IEEE P802.11
Wireless LANs

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| Clause 4.3.10a Comment Resolution |
| Date: 2012-03-06 |
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Abstract

This submission addresses resolutions to CIDs 4013, 4014, 4015, 4270, 4511, 4512, 4638, 4678, 4782, 4924, 4925, 4931, 4932, 4975, 5026, 5055, 5334, and 5401.

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| 4013 | 8.50 | 4.3.10a | "A subset of the VHT features is available for use between two VHT STAs that aremembers of the same IBSS." - which subset | please reference the subclauses that define this subset. |

Proposed Resolution: Reject.

This is a general statement that was copied from clause 4.3.10. The subset of features is not referenced in 4.3.10 as applicable to HT stations4.3.10a is concerned with the components of the architectures but not the details of these components.

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| 4014 | 8.50 | 4.3.10a | "The VHT features are available to VHT STAs associated with a VHT AP in a BSS."This begs the question of what VHT features are available to VHT STAs associated with a non-VHT AP. | Add description or reference subclauses that define what VHT features are available under this condition. |

Proposed Resolution: Reject. 4.3.10a is concerned with the components of the architectures but not the details of these components.

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| 4015 | 8.60 | 4.3.10a | "The simultaneous transmission of A-MPDUs in a single MU PPDU increases aggregate throughput"It only increases aggregate throughput under certain conditions. Excessive near-far and padding can reduce aggregate throughput. | Change "increases" to "might increase" |

Proposed Resolution: Revised. Add the“provides a means to” as indicated in the comment.

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| 4270 | 8.39 | 4.3.10a | "BW indication in RTS" is true but suggests any RTS to the uninitiated | in RTS -> in RTS sent within a VHT PPDU |

Proposed resolution: Reject. It doesn’t imply all RTS. It states that a VHT STA is required to RTS that carries BW indication.

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| 4511 | 8.40 | 4.3.10a | The 11ac draft contains a number of informative references to the maximum MPDU length of 11,454 octets, but I can't find a normative reference. | Specify somewhere the maximum lengths of MPDUs and A-MPDUs. |

Proposed Resolution: Reject

A normative reference to the maximum MPDU length of 11,545 is available in Cluase 8.2.3 and Clause 9.11.

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| 4512 | 8.65 | 4.3.10a | This line conflicts directly with line 17 above. Line 17 says a VHT STA is an HT STA, but line 65 says it does not support RIFS, which HT STAs can do. | Is a VHT STA that is operating as an HT STA not allowed to support RIFS in its HD transmission / receipt? Or is a VHT STA that currently operating as an HT STA currently not a VHT STA. Specify when a VHT STA stops operating as a VHT STA. |

Proposed resolution:

Assign to Robert

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| 4638 | 8.13 | 4.3.10a | The text "The IEEE 802.11 VHT STA operates in frequency bands below 6 GHz excluding the 2.4 GHz operation." is unclear whether 802.11y i.e. 3.650-3.7GHz US band is supported or not. Especially when there is only 50Mhz available and TX powers are different. Same question applicable for .11p band on 5.85-5.925GHz | Clarify the applicability of these bands. |

Proposed Resolution: Reject.

The sentence is copied from the VHT in < 6 GHz PAR. In reply to the commenter, while the current specs describe operation in only 5 GHz bands, there is no fundamental reason why some later amendment should not change this. 3.65 and 5.9 GHz already have 20 MHz operating classes defined so VHT operation here is not disallowed.

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| 4678 | 8.51 | 4.3.10a | Support for MBSS is missing here. | Add "A subset of the VHT features is available for use between two VHT STAs that aremembers of the same MBSS." after the sentence "A subset of the VHT features is available for use between two VHT STAs that aremembers of the same IBSS." |

Proposed Resolution: Revised. Add “Similarly,

a subset of the VHT features is available for use between two VHT STAs that have established mesh peering.”

The MBSS support was overlooked. There is no problem adding the revised ststement. It is copied for Clause 4.3.10 for HT Stations.

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| 4782 | 8.00 | 4.3.10a | Shouldn't optional support for requesting BW indication using RTS be included? | Add "Optional support for requesting BW indication using RTS" as a MAC feature |

Proposed Resolution: Reject Clause 4.3.10a highlights the main features,. It is not meant to be an exhaustive list of all the features.

The current text mentions the mandatory response to RTS BW indication, but mention nothing about the capability itself and what triggers the response.

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| 4924 | 8.13 | 4.3.10a | "excluding 2.4 GHz" not clearly defined; which other bands in addition to 5 GHz? E.g. ISM band around 868 MHz in Europe has not sufficient bandwidth for 11ac operation. | Specify more clearly in which bands 11ac can operate (3.5 GHz in US, 5 GHz) and which bands excluded (sub1G, TV Whitespace?,..) |

Resolution: Reject. See the resolution to CID 4638.

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| 4925 | 8.56 | 4.3.10a | it is noted that AP can create 4 A-MPDU for MU operation. Creation of 8 A-MPDU required to support 8 users in MU operation mode? | Check number of A-MPDU required to support 8 users in MU operation mode |

 Proposed Resolution: Reject

Clause 22.1.1 states that an MU transmission supports up to four users.

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| 4931 | 8.50 | 4.3.10a | There is not description about the available features to VHT STAs that are members of the same MBSS. | Add following sentence at the last of this paragraph."A subset of the VHT features is also available for use between VHT STAs that are members of same MBSS." |

Proposed Resolution: Revised. Add “Similarly,

a subset of the VHT features is available for use between two VHT STAs that have established mesh peering.”

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| 4932 | 8.55 | 4.3.10a | This paragraph states only a VHT AP can support MU-MIMO, but a mesh STA can support MU-MIMO. | Replace the word "AP" to "AP and mesh STA" , and replace the word "VHT BSS" to "VHT BSS and VHT MBSS" in this paragraph (line 55 to 61 of page 8). |

Proposed Resolution: Reject.

Downlink MU-MIMO is supported by VHT AP. A Mesh STA is not an AP and cannot perform functions such as group ID management, sounding, etc that are required for Mu-MIMO operation.

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| 4975 | 8.55 | 4.3.10a | Need to explicitly indicate that support for MU MIMO is an optional feature and is the downlink direction only. | ad a sentence to indicate downlink MU-MIMO is supported as an optional feature. |

Proposed Resolution: Accept. Change “the use of MU-MIMO” to “the optional use of downlink MU-MIMO”.

Deferred.

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| 5026 | 8.65 | 4.3.10a | "The use of certain HT features, such as RIFS, is not permitted for STAs operating as VHT STAs." This sentence does not include the other features such as L-SIG TXOP protection that are not supported by VHT STA | Mention L-SIG TXOP protection also as one of the features that is not supported by VHT STA |

Proposed Resolution: Reject.

L-SIG TXOP protection is an optional feature in IEEE 802.11n. A VHT STA configured as an HT STA may or may not support L-SIG TXOP protection.

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| 5055 | 8.26 | 4.3.10a | Beamforming sounding and beamforming feedback are separate features | Split the fourth bullet in two bullets:- optional support for VHT transmit beamforming sounding- optional support for VHT compressed beamforming feedback |

Proposed Resolution: Revised. Replace the fourth bullet with

Optional support for VHT sounding protocol to support beamforming

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| 5334 | 8.00 | 4.3.10a | "A VHT STA is an HT STA that, in addition to features supported as an HT STA, supports VHT features identifiedin Clause 8, Clause 9, Clause 10 and Clause 22."Clause 18 should be included here since one of the VHT feature is defined in Clause 18. |  |

Proposed Resolution: Accept. Add clause 18.

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| 5401 | 8.18 | 4.3.10a | Clauses 8, 9, 10, and 22 are referred as VHT features; however, BW signaling, which is one of the VHT feature, is defined Clause 18 and should be referred to. | As in comment. |

Proposed Resolution: Accept. See the resolution for CID 4782.

The IEEE 802.11 VHT STA operates in frequency bands below 6 GHz excluding 2.4 GHz operation.

A VHT STA is an HT STA that, in addition to features supported as an HT STA, supports VHT features identified in Clause 8, Clause 9, Clause 10, Clause 18, and Clause 22. The main PHY features in a VHT STA that are not present in an HT STA are summarized as follows:

— mandatory support for 40 MHz and 80 MHz channel widths

— mandatory support for VHT format PPDUs

— optional support for 160 MHz and 80+80 MHz channel widths

— optional support for VHT sounding protocol to support beamforming

* optional support for MU PPDUs
* optional support for VHT MCSs 8 and 9

The main MAC features in a VHT STA that are not present in an HT STA are summarized as follows:

— mandatory support for the A-MPDU padding of VHT PPDU

— mandatory support for VHT single MPDU

— mandatory support for responding to BW indication in RTS

— optional support for MPDUs of up to 11 454 octets

— optional support for A-MPDUs pre-EOF padding of up to 1 048 575 octets

— optional support for VHT link adaptation

These VHT features, among other benefits, increase the maximum throughput achievable between two VHT STAs over that achievable using HT features alone. The VHT features are available to VHT STAs associated with a VHT AP in a BSS. A subset of the VHT features is available for use between two VHT STAs that are members of the same IBSS. A subset of the VHT features is available for use between two VHT STAs that have established mesh peering.

The support for VHT transmit beamforming sounding and MU PPDUs in a VHT AP and more than one VHT

STA on a VHT BSS enables the optional use of downlink MU-MIMO. With downlink MU-MIMO, the AP can create up to 4 A-MPDUs each carrying MPDUs destined for an associated MU capable STA. The AP uses Group Identifiers to signal potential receipent STAs. Group Id values in the range from 1 to 62 indicate a downlink MU-MIMO transmission. The AP transmits the A-MPDUs simultaneously in separate space-time streams such that each recipient STA is able to demodulate the space-time streams carrying its A-MPDU. The simultaneous transmission of A-MPDUs in a single MU PPDU provides a means to increases aggregate throughput over that which would be achieved by sending the A-MPDUs in separate SU PPDUs.

The use of certain HT features, such as RIFS, is not permitted for STAs operating as VHT STAs.

**References:**