IEEE P802.11
Wireless LANs

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| [3.9.1 Reverse Direction Protocol for EDMG DL MU-MIMO] |
| Date: 2016-12-12 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Ou Yang | Intel |  |  | ou.yang@intel.com |
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Abstract

[This document proposes specification text for subclause 3.9.1 of the SFD describing reverse directional protocol for EDMG DL MU-MIMO.]

**Discussion**

This proposal has the following assumptions on terminologies.

1. An EDMG STA is a DMG STA by default.
2. An EDMG network is a DMG network by default.

10.28.5 Reverse direction for EDMG DL MU-MIMO

This subclause specifics additional rules applicable to reverse direction for EDMG DL MU-MIMO.

As part of a DL MU-MIMO PPDU transmission, an AP or PCP STA that has the Reverse Direction ~~RDG/More PPDU~~ subfield of the STA’s DMG STA Capability Information field of the DMG Capabilities element equal to 1 may grant an RD to a STA that is addressed within the PPDU and that has the Reverse Direction ~~RDG/More PPDU~~ subfield of the DMG STA Capability Information field of the DMG Capabilities element equal to 1 using one of the following methods:

* The AP or PCP shall set the RDG/More PPDU to 1 and set the ACK Policy to 0 in the QoS Control field of the MPDU addressed to the intended RD responder.
* The AP or PCP shall aggregate a BlockAckReq frame and a QoS Null frame with the RDG/More PPDU subfield in the QoS Control field equal to 1 into an A-MPDU which is transmitted to the intended RD responder.

Upon receiving an RD grant as part of a DL MU-MIMO transmission, an RD responder shall respond according to the rules that are defined in 10.28.4.

If the RD response burst requires immediate BlockAck, the RD initiator that granted an RD as part of a DL MU-MIMO transmission shall acknowledge the RD responder using one of the following methods:

* The RD initiator may transmit the immediate BlockACK to the RD responder using MU-MIMO fashion along with the next BlockACKReq frame, which is transmitted to another MU-MIMO destination STA.
* The RD initiator may aggregate the immediate BlockACK into the next MU PPDU to the RD responder.

Figure 25 illustrates an example of the RD sequences during DL MU-MIMO transmissions. The RD initiator (e.g., an AP) transmits a MU PPDU to STA 1 and STA 2. The RD initiator first grants an RD to STA 1 by setting RDG/More PPDU to 1 in the PPDU to STA 1, and requests an immediate BlockAck. STA 1 responds with an A-MPDU, which includes a BlockAck and a QoS Data frame with RDG/More PPDU equal to 0. After SIFS, the AP transmits the following PPDUs in MU MIMO fashion:

* A BlockACK to STA 1 to acknowledge its RD response burst, and
* An aggregated BlockAck and QoS Null with RDG/More PPDU equal to 1 to STA 2 in order to collect BlockAck and grant an RD to STA 2.



1. —Example of reverse direction for DL MU-MIMO

Following the reception of the RD grant, STA 2 transmits its RD response burst in multiple PPDUs. The first PPDU is an A-MPDU, which includes the BlockAck to the RD initiator and QoS Data frames with RDG/More PPDU equal to 1. A PPDU in the RD response burst contains QoS DATA with RDG/More PPDU equal to 1 if it is not the last PPDU, and it contains QoS Data with RDG/More PPDU equal to 0 if it is the last PPDU of the RD response burst. After SIFS, the AP transmits another MU PPDU to both STA 1 and STA 2, with RDG/More PPDU set to 1 and ACK Policy set to 0 for the MU PPDU sent to STA 1, and a PPDU sent to STA 2 containing an aggregated BlockAck to the RD response burst and a QoS Data frame.

**References:**

1. 11-15-1358-16-00ay-11ay Spec Framework.doc

2. IEEE P802.11-REVmc/D8.0, Aug 2016