IEEE P802.11
Wireless LANs

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| Support for GCR Coded Block Ack in 802.11aa |
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Abstract

This submission contains the normative text related to changes required in P802.11aa/D3.1 in order to support GCR Coded Block Ack (CBA). CBA is a retransmission scheme for GCR Groupcast that enables overlay FEC coding to be supported by the MAC layer and it decreases medium time used for retransmissions.

This document is based on the presentations listed in the references below. This document is based on 802.11aa Draft 3.1. Editorial instructions are relative to the contents of 802.11aa Draft 3.1.

This document is based upon

* IEEE P802.11aa Draft 3.1

**4. Abbreviations and acronyms**

***Add the following abbreviations:***

**3. Definitions**

***Insert new definitions retaining the alphabetic ordering:***

**groupcast with retries (GCR) coded block ack:** A GCR Block Ack mode in which GCR STAs reply with an Ack frame to a Block Ack Request frame if the Coding and Coding Condition fields in the BAR Control Field are set and the Block Ack Request receiving STA determines the Coding Condition to be met.

**8.3 Format of individual frame types**

**8.3.1 Control frames**

**8.3.1.8 Block Ack Request (BlockAckReq) frame format**

**8.3.1.8.1 Overview**

***Change the following Figure 8-17 on page 37***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BAR AckPolicy  | Multi-TID | CompressedBitmap | GCR | Coded | CodedCondition | Reserved | TID\_INFO |
| Bits: 1  | 1  | 1 | 1 | 1 | 6 | 1 |  |

**Figure 8-17—BAR Control Field**

**9.20.3 Data and acknowledgment transfer using immediate Block Ack policy and delayed**

**Block Ack policy**

**9.20.aa10 GCR Block Ack**

**9.20.aa10.2 Scoreboard context control during GCR Block Ack**

***Insert text on page 75, after line 36***

 - a 6-bit unsigned integer frame counter

***Insert text on page 75, before line 41***

The frame counter holds the number of frames received since the starting sequence number and is identical to the number of 1s in the bitmap, which is indexed by sequence number.

***Modify the last paragraph on page 75, starting line 44 as follows***

When a recipient receives a BlockAckReq with the GCR Group Address subfield equal to a GCR group address and the Coded bit in the BAR Control field is set, the recipient shall transmit an Ack frame at a delay of SIFS after the BlockAckReq. The Ack acknowledges the STA’s reception count as specified in the Coded Condition integer of the BAR Control field of the block of group addressed frames requested by the BlockAckReq frame. When a recipient receives a BlockAckReq with the GCR Group Address subfield equal to a GCR group address and the Coded bit in the BAR Control field is not set the recipient shall transmit a BlockAck frame at a delay of SIFS after the BlockAckReq. The BlockAck acknowledges the STA‘s reception status of the block of group addressed frames requested by the BlockAckReq frame.

***Insert figure on page 76 after Figure 9-aa1***

**Figure 9-aa2: Example of a frame exchange with GCR Coded Block Ack retransmission policy**

***Insert text on page 76, before line 8***

Figure 9-11a shows an example of a frame exchange when the GCR Block-Ack retransmission policy is used. The AP sends several A-MSDUs using the GCR Block Ack retransmission policy. The AP then sends a BlockAckRequest frame with Coded bit and Coded Condition integer set in the BAR to group member 1 of the GCR group, waits for the Ack frame and then sends a BlockAckRequest to group member 2. After not receiving the Ack frame from GCR group member 2, the AP continues to send a BlockAckRequest frame to group member 3. The absence of Acks from some of the group members indicates that at those group members, the Coding Condition is not met. The AP continues to send A-MSDUs using the GCR Block Ack retransmission policy. An AP may determine that an overlay forward error correcting coding with a certain Coding Condition (typically this is referred to as n/k) is applied by higher layer protocols. Determination of the Coding Condition is out of scope of this standard.

**11.22.15.aa2 GCR Procedures**

**11.22.15.aa2.1 Overview**

***Insert text on page 85, after line 32***

 - GCR Coded Block Ack

***Insert text on page 85, after line 45***

The GCR Coded Block Ack delivery method extends the GCR Block Ack delivery method to support overlay forward error correction coding. Once a GCR Block Ack agreement is in place, the STA providing GCR service regularly sends Block Ack Request frames to the STAs receiving the frames to ascertain the reception status of a minimum number of MSDUs related to this group address, as described in 9.20.aa10. This allows the STA providing GCR service to schedule additional MSDUs compensating for the loss of previous MSDUs. GCR Coded Block Ack is particulary suited to use with large numbers of group members as it has moderate delay, high efficiency and scalability.

**References:**

* doc.: IEEE 802.11-11/0293r0 – “Proposal for enabling overlay FEC in GCR Block Ack”