IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Normative Text for Wide Bandwidth TDLS | | | | |
| Date: 2011-03-16 | | | | |
| Author(s): | | | | |
| Name | Company | Address | Phone | Email |
| Yongho Seok | LG Electronics | Mobile Comm. Lab, LG R&D Complex 533, Hogye1, Dongan, Anyang, Korea | +82-31-450-1947 | yongho.seok@lge.com |
| Liwen Chu | STMicroelectronics | 2525 Augustine Drive, Santa Clara, CA 95054 | 408-467-8436 | Liwen.Chu@st.com |
| Menzo Wentink | Qualcomm | Straatweg 66-s, Breukelen, the Netherlands | +31-65-183-6231 | mwentink@qualcomm.com |

Abstract

Submission for Draft P802.11ac\_D0.1 comment resolution. The document address various comments related to TDLS.

Submission addresses Draft P802.11ac\_D0.1 comments 1043 and 169.

**Introduction**

**Interpretation of a Motion to Adopt**

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGaf Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGaf Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGaf Editor: Editing instructions preceded by “TGaf Editor” are instructions to the TGaf editor to modify existing material in the TGaf draft. As a result of adopting the changes, the TGaf editor will execute the instructions rather than copy them to the TGaf Draft.***

***Submission Note: Notes to the reader of this submission are not part of the motion to adopt. These notes are there to clarify or provide context.***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter**  **Name** | **Subclause** | **Page** | **Line** | **Comment**  **Type** | **Comment** | **SuggestedRemedy** |
| 1043 | Seok, Yongho | 7.4.11.3 | 35 | 3 | TR | (Refer to IEEE802.11z D13.0) To support TDLS operations in VHT STAs, VHT Operation element should be included in 7.4.11.3 TDLS Setup Confirm frame. | Include VHT Operation element in TDLS Setup Confirm frame. |
| 169 | Chu, Liwen | 11.20.1 | 62 | 6 | TR | "A VHT STA that is a member of a VHT BSS shall not transmit a 20 MHz VHT PPDU that does not use the primary 20 MHz channel of the BSS."  This is not true when TDLS off channel operation is used. The same issues should be fixed in paragraph #2, #3, #4, #5. | change the text to fix the problem. |

**Discussion:**

CID 1043 is asking that TDLS operation should be supported in VHT STAs. We need to update TDLS frames for having VHT Capabilities element and VHT Operation element.

Off-channel direct link does not use the primary channel of the BSS. CID 169 is correct.

**Proposed Resolution:**

Agree in principle. To support TDLS operations in VHT STAs, VHT Operation element should be included in TDLS Setup Confirm frame. Also, TDLS Discovery Response frame should include VHT Capabilities element and TDLS Channel Switch Request frame should include Wide Bandwidth Channel Switch element and Extended Power Constraint element.

## Editing instructions:

#### 7.3.2.27 Extended Capabilities information element

***The following row new rows to Table 7-35a as follow:***

Table 7-35a—Capabilities field

|  |  |  |
| --- | --- | --- |
| Bit | Information | Notes |
| <ANA> | TDLS wider bandwidth on base channel capable | The TDLS wider bandwidth on base channel capable subfield indicates whether the STA supports a wider bandwidth than the BSS bandwidth for a TDLS direct link on the base channel. The field is set to one to indicate that the STA supports a wider bandwidth on base channel and to zero to indicate that the STA does not support the wider bandwidth on the base channel. |

***TGac editor: Insert the follow section after the 7.3.2.20a Secondary Channel Offset element section.***

**7.3.2.20b Wide Bandwidth Channel Switch element**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Element ID | Length | New STA Channel Width | New Channel Center Frequency Segment 1 | New Channel Center Frequency Segment 2 |
| Octets: 1 | 1 | 1 | 1 | 1 |

**Figure 7-57b—Wide Bandwidth Channel Switch element format**

The Wide Bandwidth Channel Switch element is included in Channel Switch Announcement frames, as described in 7.4.1.5 (Channel Switch Announcement frame format).

The definition of subfields New STA Channel Width, New Channel Center Frequency Segment 1 and 2 are identical to definitions for STA Channel Width, Channel Center Frequency Segment 1 and 2 in the VHT Operation Information element field as described in Table 7-19 VHT Operational Information element fields of section 7.3.2.62 VHT Operation element respectively.

**7.4.7.11 TDLS Discovery Response frame format**

TGac editor: Change Table 7-57v13, appending the rows for Order 16:

**Table 7-57v13—Information for TDLS Discovery Response frame**

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 16 | VHT Capabilities | VHT Capabilities element (optional). The VHT Capabilities element is present if the dot11VHTOptionImplemented attribute is true. The VHT Capabilities element is defined in 7.3.2.61. |

**7.4.11.3 TDLS Setup Confirm frame format**

TGac editor: Change Table 7-57v4, appending the rows for Order 11:

**Table 7-57v4—Information for TDLS Setup Confirm frame**

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 11 | VHT Operation | VHT Operation element (optional). The VHT Operation element is present if the dot11VHTOptionImplemented attribute is true, the TDLS Setup Response frame contained a VHT Capabilities element, the status code is 0 (Successful), and the BSS does not support VHT. The VHT Operation element is defined in 7.3.2.62. |

**7.4.11.6 TDLS Channel Switch Request frame format**

TGac editor: Change Table 7-57v7, appending the rows for Order 8:

**Table 7-57v7—Information for TDLS Channel Switch Request frame**

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 8 | Wide Bandwidth Channel Switch | Wide Bandwidth Channel Switch element (optional). The Wide Bandwidth Channel Switch element is included when a switch to a 80MHz/160MHz/80+80MHz direct link is indicated. See 7.3.2.20b. |

**11.20 VHT BSS operation**

**11.20.1 Basic VHT BSS functionality**

TGac editor: Change the following paragraph, as shown below:

A VHT STA that is a member of a VHT BSS shall not transmit a 20 MHz VHT PPDU that does not use the primary 20 MHz channel of the BSS, except for a 20 MHz VHT PPDU transmission on an off-channel TDLS direct link.

A VHT STA that is a member of a VHT 40 MHz, 80 MHz, 160 MHz or 80+80 MHz BSS shall not transmit a 40 MHz PPDU that does not use the primary 20 MHz channel of the BSS, except for a 40 MHz VHT PPDU transmission on an off-channel TDLS direct link.

A VHT STA that is part of a VHT 80 MHz, 160 MHz or 80+80 MHz BSS shall not transmit an 80 MHz PPDU that does not use the primary 20 MHz channel of the BSS, except for an 80 MHz VHT PPDU transmission on an off-channel TDLS direct link.

A VHT STA shall not transmit a 160 MHz VHT PPDU using a 160 MHz channel that cannot be used to setup a VHT 160 MHz BSS, except for a 160 MHz VHT PPDU transmission on an off-channel TDLS direct link.

A VHT STA shall not transmit a 80+80 MHz VHT PPDU using two nonadjacent 80 MHz channels if either channel cannot be used to setup a VHT 80 MHz BSS, except for an 80+80 MHz VHT PPDU transmission on an off-channel TDLS direct link.

**11.21 Tunneled Direct Link Setup**

**11.21.1 General**

TGac editor: Change the following paragraph, as shown below:

Features that are not supported by the BSS but that are supported by both TDLS peer STAs may be used on a TDLS direct link between those STAs, except PCO. An example is the use of an HT MCS on a TDLS direct link between HT STAs when these STAs are associated with a non-HT BSS. Features that are supported by the BSS shall follow the BSS rules when they are used on a TDLS direct link on the base channel. The channel width of the TDLS direct link on the base channel shall not exceed the channel width of the BSS to which the TDLS peer STAs are associated, except when both TDLS peer STAs set the TDLS wider bandwidth on base channel capable subfield in the Extended Capability element of the TDLS Setup Request frame or TDLS Setup Response frame set to one. A TDLS direct link on the base channel may have a wider bandwidth than the BSS bandwidth when both STA indicated that they are TDLS wider bandwidth on base channel capable.

The VHT capable TDLS direct link shall use the HT BSS primary channel/non-HT operating channel as the primary channel, and the VHT TDLS channel width shall not be wider than the minimal channel width supported by TDLS initiator STA and TDLS responder STA.

Add the following paragraph at the end of 11.21.1:

The VHT Operation element shall be present in a TDLS Setup Confirm frame when both STA are VHT capable but the BSS is not.

TGac editor: Modify section after section 11.21.6.2 as shown below:

**11.21.6.2 Setting up a wideband off-channel TDLS direct link**

**11.21.6.2.1 General**

A wideband TDLS off-channel TDLS direct link is a 40MHz/80MHz/160MHz/80+80MHz off-channel TDLS direct link.

A wideband off-channel TDLS direct link may be started if both TDLS peer STAs indicated wideband support in the Supported Channel Width Set field of the VHT Capabilities element included in the TDLS Setup Request frame or the TDLS Setup Response frame.

Switching to a wideband off-channel direct link is achieved by including any of the following information in the TDLS Channel Switch Request frame:

— an Operating Class element indicating 40 MHz Channel Spacing

— a Secondary Channel Offset element indicating SCA or SCB

— a Wide Bandwidth Channel Switch element indicating 80MHz/160MHz/80+80MHz channel width

The operating class in TDLS Channel Switch Request frame shall have a value of 5 GHz for the channel starting frequency.

The TDLS peer STA initiating the switch to the wideband off-channel shall be the IDO STA on that channel.

**11.21.6.2.2 Basic wideband functionality**

TDLS peer STAs may transmit 80MHz/160MHz/80+80MHz PPDUs on a 80MHz/160MHz/80+80MHz direct link, respectively. A TDLS peer STA shall not transmit a 20 MHz PPDU in the non-primary channel of its 80MHz/160MHz/80+80MHz direct link.

**11.21.6.2.3 Channel selection for a wideband off-channel direct link**

If a TDLS peer STA chooses to start a wideband direct link that occupies the same channels as an existing wideband network (i.e., a 40MHz/80MHz/160MHz/80+80MHz BSSs or a 40MHz/80MHz/160MHz/80+80MHz direct link), then it shall ensure that the primary and secondary channels of the new direct link are identical to the primary and secondary channels of the existing 40MHz/80MHz/160MHz/80+80MHz network, unless the TDLS peer STA discovers that on these two channels there are existing 40MHz/80MHz/160MHz/80+80MHz networks with different primary and secondary channels.

If a TDLS peer STA chooses to start a wideband off-channel TDLS direct link, the selected non-primary channel should correspond to a channel on which no beacons are detected.

**11.21.6.2.4 Switching from a wideband to a 20 MHz direct link**

Switching from a wideband off-channel direct link to a 20 MHz off-channel direct link is established through a TDLS channel switch. When on a wideband off-channel direct link, a requested switch to a 20 MHz direct link shall always be accepted.

**11.21.6.2.5 CCA sensing and NAV assertion in a 80MHz/160MHz/80+80MHz direct link**

When active on a wideband direct link, the TDLS peer STAs shall follow the CCA rules as defined in 11.20.2 (STA CCA sensing in a VHT BSS) and the NAV rules as defined in 11.20.3 (NAV assertion in a VHT BSS).