**IEEE P802.11
Wireless LANs**

|  |
| --- |
| LB275 CR for CID 19593 |
| Date: 2023-10-9 |
| Author(s): |
| Name | Affiliation | Address | Phone | Email |
| Yingqiao Quan | Spreadtrum |  |  | yingqiao.quan @unisoc.com |
| Xiangxin Gu | Spreadtrum |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Abstract**

This submission proposes CR for CID 19593

**Revisions:**

* Rev 0: Initial version of the document.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 19593 | 11.20.6.1 | 392.01 | It is possible for a non-AP MLD to simultaneously have data transmission with its associated AP through its first affilliated STA on base channel and have TDLS data transmission with TDLS peer STA on TDLS off-channel through its second affliated STA. This operation enables the first affiliated STA not to be in doze during TDLS frame exchange on the off-channel then brings gain. | modify the standard text to make this operation possible | Revised - Agree with the commenter in principle.TGbe editor to make the changes shown in 11-23/1621r0 under all headings that include CID 19593 |

**Discussion:**

According to Clause 35.3.21, a non-AP MLD (MLD\_S) can establish a single link TDLS direct link with a peer STA (a non-MLD STA or a STA affiliated with another non-AP MLD). On such a direct link, the MLD address of the MLD\_S is used as RA/TA for the frame exchanges. It is possible for the MLD\_S and a peer STA to use the TDLS channel switching operation to switch to a TDLS off-channel to do frame exchanges for any reason. It may be possible for an STR MLD\_S to deal with the off channel TDLS transmission and DL transmission simultaneously.

But in current baseline SPEC, the rule

 “*The TDLS peer STA shall be in PS mode with the AP and shall not be involved in an active Service Period with the AP before sending a TDLS Channel Switch Request frame or a TDLS Channel Switch Response frame with the Status Code field(#4356) set to SUCCESS. The TDLS peer STA that receives a TDLS Channel Switch Request frame may enter PS mode with the AP prior to sending the TDLS Channel Switch Response frame.*” (REVme D4.0 P2570 L23) prevents such operations.

According to current SPEC, for a TDLS peer STA affiliated with a non-AP MLD, it can’t do frame exchange on the TDLS off-channel and be in awake state to its associated AP on the base channel simultaneously.

An example to clarify the intention more clearly:

The non-AP MLD (MLD\_S) is associated with the AP MLD (MLD\_A).

STA1, STA2, STA3 are affiliated with MLD\_S that has capability to setup three links on 2.4GHz, 5GHz and 6GHz bands.

AP1, AP2 are affiliated with MLD\_A that has capability to setup two links on 2.4GHz and 5GHz bands.

STA1 and AP1 are operating on 2.4GHz band (link1), STA2 and AP2 are operating on 5GHz band (link2).

Peer STA is an MCC non-MLD non-AP STA that can operate on 2.4GHz, 5GHz and 6GHz bands separately and is associated with the AP1 on 2.4GHz band.

Peer STA may propose a channel on the 6 GHz band as the target channel for TDLS Channel Switching since there are no detectable medium occupancy on it.

From the device capability point of view, it is possible for the MLD\_S to use STA3 to operate on the 6GHz band and do frame exchange with Peer STA concurrently with the frame exchanges between STA1 and AP1 on link1.



But according to the cited SPEC text, when doing TDLS Channel Switching, STA1 shall be in PS mode. So the SPEC needs to be modified to let the behavior in the example happen.

The selection of the MLD lower MAC sublayer for transmission is one of the MLD functions which might be implementation dependent. Whether to do the “real” TDLS channel switching (and be in PS mode to AP) or to use another available affiliated STA to make transmission is the non-AP MLD’s choice and is transparency to the peer device.

It’s obvious that such operation might bring some benefits. So the SPEC should not limit a non-AP MLD not to do so.

The change to the SPEC to let the behavior in the example happen is trivial.

**Change text for CID 19593:**

***TGbe editor: Please make the following changes in Subclause 11.20.6 (TDLS channel switching) in P.L.400.2 for TGbe D4.1:***

11.20.6.1 General

***TGbe editor:the existing text in REVme D4.0 that may not be presented in 11be draft.***

A STA that supports TDLS channel switching has dot11TDLSChannelSwitchingActivated equal to true and shall set dot11MultiDomainCapabilityActivated and dot11ExtendedChannelSwitchActivated to true. When TDLS channel switching is enabled, the STA may set TDLS Channel Switching subfield to 1. The STA shall include a Supported Channels element and a Supported Operating Classes element in all TDLS Setup Request and TDLS Setup Response frames that have a TDLS Channel Switching subfield equal to 1. (#3510)The Supported Channels element shall indicate the channels supported for the current operating class. The STA shall include only channels in the Supported Channels element for which it can adhere to the local power constraint. A channel switch shall not be initiated by a STA when the TDLS peer STA did not set the TDLS Channel Switching capability field to 1 in the transmitted TDLS Setup Request frame or the TDLS Setup Response frame that caused the TDLS direct link to be set up.

Insert the following paragraph after the first paragraph as follows:

NOTE—A TDLS peer STA that is affiliated with an MLD may include a Supported Channels element and a Supported Operating Classes element that indicates the supported channels and supported operating classes of the MLD in TDLS Setup Request and TDLS Setup Response frames.

**…**

Change the eighth paragraph as follows:

The TDLS peer STA that is not affiliated with an MLD shall be in PS mode with the AP and shall not be involved in an active Service Period with the AP before sending a TDLS Channel Switch Request frame or a TDLS Channel Switch Response frame with the Status Code field set to SUCCESS. The TDLS peer STA that receives a TDLS Channel Switch Request frame may enter PS mode with the AP prior to sending the TDLS Channel Switch Response frame.

Insert the following paragraphs after the eighth paragraph as follows:

The TDLS peer STA that is affiliated with an MLD may not be in PS mode with the AP and may be involved in an active Service Period with the AP before sending a TDLS Channel Switch Request frame or a TDLS Channel Switch Response frame with the Status Code field set to SUCCESS.

NOTE—A TDLS peer STA that is affiliated with an MLD may decide to be in PS mode with the AP or not, before sending a TDLS Channel Switch Request frame or a TDLS Channel Switch Response frame with the Status Code field set to SUCCESS for implementation dependent reasons, including the capabilities of the MLD, the power consumption and the frequency separation between the base channel and the off channel.