IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Proposed Draft Text (PDT-PHY): An update to MU-MIMO | | | | |
| Date: 2020-11-16 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Sameer Vermani | Qualcomm |  |  | svverman@qti.qualcomm.com |
| Bin Tian | Qualcomm |  |  | btian@qti.qualcomm.com |

Abstract

This submission proposes the updates to draft text on MU-MIMO based on motions after TGbe D0.1

* MU-MIMO
* DL MU-MIMO
* Supported RU sizes in DL MU-MIMO

A STA that sets the Partial Bandwidth DL MU-MIMO subfield of the EHT PHY Capabilities Information field in the EHT Capabilities element that it transmits to 1 shall support receiving an RU/M-RU in an EHT PPDU where MU-MIMO is employed in the RU/M-RU, the RU/M-RU size being greater than or equal to 242-tones, and where there are multiple RU/M-RUs within the PPDU bandwidth.

* + - * 1. Maximum number of spatial streams in an EHT MU PPDU

An EHT STA shall support the reception of non-OFDMA DL MU-MIMO transmissions with a maximum number of space-time streams (per user) that is the minimum of 4 and the maximum number of space-time streams supported for reception of an EHT MU PPDU that is sent to that STA as an SU transmission. The maximum number of space-time streams supported for reception of an EHT MU PPDU when sent to a STA as part of an SU transmission is indicated for various bandwidths in the Supported EHT-MCS and NSS Set field in the EHT Capabilities element.

The maximum total number of space-time streams (across all users) that is supported for the reception of an EHT MU PPDU is indicated by TBD field in EHT PHY capabilities and its minimum value is 4.

An EHT AP with 4 or more antennas shall support non-OFDMA DL MU-MIMO transmissions on all RU/MRU sizes greater than or equal to 242-tones in the supported, bandwidths.

All of the aforementioned requirements in this subclause on the per user and total number of space-time-streams are also applicable to an MU-MIMO transmission on an RU/M-RU in an EHT PPDU which consists of more than one RU/M-RU within the PPDU bandwidth.

* UL MU-MIMO
* Introduction

UL MU-MIMO is a technique to allow multiple STAs to transmit simultaneously over the same frequency resource to the receiver. The concept is very similar to SU-MIMO where multiple space-time streams are transmitted simultaneously over the same frequency resource utilizing spatial multiplexing through multiple antennas at the transmitter and receiver. The key difference from SU-MIMO is that in UL MU-MIMO, the transmitted streams originate from multiple STAs.

* Supported RU sizes in UL MU-MIMO

An AP that sets the Partial Bandwidth UL MU-MIMO subfield of the EHT PHY Capabilities Information field in the EHT Capabilities element that it transmits to 1 shall support receiving an RU/M-RU in an EHT TB PPDU where MU-MIMO is employed in an RU/M-RU, the RU/M-RU size being greater than or equal to 242-tones, and where there are multiple RU/M-RUs within PPDU bandwidth.

An EHT AP with 4 or more antennas shall support non-OFDMA UL MU-MIMO transmissions on all RU/MRU sizes greater than or equal to 242-tones in the supported bandwidths.

A non-AP STA that sets the Partial Bandwidth UL MU-MIMO subfield of the EHT PHY Capabilities Information field in the EHT Capabilities element that it transmits to 1 shall support transmitting an RU/M-RU in an EHT TB PPDU where UL MU-MIMO is employed in the RU/M-RU, the RU/M-RU size being greater than or equal to 242-tones, and where there are multiple RU/M-RUs within the PPDU bandwidth.

A non-AP STA shall support non-OFDMA UL MU-MIMO transmission on all RU/MRU sizes greater than or equal to 242 tones in the supported bandwidths.

* UL MU-MIMO EHT-LTF mode

A non-AP STA shall support, for UL MU-MIMO transmissions in an EHT TB PPDU, transmission of 1x LTFs without pilots and transmission of 2x and 4x LTFs with single stream pilots.

* Maximum number of spatial streams in UL MU-MIMO

A non-AP STA shall support transmitting an EHT TB PPDU using MU-MIMO where:

* The number of spatial streams allocated to the non-AP STA ranges from 1 to *N*, where *N* is the smaller of 4 and the maximum number of spatial streams supported by the non-AP STA for SU transmissions.
* The number of total spatial streams (summed over all users) is less than or equal to 8.

The maximum number of spatial streams supported by a STA for SU transmissions is indicated in the Supported EHT-MCS And NSS Set field in the EHT Capabilities element.

All the requirements in this subclause on the per user and total number of spatial streams are applicable to both non-OFDMA UL MU-MIMO transmissions as well as to UL MU-MIMO transmissions in an EHT TB PPDU which consists of more than one RU/M-RU within the PPDU bandwidth.

* Maximum number of users in MU-MIMO

The maximum number of EHT STAs that can be multiplexed using MU-MIMO on an RU/M-RU is 8, both for DL and UL. This is applicable to both non-OFDMA MU-MIMO transmissions as well as to MU-MIMO transmissions in an EHT PPDU which consists of more than one RU/M-RU within the PPDU bandwidth.