilities element**

***TGmc editor: within 8.4.2.26 Extended Capabilities element, add a new row to Table 8-132 Capabilities field as shown:***

|  |  |  |
| --- | --- | --- |
| **Bit** | **Information** | **Notes** |
| <ANA> | RXOFLO support | The RXOFLO support subfield indicates support for RXOFLO signaling through the RXOFLO bit of the BA frame as defined in 9.24.7.5 (Generation and transmission of BlockAck frames by an HT STA or DMG STA) When dot11RXOFLOSignalingOptionImplemented is true, the RXOFLO support subfield is set to 1. Otherwise, the RXOFLO support subfield is set to 0 to indicate that this capability is not supported on this link. |

***TGmc editor: add the following new MIB variable to the dot11StationConfig group and add a corresponding value in the group’s SEQUENCE definition and add an appropriate entry to the dot11VHTMACAdditions Object-group and an entry to the dot11SMTbase13 group:***

**C.3 MIB Detail**

dot11RXOFLOSignalingOptionImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the IEEE 802.11 RXOFLO Signaling option is implemented."

DEFVAL { false }

::= { dot11StationConfigEntry <ANA> }

**References:**