IEEE P802.11
Wireless LANs

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| 4.2 Spatial sharing and interference mitigation |
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| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Kyungtae Jo | LG Electronics | Yangjae-daero 11gil, Seocho-gu, Suoul, 137-893, Korea | +82-10-8421-7010 | kyungtae.jo@lge.com |
| Lei Huang | Panasonic |  |  | lei.huang@sg.panasonic.com |
| Christopher Hansen | Peraso |  |  | chris@covariantcorp.com |

Abstract

This document proposes specification text for subcaluse 4.2 of the SFD describing Spatial sharing and interference mitigation.

**11.32 Spatial sharing and interference mitigation for DMG STAs**

**11.32.1 General**

***Change this subclause as follows:***

This subclause describes mechanisms to enable spatial sharing and interference mitigation for operation in one or multiple 2.16 GHz channels within a PBSS/infrastructure BSS and in a uncoordinated OBSS environment.

Spatial sharing mechanisms allow SPs belonging to different STAs in the same spatial vicinity to be scheduled concurrently over the same ~~channel~~one or multiple 2.16 GHz channels, and for interference mitigation. Alternatively, the AP or PCP can use CBAPs to mitigate interference.

The SPSH and Interference Mitigation field in the DMG Capabilities element indicates whether a STA supports spatial sharing.

A STA that supports spatial sharing, as indicated in the SPSH and Interference Mitigation field equal to 1 in the STA’s DMG Capabilities element, shall support the directional channel quality measurements described in 9.4.2.21.16 and 9.4.2.22.15.

**11.32.2 Spatial sharing and interference assessment**

***Change this subclause as follows:***

The AP or PCP should request STAs to perform and report spectrum and radio resource measurements described in 11.11 to assess the possibility to perform spatial sharing and for interference mitigation.

The AP or PCP should use the directional channel quality described in 9.4.2.21.16 and 9.4.2.22.15 to assess the possibility for spatial sharing of SPs over one or multiple 2.16 GHz channels.

An SP to be assessed for spatial sharing with other scheduled (existing) SPs or considered to be reallocated in the beacon interval is hereby termed as a candidate SP. There might be multiple candidate and existing SPs at one time, and an SP may simultaneously assume the role of candidate and existing SP depending upon the context it is used for spatial sharing and interference assessment.

STAs that participate in an SP and that support spatial sharing over one or multiple 2.16 GHz channels should perform SISO or SU-MIMO beamforming training with each other before engaging in any other communication or performing any measurements described in this subclause.

For the purpose of spatial sharing with an existing SP over one or multiple 2.16 GHz channels, ~~T~~the AP or PCP should request source ~~DMG~~ STA and destination ~~DMG~~ STA involved in a candidate SP to perform measurements ~~for the purpose of spatial sharing with an existing SP~~ only after the STAs have SISO or SU-MIMO beamforming trained with each other. For the purpose of spatial sharing with multiple existing SPs over multiple 2.16 GHz channels, the AP or PCP should request source EDMG STA and destination EDMG STA involved in each of multiple candidate SPs to perform measurements only after the STAs have SISO or SU-MIMO beamforming trained with each other. The AP or PCP can infer that the STAs in a candidate SP have a SISO or SU-MIMO beamformed link with each other if the Beamforming Training field within the DMG TSPEC used to set up the candidate SP was set to 1 and at least one beacon interval has elapsed since the candidate SP was first scheduled.

In order to enable spatial sharing for operation in multiple 2.16GHz channels, the Directional Channel Quality request described in 9.4.2.21.16 and the Directional Channel Quality report described in 9.4.2.22.15 shall allow measurements over multiple 2.16 GHz channels and reporting the individual or averaged results of the measurements over multiple 2.16 GHz channels.

If the AP or PCP transmits a Directional Channel Quality request to a STA involved in a candidate SP to assess the possibility for spatial sharing with another existing SP, it shall set the Target STA to the corresponding peer STA’s MAC address involved in the candidate SP and shall set the Measurement Method field to indicate ANIPI.

If the candidate SP has already been allocated channel time, the AP or PCP should additionally transmit a Directional Channel Quality request to the STAs involved in the existing SP to assess the possibility for spatial sharing with the candidate SP. In the Directional Channel Quality request, the AP or PCP shall set the Target STA to the corresponding peer STA involved in the existing SP and shall set the Measurement Method field to indicate ANIPI.

NOTE—When the AP or PCP transmits a Directional Channel Quality request to a STA of an existing SP, it intends to assess the channel quality during transmission by STAs belonging to the candidate SP. Similarly, when the AP or PCP transmits a Directional Channel Quality request to a STA of a candidate SP, it intends to assess the channel quality during transmission by STAs belonging to the existing SP.

If a recipient STA that receives a Directional Channel Quality request frame is already SISO beamformed trained with the target STA specified by the AID field within the frame, then the recipient STA shall carry out the measurement employing the same receive antenna configuration as is used by the recipient STA when receiving frames from the target STA. If a recipient STA that receives a Directional Channel Quality request frame is already SU-MIMO beamformed trained with the target STA specified by the AID field within the frame, then the recipient STA shall carry out the measurements concurrently employing the same multiple receive antenna configurations as are used by the recipient STA when receiving frames from the target STA. The Directional Channel Quality request described in 9.4.2.21.16 and the Directional Channel Quality report described in 9.4.2.22.15 shall allow reporting the individual or averaged results of the concurrent measurements employing multiple receive antenna configurations. If the AID field is set to the broadcast AID or an unknown AID, then the recipient STA shall perform the measurements using a quasi-omni antenna pattern.

Figure 11-45 illustrates an example of spatial sharing assessment between two SPs. In this example, SP1 is the existing SP and SP2 is the candidate SP. The AP or PCP transmits a Directional Channel Quality request to STAs C and D to measure over SP1’s channel allocation, and transmits a Directional Channel Quality request to STAs A and B to measure over SP2’s channel allocation. The relation of the Measurement Start Time and Measurement Duration fields in the Directional Channel Quality request message is shown in Figure 11-45, while the field Number of Time Blocks is the ratio (Measurement Duration/Measurement Unit).

If a non-AP and non-PCP STA receives a Directional Channel Quality request from its AP or PCP, it should perform the measurements as indicated in the request and shall report back to the AP or PCP using the Directional Channel Quality report. The report shall be formatted and transmitted as per specified in the Directional Channel Quality request. The non-AP and non-PCP STA shall set the Report Mode field (9.4.2.22) in the report frame to indicate whether it performed the measurement as requested by the AP or PCP.



Figure 11-45—Example of spatial sharing assessment