IEEE P802.11  
Wireless LANs

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| CR on SU-MIMO Beamforming and MU-MIMO Beamforming in Candidate Draft D0.2 | | | | |
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| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Lei Huang | Panasonic |  |  | lei.huang@sg.panasonic.com |
| Motozuka Hiroyuki | Panasonic |  |  |  |
| Sakamoto Takenori | Panasonic |  |  |  |
| Gaius Wee | Panasonic |  |  |  |

Abstract

This document proposes changes on 10.38.9.2.3 SU-MIMO beamforming and 10.38.9.2.4 MU-MIMO beamforming in Candidate Draft D0.2.

***Make the following changes on D0.2:***

10.38.9.2.3 SU-MIMO beamforming

The objective of the SISO phase is to enable the initiator to collect feedback of the last initiator TXSS from the responder and also enables the responder to collect feedback of the last responder TXSS from the initiator. During the SISO phase, all transmissions should use the DMG control mode.

Figure 44 depicts the SISO phase, which consists of three subphases: an optional initiator TXSS subphase, an optional responder TXSS subphase, and an SISO Feedback subphase. If both the initiator TXSS subphase and the responder TXSS subphase are present in the SISO phase, the SISO Feedback subphase shall be separated from the responder TXSS subphase by an MBIFS, which in turn shall be separated from the initiator TXSS subphase by an MBIFS.

Figure 44—The SISO phase

The initiator may perform the initiator TXSS subphase to start the SISO phase. During the initiator TXSS subphase, the initiator performs an initiator TXSS (see 10.38.2.2.2). The Short SSW packet shall be used during the initiator TXSS. In each Short SSW packet transmitted as part of the initiator TXSS, the initiator shall set the Packet Type field to 0, set the Direction field to 0, and set the Addressing Mode field to 0. In addition, the CDOWN field in each transmitted Short SSW packet shall contain the total number of Short SSW packet transmissions remaining until the end of the initiator TXSS, including any LBIFS if required, such that the last Short SSW packet transmission of the initiator TXSS has the CDOWN field set to 0.

If the initiator TXSS subphase was present in the SISO phase, the responder shall initiate the responder TXSS subphase following the completion of the initiator TXSS subphase. Otherwise the responder shall not initiate the responder TXSS subphase following the completion of the initiator TXSS subphase. During the responder TXSS subphase, the responder performs a responder TXSS (see 10.38.2.3.2). The Short SSW packet shall be used during the responder TXSS. In each Short SSW packet transmitted as part of the responder TXSS, the responder shall set the Packet Type field to 0, set the Direction field to 1 and set the Addressing Mode field to 0. The CDOWN field in each transmitted Short SSW packet shall contain the total number of Short SSW packet transmissions remaining until the end of the responder TXSS, including any LBIFS if required, such that the last Short SSW packet transmission of the responder TXSS has the CDOWN field set to 0. In addition, the Short SSW Feedback field in each transmitted Short SSW packet shall contain the value of the CDOWN field of the Short SSW packet that was received with best quality in the immediately preceding initiator TXSS.

It is mandatory to perform the SISO Feedback subphase. In the SISO Feedback subphase, the initiator shall send a BRP frame to the responder. The BRP frame shall contain a list of CDOWN values and SNRs of the transmit sectors received during the last responder TXSS. The responder shall send a BRP frame to the initiator a SIFS following the reception of the BRP frame from the initiator, which shall contain a list of CDOWN values and SNRs of the transmit sectors received during the last initiator TXSS.

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10.38.9.2.4 MU-MIMO beamforming

10.38.9.2.4.2. SISO phase

The goal of the SISO phase is to collect feedback on one or more suitable initiator’s TX and responder’s RX DMG antennas and sectors between the initiator and each responder intended to be part of the MU group. This information is then used to perform the following MIMO phase. All transmissions during the SISO phase should use the DMG control mode.

Figure 46 depicts the SISO phase, which consists of two subphases, namely, an I-TXSS subphase and a SISO Feedback subphase. The initiator may perform the I-TXSS subphase. The I-TXSS subphase enables the initiator to obtain feedback from the responders in the MU group on one or more sectors for each of the initiator’s TX DMG antenna.

The initiator performs the I-TXSS subphase through the use of the Short SSW packet (see 30.9.1). In each Short SSW packet transmitted as part of the I-TXSS, the initiator shall set the Direction field to zero, shall set the Addressing Mode field to indicate MU-MIMO and shall set the Destination AID field to contain a group ID announced by the PCP or AP in the last transmitted EDMG Group ID Set element. In addition, the CDOWN field shall be set to the number of Short SSW packets remaining until the end of the I-TXSS subphase and the Setup Duration field shall be set to the duration of the following SISO Feedback subphase.

A MU-MIMO capable EDMG STA that receives a Short SSW packet indicating MU-MIMO transmission determines that it is an intended recipient of the packet by matching the value of the Destination AID field in the packet with a value of the EDMG Group ID field contained in the last received EDMG Group ID Set element. In case a match is found, the EDMG STA is an intended recipient of the packet if its AID is included in the EDMG Group ID field of the corresponding group. Otherwise, the EDMG STA is not an intended recipient of the packet and can ignore the remaining of the I-TXSS and SISO Feedback subphase, which can be done through the use of the value of the CDOWN and Setup Duration fields contained in the received Short SSW packet.

The initiator shall perform the SISO Feedback subphase. If the I-TXSS is present, the SISO Feedback subphase shall start MBIFS following the end of the I-TXSS subphase. During the SISO Feedback subphase, the initiator transmits a BRP frame to poll each responder intended to be part of the MU group to obtain a list of sectors per each TX DMG antenna, and their associated quality indicators, between the initiator and each responder. A responder shall respond to a received BRP frame with a BRP frame, which contains the sectors for each TX DMG antenna of the initiator and the sector’s corresponding quality indicator. The BRP frame shall be transmitted SIFS following the reception of the corresponding BRP frame.



Figure 46—The SISO phase

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