IEEE P802.11
Wireless LANs

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| Proposed Resolutions to LB 178 Miscellaneous Comments |
| Date: 2011-10-12 |
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Abstract

This submission contains proposed resolutions to MAC comments, CIDs 2180, 2558, 2789, 3134, 2571, 3350, 3075, 3365, 3582, 3586, 3721, and MU comment, CID 2118.

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| **CID** | **Clause** | **Page #** | **Comment** | **Proposed Changes** | **Proposed Resolution** |
| 2180 | 4 | 5.65 | There are no changes to clause 4 describing the new VHT features | Include them. | Accept |
| 2558 | 4 | 5.01 | There is no description at all of VHT in the General Description. | Write a general description of VHT for Clause 4. At least include a VHT-descriptive subclause after 11mb 4.10. | Accept |
| 2789 | 4.3 | 5.01 | general description on VHT STA is missiong | Add general description on VHT STA to "4.3 Componenets of the IEEE 802.11 architecture" | Accept |
| 3134 | 4 | 5.01 | should we add something in Clause 4 "General Description"? | add something in Clause 4 describing 11ac | Accept |

Proposed Resolution:

Insert the new subsection below at the end of Clause 4.3.

**4.3.ac Very High Throughput (VHT) Station (STA)**

The IEEE 802.11 VHT STA provides physical layer (PHY) and medium access control (MAC) features that can support an aggregate (multi-station) throughput of at least 1 Gb/s as measured at the MAC data service access point (SAP). A VHT STA supports VHT features as identified in Clause 9 (MAC sublayer functional description) and Clause 22 (Very High Throughput (VHT) PHY specification (11ac)). A VHT STA operates exclusively in the 5 GHz band and supports transmission and reception of frames that are compliant with mandatory PHY specifications as defined in Clause 18 (Orthogonal frequency division multiplexing (OFDM) PHY specification (11y)) and in Clause 20 (High Throughput (HT) PHY Specification (11n)). A VHT STA is also a quality of service (QoS) STA. The VHT features are available to VHT STAs associated with a VHT access point (AP) in an infrastructure basic service set (BSS). A subset of the VHT features is available for use between two VHT STAs that are members of the same independent basic service set (IBSS). Similarly, a subset of the VHT features is available for use between two VHT STAs that have established mesh peering (need a reference clause) (11s).

A VHT STA has PHY features consisting of the modulation and coding scheme (MCS) set described in 22.5 (Parameters for VHT MCS) and physical layer convergence procedure (PLCP) protocol data unit (PPDU) formats described in 22.2.2 (VHT PPDU formats). Some PHY features that distinguish a VHT STA from an HT STA are referred to as downlink multi-user multiple input, multiple output (DL MU-MIMO) operation and support for wider than 40 MHz channel bandwidths. The allowed PPDU formats are non-HT format, HT-mixed format, and VHT format~~. The PPDUs shall be transmitted with 20 MHz, 40 MHz, or 80 MHz bandwidth. The PPDUs may be transmitted with 160 MHz or segmented 80+80 MHz bandwidth~~. Transmission of 20 MHz, 40 MHz, and 80 MHz PPDUs is mandatory. Transmission of PPDUs is optional with 160 MHz contiguous channels and 80+80 non-contiguous channels.

A VHT STA has MAC features that include A-MPDU EOF padding, VHT Single MPDU format, Multi-Rate support, TXOP sharing, and TXOP Power Save.

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| **CID** | **Clause** | **Page #** | **Comment** | **Proposed Changes** | **Proposed Resolution** |
| 2571 | 9.3.2.4.2 | 70.64 | While it is true that every clause in the draft is subject to removal in a future revision, the statement about RIFS "This clause is obsolete and is subject to removal in a future revision." is premature by a decade or so. RIFS has to be supported whenever VHT stations drop back to HT mode -- and there will be just a few billion HT STAs around for the next decade.  | Delete the sentence "This clause is obsolete and is subject to removal in a future revision."  | Revised. Refer to the resolution of CIDs 2010 and 2011 in 11-11-1127r2 |
| 3356 | 9.3.2.4.2 | 70.64 | Is it intended to deprecate RIFS even for non-VHT HT STAs (10.25.1 suggests not)?. | If not, delete the first sentence | Revised. Refer to the resolution of CIDs 2010 and 2011 in 11-11-1127r2 |

***From 11-11-1127r2:***

Insert the following at the start of 9.3.2.4.2:

“RIFS in the OBand is an obsolete mechanism that is subject to removal in a future revision of this standard.”

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| **CID** | **Clause** | **Page #** | **Comment** | **Proposed Changes** | **Proposed Resolution** |
| 3075 | 8.4.2.32 | 48.65 | In 8.4.2.32 TSPEC element. The Mean Data Rate allows to indicate only up to 4.2Gbps; "The Mean Data Rate field is 4 octets long and contains an unsigned integer that specifies the average datarate specified at the MAC\_SAP, in bits per second, for transport of MSDUs or A-MSDUs(11n) belonging to this TS within the bounds of this TSPEC."."The Peak Data Rate field is 4 octets long and contains an unsigned integer that specifies the maximumallowable data rate, in bits per second, for transfer of MSDUs or A-MSDUs(11n) belonging to this TSwithin the bounds of this TSPEC."  | For TSPECs between two VHT STAs, define the Mean Data Rate in multiple of 2bits per second  | Reject. The current range of 4.2 Gbps is sufficient to cover most demanding strea, requirements. |

Discussion:

One needs to distinguish between the application rate and the network rate. While it is true that IEEE 802.11ac amendment defines modes of operation cabable of achieveing network rate up to 7 Gbps, it is also true that today’s applications mean and peak rates are well within the range provided by the TSPEC. For example an uncompressed video stream generates traffic at a rate of 150-250 Mbps, well below the 4.2 Gbps range.

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| **CID** | **Clause** | **Page #** | **Comment** | **Proposed Changes** | **Proposed Resolution** |
| 3365 | 10.22.6.3.1 | 96.46 | So Wide Bandwidth Channel Switch may not be used for switching to 20 MHz or 40 MHz? | Clarify | Reject. 20 MHz is not part of off-channel TDLS. No changes to the handling of the 40 MHz case were made. |

Discussion:

Off-channel TDLS is not applicable to 20 MHz channels. Therefore there is no need to have support for 20 MHz channels included.

The 40 MHz case is covered by the the inclusion of the Operating Class field in the TDLS Channel Switch Request frame. IEEE 802.11ac doesn’t propose a new field or information element for switching to 40 MHz channels.

Wider channel BWs, 80 MHz, 160 MHz, and 80+80 MHz are introduced in the IEEE 802.11ac. Switching to any of these channels is indicated by the newly introduced Wide BW Channel Switch Element.

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| **CID** | **Clause** | **Page #** | **Comment** | **Proposed Changes** | **Proposed Resolution** |
| 3582 | 10.22.1 | 96.12 | "The VHT capable TDLS direct link shall use t"Links are not behavioural entities. | Reword in terms of normative requirements separately at each end of the TDLS link. | Accept |

Proposed Resolution

VHT STAs in TDLS peer relationship 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.

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| **CID** | **Clause** | **Page #** | **Comment** | **Proposed Changes** | **Proposed Resolution** |
| 3586 | 10.22.6.3.5 | 97.22 | "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)."Is there anything in the cited subclauses that would otherwise excuse a TDLS VHT sta from these procedures? I think not. | Turn into an informative note. | Accept |

Proposed Resolution:

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).

Please clarify

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| 3721 | 10.22.6.3.2 | 96.58 | Does the widechannel includes 40MHz as well ? Not consistent with P96L32 "A wideband TDLS off-channel TDLS direct link is a 40 MHz, 80 MHz, 160 MHz or 80+80 MHz off-channelTDLS direct link.". | Please clarify | Accept. |

Proposed Resolution

TDLS peer STAs may transmit 40 MHz, 80 MHz, 160 MHz or 80+80 MHz PPDUs on a 40 MHz, 80 MHz, 160 MHz or 80+80 MHz direct link, respectively. A TDLS peer STA shall not transmit a 20 MHz PPDU in the non-primary channel of its 80 MHz, 160 MHz or 80+80 MHz direct link

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| 2118 |  |  | As the specification of the GroupID is not completely clear, would it be possible to use TPC per STA in a GroupID ? |  | Reject. The GrpID field serves a function different from TPC. |

Discussion:

The Group ID field is defined to support DL MU-MIMO transmissions from the AP to a grup of stations. Its value defines the set of potential receipients of the DL MU-MIMO transmission. It is therefore not appropriate to use per STA TPC in a GroupID.