IEEE P802.11  
Wireless LANs

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| LB187-PR-IE-CAP-OP-LOAD-AND-MORE | | | | |
| Date: 2012-05-03 | | | | |
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|  |  |  |  |  |

Abstract

Proposed resolutions for TGac LB187 CIDs 4033, 4034, 4037, 4038, 4312, 4315, 4317, 4321, 4322, 4534, 4798, 4912, 4968, 4977, 4912.

# Revision notes:

**REV0:**

**CID 4033:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4033 | Adrian Stephens | 67.42 | 8.4.2.160.2 | "Set to 0 for 3895 octets (Maximum A-MSDU Length in HT Capabilities set to 3839)"  This is essentially a well hidden normative requirement on the behaviour of the transmitting STA related to consistency between HT and VHT elements. | Create or locate a place in Clause 10 to describe the normative behaviour of the transmitting STA related to these consistency requirements, i.e. "A VHT STA that indicates a Maximum MPDU Length corresponding to 11 454 octets shall set the Maximum A-MSDU Length field of the HT Capabilities element to indicate a length of 7935 octets." etc.. Or (prefer) include a table that says the same thing with less words. | Revise – Tgac editor to make changes shown under the heading “CID 4033 Proposed resolution ALTERNATIVE ONE” within document 11-12-0540r0 which modify the frame format text to make a reference to normative text that already exists in the draft in clause 9 and which is very similar to the proposed text but is not in clause 10. |

**Discussion:**

The TGac draft already contains nearly exactly the text that the commenter is requesting. However, that text appears within subclause 9.11 A-MSDU operation.

There are exactly five possible paths forward to resolve this comment.

1. Reject the comment, since subclause 9.11 already includes a mechanism to force a specific normative constraint between the parameters of the VHT and HT capabilities
2. Revise the comment by changing the parenthetical information in clause 8 to a note to appear at the bottom of the table that mentions the constraint and gives a reference to subclause 9.11.
3. Revise the comment same as 2, but move the normative text from 9.11 to a new subclause at the top of the MLME section (call it 10.a) (modifying the normative text slightly to account for its location) table note would refer to the new subclause 10.a.
4. Revise the comment by deleting the normative text in 9.11 and the parenthetical information in the table for the VHT Cap element (and maybe leaving a note, but wait, that note will be complicated) and instead putting the normative language throughout clause 10 (MLME) by modifiying each subclause under 10 that includes a management frame transmission that includes both a VHT Capabilities parameter and an HT Capabilities element by normatively repeating the constraint requirement within each such subclause. E.g. this would be done at least for subclauses that describe Association, Reassociation, starting a BSS, DLS establishment, TDLS establishment, and some MESH subclauses. Note that this would create a specification with the same normative requirement repeated in quite a few places. Note that MLME language sometimes uses frames and sometimes refers to SAPs so the normative language would be adjusted for each instance.
5. Revise the comment by deleting the normative text in 9.11 and the parenthetical information in the table for the VHT Cap element (and maybe leaving a note, but wait, that note will be complicated) and instead putting the normative language into clause 6 (SME SAPs) by modifiying each SME SAP in clause 6 that includes both a VHT Capabilities parameter and an HT Capabilities parameter by normatively repeating the constraint requirement within each such SAP. E.g. this would be done for at least some SAPs within each of: Associate, Reassociate, Start, DLS, TDLS, and some MESH SAPs subclauses. Note that some SME SAPs that include HT and VHT parameters include them through an indirect mechanism – see TDLS Setup Request for an example, where the entire frame body is referred to as a single parameter whose contents are described in an action frame in clause 8 so that including a constraint on HT and VHT parameter values within such a sub-clause/SAP does not seem appropriate because those parameters are not even mentioned by those SAPs. For such SAPs, a more appropriate location might be in clause 10, where the procedure that is associated with the SME SAP is mentioned, in which case, multiple locations throughout clauses 6 and 10 would repeat the normative constraint.

Here is the existing 9.11 language:

A VHT STA that sets the Maximum MPDU Length in the VHT Capabilities element to indicate 3895 octets

shall set the Maximum A-MSDU Length in the HT Capabilities element to indicate 3839 octets. A VHT STA

that sets the Maximum MPDU Length in the VHT Capabilities element to indicate 7991 octets or 11 454 octets

shall set the Maximum A-MSDU Length in the HT Capabilities element to indicate 7935 octets.

**CID 4033 Proposed resolution ALTERNATIVE ONE:**

Effectively, solution 2 – make a note that refers to existing 9.11 language.

***TGac editor, modify the contents of the “Maximum MPDU Length” row of the table “*Table 8-183u—Subfields of the VHT Capabilities Info field” *within subclause “*8.4.2.160.2 VHT Capabilities Info field” *of 802.11 TGac draft 2.1, as shown:***

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Maximum MPDU  Length | Indicates the maximum MPDU  length (see 9.11 (A-MSDU  operation)). | Set to 0 for 3895 octets (See NOTE XX)  Set to 1 for 7991 octets (See NOTE XX)  Set to 2 for 11 454 octets (See NOTE XX)  The value 3 is reserved |

***TGac editor, add a note beneath the table “*Table 8-183u—Subfields of the VHT Capabilities Info field” *within subclause “*8.4.2.160.2 VHT Capabilities Info field” *of 802.11 TGac draft 2.1, as shown:***

NOTE XX - Whenever a VHT Capabilities element is included in a frame, the value for the Maximum MPDU Length in the VHT Capabilities field imposes a constraint on the allowed value of the Maximum MPDU Length in the HT Capabilities field if an HT Capabilities element is contained in that frame. (See 9.11 A-MSDU operation.)

**CID 4033 Proposed resolution ALTERNATIVE TWO:**

Effectively, solution 3, move 9.11 language to 10.a and refer to it.

***TGac editor, modify the contents of the “Maximum MPDU Length” row of the table “*Table 8-183u—Subfields of the VHT Capabilities Info field” *within subclause “*8.4.2.160.2 VHT Capabilities Info field” *of 802.11 TGac draft 2.1, as shown:***

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Maximum MPDU  Length | Indicates the maximum MPDU  length (see 9.11 (A-MSDU  operation)). | Set to 0 for 3895 octets (See NOTE XX)  Set to 1 for 7991 octets (See NOTE XX)  Set to 2 for 11 454 octets (See NOTE XX)  The value 3 is reserved |

***TGac editor, add a note beneath the table “*Table 8-183u—Subfields of the VHT Capabilities Info field” *within subclause “*8.4.2.160.2 VHT Capabilities Info field” *of 802.11 TGac draft 2.1, as shown:***

NOTE XX- Whenever a VHT Capabilities element is included in a frame, the value for the Maximum MPDU Length in the VHT Capabilities field imposes a constraint on the allowed value of the Maximum MPDU Length in the HT Capabilities field if an HT Capabilities element is contained in that frame. (See 10.a Parameter constraints.)

***TGac editor, please delete the paragraph that begins with the words “A VHT STA that sets the Maximum MPDU Length in the VHT Capabilities element” within subclause “*8.9.11 A-MSDU operation” *of 802.11 TGac draft 2.1, as shown:***

***TGac editor, please insert the following headings, editing instruction and text immediately after the heading “*10.MLME*” in 802.11 TGac draft 2.1:***

***Insert the following new subclause:***

**10.a Parameter constraints**

If a STA sets the value of the Maximum MPDU Length in the VHT Capabilities element in a frame to indicate 3895 octets, then the Maximum A-MSDU Length in the HT Capabilities element in that frame shall be set to indicate 3839 octets, if the HT Capabilities element exists in that frame. If a STA sets the value of the Maximum MPDU Length in the VHT Capabilities element in a frame to indicate 7991 octets or 11,454 octets, then the Maximum A-MSDU Length in the HT Capabilities element in that frame shall be set to indicate 7935 octets, if the HT Capabilities element exists in that frame.

**CID 4034:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4034 | Adrian Stephens | 69.08 | 8.4.2.160.2 | "whether or not the STA is in VHT TXOP Power Save mode."  The VHT Capabilities element should be static. So in the non-AP case does this truly reflect dynamic data (in which case it shouldn't be in the capabilities element) or static data (in which case the descripiton is misleading). | Change the description so that it reflects non-AP capabilities, not dynamic behaviour, i.e. replace "is in TXOP power save mode" with "is capable of entering TXOP power save mode". | Revise – Tgac editor to make changes shown under the heading CID 4034 within document 11-12-0540r0 which change the description to indicate that the non-AP STA has enabled the TXOP PS Mode. |

**Discussion:**

It turns out that it is not an accurate description to say that a non-AP STA mode is “in” or “not in” TXOP Power Save Mode. TXOP Power Save Mode is an opportunistic behaviour that the STA can engage in, if the AP permits it. The VHT TXOP PS bit in the VHT Cap element really only indicates to the AP whether the non-AP STA might possibly engage in this behavior. In this sense, the bit is an indication of whether or not the non-AP STA has “enabled” the functionality.

Note that even when the functionality is enabled, the non-AP STA may only enter the DOZE state during a TXOP when the AP grants it permission to do so, and even if the AP grants a TXOP-PS-enabled STA permission to DOZE during a TXOP, the STA might decline to accept the invitation. This behavior is noted because to further demonstrate that the VHT Cap element bit is an indication of enablement.

Proposed resolution is revise, with the following changes:

***TGac editor, please make changes as shown to the VHT TXOP PS row of “*Table 8-183u—Subfields of the VHT Capabilities Info field*” within subclause “*8.4.2.160.2 VHT Capabilities Info field” *of 802.11 TGac draft 2.1:***

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| VHT TXOP PS | Indicates whether or not the AP  supports VHT TXOP Power  Save Mode or whether or not  the non-AP STA is has enabled VHT TXOP  Power Save mode. | When transmitted by a VHT AP in the VHT  Capabilities element included in Beacon, Probe  Response, Association Response and Reassociation  Response frames:  Set to 0 if the VHT AP does not support  VHT TXOP Power Save in the BSS.  Set to 1 if the VHT AP supports TXOP  Power Save in the BSS.  When transmitted by a VHT non-AP STA in  the VHT Capabilities element included in  Association Request, Reassociation Request  and Probe Request frames:  Set to 0 when the VHT STA has enabled TXOP  Power Save Mode.  Set to 1 when the VHT STA has enabled TXOP  Power Save Mode. |

**CID 4977:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4977 | Osama Aboulmagd | 68.48 | 8.4.2.160.2 | Table 13-u related to MU Beamformer-Beanformee capable. Since MU support is conditioned on SU support, there is the need to indicate this dependence | Change the encoding of the MU Beamforming Capable and/or MU Beamformee Capable to Reserved when SU Beamforming Capable and/or Beamformee Capable are set to 0. | Revise – Tgac editor to make changes shown under the heading CID 4977 within document 11-12-0540r0 add a note to the table entries. |

***TGac editor, please make changes as shown to the MU Beamformer Capable and MU Beamformee Capable rows of “*Table 8-183u—Subfields of the VHT Capabilities Info field*” within subclause “*8.4.2.160.2 VHT Capabilities Info field” *of 802.11 TGac draft 2.1:***

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| MU Beamformer  Capable | Indicates support for operation  as an MU beamformer (see  9.31.5 (VHT sounding protocol)) | Set to 0 if not supported or if SU Beamformer Capable is set to 0 or if sent by a non-AP  STA  Set to 1 if supported and SU Beamformer Capable is set to 1 |
| MU Beamformee  Capable | Indicates support for operation  as an MU beamformee (see  9.31.5 (VHT sounding protocol)) | Set to 0 if not supported or if SU Beamformee Capable is set to 0 or if sent by an AP  Set to 1 if supported and SU Beamformee Capable is set to 1 |

**CID 4037:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4037 | Adrian Stephens | 71.09 | 8.4.2.160.3 | "The 2-bit Max MCS For n SS field for each number of spatial streams n = 1, ..., 8"  This does not establish that n=1 is in the low or high order bits. | Add "where n=1 occupies the two lowest numbered bits of Rx MCS map".  Ditto at 71.24. Similar change at 72.46. | Revise – Tgac editor to make changes shown under the heading CID 4037 within document 11-12-0540r0 which add clarity to description of The VHT Basic MCS Set. No change is needed for the RX MCS Map and TX MCS Map, since the requested clarifying information is already definitively indicated in the diagram. (The names of each subfield in the diagram include the NSS numerical value and the bit positions are indicated along the top of the diagram.) |

***TGac editor, please make changes as shown to subclause “*8.4.2.160.3 VHT Supported MCS Set field*” within 802.11 TGac draft 2.1:***

The Rx MCS Map subfield, the Tx MCS Map subfield and the VHT Basic MCS Set field have the structure shown in Figure 8-401bt.

**CID 4037:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4038 | Adrian Stephens | 71.36 | 8.4.2.160.3 | "NOTE--Some MCSs are not be valid for particular bandwidth"  Another alien conjugation. Also, I think the meaning is obscure. Also the spatial stream number is taken into account as these tables are per spatial stream. | Replace with: "NOTE--An MCS indicated as supported in the MCS Map fields for a particular number of spatial streams might not be valid at all bandwidths (see 22.5 (Parameters for VHT MCSs))." | Accept. |

**CID 4968:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4968 | Nir Shapira | 70.12 | 8.4.2.160.3 | Add option to support RX LDPC for up to a maximum data-rate, above which the STA supports only BCC. This enables implementers to increase robustness of lower rates for extended reach, while still supporting high rates with BCC. In current spec support of LDPC must be for all supported rates. In case an impementer must support a high rate but cannot afford an implementation of LDPC in that rate, he must abandon LDPC altogether. Suggest to add this distinction in the VHT Supported MCS Set field | Resolution of LDPC max rate can be in 100s of Mb/s. This requires 6 bits (for maximum rate of 6400Mb/s). We can use the 6 remaining reserved bits (B29-B31,B61-B63). A value of 0 (when RX LDPC capability is 1) can signal that LDPC can be done for the highest supported rate. | Reject – The group does not see the value in creating the infrastructure to support a mode that the group feels is very unlikely to ever be implemented. |

**CID 4312:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4312 | Brian Hart | 66.40 | 8.4.2.160.1 | Element ID and Length fields not defined | Define | Revise - Tgac editor to make changes shown under the heading CID 4312 within document 11-12-0540r0 which generally agree with the sentiment expressed by the commenter. |

***TGac editor, please add the following new text to the subclause “*8.4.2.160.1 VHT Capabilities element structure*” within 802.11 TGac draft 2.1, immediately after “*Figure 8-401bq—VHT Capabilities element format”*:***

The Element ID field is set to the value for VHT Capabilities element defined in Table 8-54.

The Length field of the VHT Capabilities element is set to 12.

**CID 4315, 4317:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4315 | Brian Hart | 68.37 | 8.4.2.160.2 | "Antennas Supported" but NOTE 2 and the usage of this field in the rest of the amendment indicates that really Note 2 should be the definition. And then change that name too - VHT NDP STSs not antennas | Change the name, align the definition with NOTE 2, delete Note 2 | Revise - Tgac editor to make changes shown under the heading CID 4315 within document 11-12-0540r0 which generally agree with the sentiment expressed by the commenter. |
| 4317 | Brian Hart | 69.55 | 8.4.2.160.2 | NOTE 1 makes an "illegal call" into the bowels of the PHY | Refer to parameters exposed at the MAC/PHY interface - i.e. TXVECTOR/RXVECTOR | Revise - Tgac editor to make changes shown under the heading CID 4317 within document 11-12-0540r0 which generally agree with the sentiment expressed by the commenter. |

**Discussion:**

Commenter is generally correct, in that the purport of the Compresssed Steering Number of Beamformer Antennas Supported field in the two locations where its use it noted indicates a restriction on the transmission of a number of streams to a beamformee or the minimal number of streams that the recipient is capable of receiving and that NOTE 1 needs a small modification.

Proposed resolution is revise, with the following proposed draft changes:

***TGac editor, please make changes as shown to the VHT TXOP PS row of “*Table 8-183u—Subfields of the VHT Capabilities Info field*” and to NOTE1 and NOTE 2 below the table, within subclause “*8.4.2.160.2 VHT Capabilities Info field” *of 802.11 TGac draft 2.1:***

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Maximum Number of Received Space Time Streams | The maximum number of space time streams that the STA can receive in an NDP or an MU PPDU and the maximum value of Nc that the STA transmits in a compressed  beamforming feedback frame | If SU beamformee capable, set to maximum  value minus 1.  Otherwise reserved. |

NOTE 1—An AP that sets MU Beamformer Capable to 1 can transmit an VHT MU PPDU with only one nonzero TXVECTOR

NUM\_STS[p] subfield, for 0 <= p <= 3. However, a STA that sets MU Beamformee Capable to 0 is not required to be

able to demodulate an VHT MU PPDU with only one non-zero RXVECTOR NUM\_STS[p] subfield, for 0 <= p <= 3.

***TGac editor, please add the following new subclause heading, editing instructions and text to 802.11 TGac draft 2.1:***

**9.29.3 Explicit feedback beamforming**

***Insert the following text after the thirteenth paragraph of the subclause:***

The value of Nc within an explicit Beamforming feedback frame transmitted by a VHT Beamformee will not exceed the value indicated in the Maximum Number of Received Space Time Streams subfield of the VHT Capabilities element.

***TGac editor, please change subclause “*9.31.6 Transmission of a VHT NDP*” 802.11 TGac draft 2.1 as shown:***

**9.31.6 Transmission of a VHT NDP**

The number of space-time streams sounded and as indicated by the NUM\_STS parameter shall not exceed the value indicated in the Maximum Number of Received Space Time Streams subfield in the VHT Capabilities element of any intended recipient of the VHT NDP frame. The NUM\_STS parameter may be set to any value, subject to the constraint of the previous sentence, regardless of the value of the Supported MCS Set field of the VHT Capabilities element at either the transmitter or recipient of the NDP.

***TGac editor, please change subclause “*22.3.11.3 Maximum Number of Total Spatial Streams in MU PPDUs*” 802.11 TGac draft 2.1 as shown:***

**22.3.11.3 Maximum Number of Total Spatial Streams in MU PPDUs**

An MU capable STA shall support reception of MU PPDUs with the total number of space-time streams across the NUM\_USERS users being less than or equal the value indicated in the Maximum Number of Received Space Time Streams subfield in the VHT Capabilities Info field.

**CID 4534:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4534 | David Hunter | 71.09 | 8.4.2.160.3 | What is a "maximum MCS"? 11mb was careful to specify whether the subject is an MCS index value, a value of a field or a specific MCS scheme. There is no use of "maximum MCS" in 802.11mb. | Either define this new concept or specify what is maximized here. Is it the "maximum MCS index value"? If so, replace "maximum MCS" with "maximum MCS index value" throughout the 11ac draft. | Revise - Tgac editor to make changes shown under the heading CID 4534 within document 11-12-0540r0 which generally agree with the sentiment expressed by the commenter. |

**Discussion:**

Commenter is close – the MCS that the MAC is aware of is the MCS parameter of the TXVECTOR and RXVECTOR. Proposed change is to add this clarification where MCS is mentioned in this subclause.

Proposed resolution is revise, with the following proposed draft changes:

***TGac editor, please make changes as shown to the RX MCS Map and TX MCS Map rows of “*Table 8-183u—Subfields of the VHT Capabilities Info field*” within subclause “*8.4.2.160.2 VHT Capabilities Info field” *of 802.11 TGac draft 2.1:***

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Rx MCS Map | Indicates the maximum value of the MCS parameter of the RXVECTOR of a frame that can be received by this STA for each number of spatial streams. | The 2-bit Max MCS For *n* SS field for each  number of spatial streams *n* = 1, ..., 8 is  encoded as follows (see NOTE):  0 indicates support for MCS 0-7  1 indicates support for MCS 0-8  2 indicates support for MCS 0-9  3 indicates that *n* spatial streams is not supported |
| Tx MCS Map | Indicates the maximum value of the MCS parameter of the TXVECTOR of a frame that can be transmitted by this STA for each number of spatial streams. | The 2-bit Max MCS For *n* SS field for each  number of spatial streams *n* = 1, ..., 8 is  encoded as follows (see NOTE):  0 indicates support for MCS 0-7  1 indicates support for MCS 0-8  2 indicates support for MCS 0-9  3 indicates that *n* spatial streams is not supported |

**CID 4321:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4321 | Brian Hart | 71.60 | 8.4.2.161 | Length field not defied | Fix | Revise - Tgac editor to make changes shown under the heading CID 4534 within document 11-12-0540r0 which generally agree with the sentiment expressed by the commenter. |

***TGac editor, please add the following new text to the subclause “*8.4.2.161 VHT Operation element*” within 802.11 TGac draft 2.1, immediately after the paragraph that begins with “*The Element ID field is set to the value*”:***

The Length field of the VHT Operation element is set to 5.

**CID 4322:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4322 | Brian Hart | 72.26 | 8.4.2.161 | Segments are labelled 1 and 2 but from eqn (22-1), segments are identified as 0 and 1 | Renumber from 1 and 2 to 0 and 1. Also, in Table 8-53i on P58, the (L) and (H) terminology is used - should use (0) and (1) again; perhaps with additional requirements in (22-1) (i.e. segment carrier freq must increase with increasing segment #) |  |

**Discussion:**

Not sure of what to do.

Equation 22-1 does not appear to use 0 and 1 as the commenter suggests, but instead, only uses index1, which is the name given throughout the document to that segment.

It is agreed that table 8-53i uses L and H where some other values might be appropriate. It is not clear where these values come from, nor is it clear whether the correct values should be 0 and 1 or 1 and 2.

**CID 4798:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4798 | Mark RISON | 63.16 | 8.4.2.29 | This feature can't be retroactively imposed on non-VHT HT devices. Non-VHT STAs can already support this feature, but will have this bit set to 0 | Add "of a VHT BSS" or somesuch | Reject – This is not an existing feature. HT STA may set up a 40 MHz TDLS that is not on the base channel. This bit is advertising the capability to set up a TDLS on the base channel. |

**Discussion:**

The commenter is probably trying to state that “advertisement of support for a wider channel TDLS link” cannot be imposed on non-VHT HT devices. (Wider here refers to the relative comparison of the operating channel width of the TDLS link to the operating channel width of the BSS to which the two TDLS STA are associated.)

The commenter suggests that HT devices are already allowed to create wider channel TDLS links, and given this, then the addition of an adversitement for that capability might create a problem for HT devices that support the feature today, but which do not indicate their support in this bit and which will not know how to indicate that support if this bit is added because they do not know about this new bit.

The commenter suggests fixing this by making the advertisement apply only to VHT STA.

However, the feature being advertised is not the feature that is supported by HT STA already.

HT STA are allowed to create wider TDLS links, but only if they are off-channel links. At least, that is the implication of the language in the baseline, which only specifies the procedure for starting a 40 MHz TDLS when that TDLS is “off-channel.”

**10.22.6.2 Setting up a 40 MHz direct link**

A 40 MHz off-channel direct link may be started if both TDLS peer STAs indicated 40 MHz support in the

Supported Channel Width Set field of the HT Capabilities element (which is included in the TDLS Setup

Request frame and the TDLS Setup Response frame).

Off-channel is defined earlier to mean that the TDLS operates on a channel that is not the base channel of the BSS:

**10.22 Tunneled direct-link setup**

**10.22.1 General**

The channel on which the AP operates is referred to as the base channel. If the AP operates in a 40 MHz

channel, then the base channel refers to the primary channel. If the direct link is switched to a channel that is

not the base channel, then this channel is referred to as the off-channel.

The implication is that without explicit permission to operate a 40 MHz direct link on the base channel, that an HT STA is not allowed to operate a 40 MHz direct link on the base channel.

If this is true, then the cited text from 11ac draft 2.1 is correct as it stands, because it explicitly describes the feature being advertised as the ability to operate a wider TDLS link on the base channel.

*The TDLS Wider Bandwidth 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 1 to indicate that*

*the STA supports a wider bandwidth on the base channel and to 0*

*to indicate that the STA does not support a wider bandwidth on*

*the base channel.*

**CID 4912:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4912 | Matthew Fischer | 63.17 | 8.4.2.29 | Is the "base channel" restriction really necessary here? -- The TDLS Wider Bandwidth 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 1 to indicate that the STA supports a wider bandwidth on the base channel and to 0 to indicate that the STA does not support a wider bandwidth on the base channel. | Change the cited text to read: "The TDLS Wider Bandwidth subfield indicates whether the STA supports a wider bandwidth than the BSS bandwidth for a TDLS direct link than the base channel. The field is set to 1 to indicate that the STA supports a wider bandwidth than the BSS bandwidth for a direct link and set to 0 to indicate that the STA does not support a wider bandwidth than the BSS bandwidth for a direct link." | Withdraw |

**References:**