IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Bug fixes to asymmetric beamforming training | | | | |
| Date: 2019-05-03 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Thomas Handte | Sony Europe B.V. | Heldelfinger Strasse 61  70327 Stuttgart, Germany | +49 711 5858 236 | thomas.handte @ sony.com |
| Cheng Chen | Intel |  |  | cheng.chen @ intel.com |
|  |  |  |  |  |

Abstract

This document proposes text to resolve two bug fixes related to asymmetric beamforming training.

Specification text changes are based on TGay D3.0.

Background

* In asymmetric beamforming training, a STA may transmit a SSW frame in a time period in which the AP receives with a directive receive beam
  + The AP receive beam corresponds to the transmit beam used for transmission of the beacon which scheduled the asymmetric beamforming training.
  + Asymmetric beamforming training and its slots are scheduled with the EDMG Extended Schedule element and requires pattern reciprocity at the AP.

Issues discovered

* The spec uses two terms for an asymmetric beamforming training slot
  + “timeslot” vs. “space-time slot”
* It’s not mentioned which asymmetric beamforming allocation a STA may use if it received multiple beacons that schedule an asymmetric beamforming training.
  + This is an important to implement the applications shown in 11-17/0067
    - Association of far away STAs
      * high link budget is important
    - Collision reduction in dense environment by “spatial filtering”
      * A STA should respond in a sector which it intends to use for data communications
  + The proposal is that STAs respond in the sector received with best quality during BTI
    - 11-17/0067 suggests “Each responding STA transmits one [SSW] frame in the Initiator’s sector detected as the best one during BTI TXSS.”
    - At the same time a STA should have the ability to respond in other sectors in case it didn’t receive a Sector ACK

Proposed solution

* Clarification to subclause 9.4.2.252 EDMG Extended Schedule element

*TGay Editor: Please add to P133, L27:*

A space-time slot is a time slot in an asymmetric beamforming training allocation in which the AP listens on the combination of sector and DMG antenna as defined in 10.43.10.3.3.

* Clarification to subclause 10.43.10.3.2 Scheduling during the BTI

*TGay Editor: Please add to P304, L8:*

A STA may preferably select that asymmetric beamforming allocation which corresponds to the beacon received with best quality in BTI. The determination of which beacon was received with best quality is implementation dependent.

Straw Poll

Do you agree to adopt the resolution for bug fixes related to asymmetric beamforming training as proposed in 11-19/0695r0?

Y / N / A