IEEE P802.11  
Wireless LANs

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| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Inter-band Channel Switch using ECS | | | | | | Date: 2023-07-02 | | | | | | Author(s): | | | | | | Name | Affiliation | Address | Phone | email | | Youhan Kim | Qualcomm Technologies, Inc. |  |  | [youhank@qti.qualcomm.com](mailto:youhank@qti.qualcomm.com) | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |

Abstract

This submission proposes resolutions for the following CIDs from LB273:

4343, 4357, 4268, 4203

NOTE – Set the Track Changes Viewing Option in the MS Word to “All Markup” to clearly see the proposed text edits.

**Revision History:**

R0: Initial version.

R1: Added CIDs 4357, 4203

# CID 4343, 4357

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| **CID**  **Clause**  **Page.Line** | **Comment** | **Proposed Change** |
| 4343  3.2  (No page/line identified) | CID 1948 on HE/HT/duplicate PPDU wasn't incorporated correctly | Incorporate the following:  REVISED (GEN: 2022-06-15 14:29:50Z) Add the following definition in Clause 3.2:  non-high-efficiency (non-HE) physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted by a Clause 15 (DSSS PHY specification for the 2.4 GHz band designated for ISM applications), Clause 16 (High rate direct sequence spread spectrum (HR/DSSS) PHY specification), Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification), or Clause 18 (Extended Rate PHY (ERP) specification) PHY, or not using a TXVECTOR FORMAT parameter equal to HE.  And change non-high-thought (non-HT) physical layer (PHY) protocol data unit (PPDU): non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted by a Clause 15 (DSSS PHY specification for the 2.4 GHz band designated for ISM applications), Clause 16 (High rate direct sequence spread spectrum (HR/DSSS) PHY specification), Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification), or Clause 18 (Extended Rate PHY (ERP) specification) PHY, or not using a TXVECTOR FORMAT parameter equal to HT\_MF, HT\_GF, VHT. or HE |
| 4357  3.2  (No page/line identified) | Incorporation of the CID 1948 resolution into D2.0 wasn't done correctly:  REVISED (GEN: 2022-06-15 14:29:50Z) Add the following definition in Clause 3.2:  non-high-efficiency (non-HE) physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted by a Clause 15 (DSSS PHY specification for the 2.4 GHz band designated for ISM applications), Clause 16 (High rate direct sequence spread spectrum (HR/DSSS) PHY specification), Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification), or Clause 18 (Extended Rate PHY (ERP) specification) PHY, or not using a TXVECTOR FORMAT parameter equal to HE.  And change non-high-thought (non-HT) physical layer (PHY) protocol data unit (PPDU): non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted by a Clause 15 (DSSS PHY specification for the 2.4 GHz band designated for ISM applications), Clause 16 (High rate direct sequence spread spectrum (HR/DSSS) PHY specification), Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification), or Clause 18 (Extended Rate PHY (ERP) specification) PHY, or not using a TXVECTOR FORMAT parameter equal to HT\_MF, HT\_GF, VHT. or HE | Implement the CID 1948 resolution as directed |

## Discussion

Following was the original related text in REVme 1.0. (Note that there was no definition of non-HE PPDU in REVme D1.0.)

REVme D1.0 P230

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| **non-high-throughput (non-HT) duplicate physical layer (PHY) protocol data unit (PPDU):** A PPDU transmitted by a Clause 19 or Clause 21 PHY with the TXVECTOR FORMAT parameter equal to NON\_HT and the CH\_BANDWIDTH parameter equal to NON\_HT\_CBW40, CBW40, CBW80, CBW160, or CBW80+80.  **…**  **non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU):** A PPDU that is transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HT\_MF, HT\_GF or VHT. |

As the commenter has pointed out, CID 1948 (LB258) had the following resolution.

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| "REVISED (GEN: 2022-06-15 14:29:50Z) Add the following definition in Clause 3.2:  non-high-efficiency (non-HE) physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted by a Clause 15 (DSSS PHY specification for the 2.4 GHz band designated for ISM applications), Clause 16 (High rate direct sequence spread spectrum (HR/DSSS) PHY specification), Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification), or Clause 18 (Extended Rate PHY (ERP) specification) PHY, or not using a TXVECTOR FORMAT parameter equal to HE.  And change non-high-thought (non-HT) physical layer (PHY) protocol data unit (PPDU): non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted by a Clause 15 (DSSS PHY specification for the 2.4 GHz band designated for ISM applications), Clause 16 (High rate direct sequence spread spectrum (HR/DSSS) PHY specification), Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification), or Clause 18 (Extended Rate PHY (ERP) specification) PHY, or not using a TXVECTOR FORMAT parameter equal to HT\_MF, HT\_GF, VHT. or HE" |

Resolution for CID 1948 (LB258) instructed for the following change.

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| **non-high-efficiency (non-HE) physical layer (PHY) protocol data unit (PPDU):** A PPDU that is transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HE.  **non-high-throughput (non-HT) duplicate physical layer (PHY) protocol data unit (PPDU):** A PPDU transmitted by a Clause 19 or Clause 21 PHY with the TXVECTOR FORMAT parameter equal to NON\_HT and the CH\_BANDWIDTH parameter equal to NON\_HT\_CBW40, CBW40, CBW80, CBW160, or CBW80+80.  **…**  **non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU):** A PPDU that is transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HT\_MF, HT\_GF or VHT or HE. |

Unfortunately, the resolution did not clearly indicate the page and line number of the change, hence the REVme editors updated the definition for “non-HT **duplicate** PPDU” instead of “non-HT PPDU”.

Hence, D2.0 became (P221):

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| **non-high-efficiency (non-HE) physical layer (PHY) protocol data unit (PPDU):** A PPDU that is transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HE.  **…**  **non-high-throughput (non-HT) duplicate physical layer (PHY) protocol data unit (PPDU):** A PPDU transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HT\_MF, HT\_GF or VHT or HE.  **…**  **non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU):** A PPDU that is transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HT\_MF, HT\_GF or VHT. |

Then, CID 3330 (LB270) further updated the text to (implemented correctly by the editors):

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| **non-high-efficiency (non-HE) physical layer (PHY) protocol data unit (PPDU):** [non-HE PPDU] A PPDU that is transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HE.  **…**  **non-high-throughput (non-HT) duplicate physical layer (PHY) protocol data unit (PPDU):** [non-HT duplicate PPDU] A PPDU transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HT\_MF, HT\_GF or VHT or HE.  **…**  **non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU):** [non-HT PPDU] A PPDU that is transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY. |

So, the final status is:

* Non-HE PPDU definition is as instructed by the resolution of CID 1948
  + However, the definition is errorneous. For example, a WUR, S1G or DMG PPDU does not use the “TXVECTOR FORMAT parameter equalt to HE”, hence is a non-HE PPDU by the current definition, which is not technically accurate.
  + However, ‘fixing’ the non-HE PPDU definition is outside the scope of CID 4343 – remember that CID 4343 is stating that CDI 1948 was not implemented correct. But CID 1948 was implemented correctly for the non-HE PPDU. It’s just that the resolution for CID 1948 itself was errorneous.
  + Fortunately, there is another CID (CID 4268) which is asking to update the non-HE PPDU definition, so let’s deal with it in that CID.
* Non-HT duplicate PPDU definition should not have been updated, but was updated errorneously (confusion by editors when implementing CID 1948)
  + This needs to be fixed.
* Non-HT PPDU definition is as instructed by the resolution of CID 3330. This comment we are resolving now (CID 4343) is pointing out that the non-HT PPDU definition does not match the resolution of CID 1948 (LB258), but CID 3330 ovewrote that anyway.
  + Current definition (per CID 3330) is appropriate and adequate; hence no further change is recommended.

## Proposed Resolution: CID 4343, 4357

**REVISED**

**Instruction to TGme Editor:**

Implement the proposed text updates for CIDs 4343 and 4357 in [https://mentor.ieee.org/802.11/dcn/23/11-23-1127-01-000m-lb273- misc-cids.docx](https://mentor.ieee.org/802.11/dcn/23/11-23-1127-01-000m-lb273-%20misc-cids.docx)

Note that CIDs 4343 and 4357 have the same resolution and text updates.

**Note to Commenter:**

The proposed text update fixes the definition for non-HT duplicate PPDU. Definition for non-HT PPDU has been superceded by CID 3330 (LB270), hence requires no further change.

## Proposed Text Update: CID 4343, 4357

*Instruction to TGme Editor: Update REVme D3.0 P220L31 as shown below.*

**non-high-efficiency (non-HE) physical layer (PHY) protocol data unit (PPDU):** [non-HE PPDU] A PPDU that is transmitted using PPDU formats defined in Clause 15, Clause 16, Clause 17, Clause 18, Clause 19, or Clause 21.

*Instruction to TGme Editor: Update REVme D3.0 P221L21 as shown below.*

**non-high-throughput (non-HT) duplicate physical layer (PHY) protocol data unit (PPDU):** [non-HT duplicate PPDU] A PPDU transmitted with the TXVECTOR FORMAT parameter equal to NON\_HT and the NON\_HT\_MODULATION parameter equal to NON\_HT\_DUP\_OFDM.

**non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU):** [non-HT PPDU] A PPDU that is transmitted using PPDU formats defined in Clause 15, Clause 16, Clause 17 or Clause 18.

# CID 4268

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| **CID**  **Clause**  **Page.Line** | **Comment** | **Proposed Change** |
| 4268  3.2  (No page/line identified) | We redefined non-HT PPDU to be in terms of PPDU formats defined by specific clauses -- also need to do this for non-HE PPDU etc. | As it says in the comment [confirm direction] |

## Discussion

See the discussion for CID 4343.

Furthermore, I have reviewed REVme D3.0 P220-221 and did not find any other locations to make definition changes other than the non-HE PPDU.

## Proposed Resolution: CID 4268

**REVISED**

**Instruction to TGme Editor:**

Implement the proposed text updates for CID 4268 in [https://mentor.ieee.org/802.11/dcn/23/11-23-1127-01-000m-lb273- misc-cids.docx](https://mentor.ieee.org/802.11/dcn/23/11-23-1127-01-000m-lb273-%20misc-cids.docx)

**Note to Commenter:**

The proposed text update changes the definition for non-HE PPDU in the direction suggested by the commenter.

## Proposed Text Update: CID 4268

*Instruction to TGme Editor: Update REVme D3.0 P220L31 as shown below.*

**non-high-efficiency (non-HE) physical layer (PHY) protocol data unit (PPDU):** [non-HE PPDU] A PPDU that is transmitted using PPDU formats defined in Clause 15, Clause 16, Clause 17, Clause 18, Clause 19, or Clause 21.

# CID 4203

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| **CID**  **Clause**  **Page.Line** | **Comment** | **Proposed Change** |
| 4203  O.5.1  5727.36 | "An HT AP that has dot11FortyMHzOperationActivated equal to true sets its STA Channel Width field of the HT Operation element to a nonzero value. This field signals the current operating mode of the AP, not the BSS. An HT AP might operate a 20/40 MHz BSS while it is operating as a 20 MHz device. " -- this is confusing, because HT Operation is about the BSS not the STA (HT Capabilities is about the STA) | Confirm whether STA Channel Width is really about the transmitting STA not about the BSS, and if it is put a NOTE to that effect, which also describes how the BSS width is signalled [needs discussion] |

## Discussion

Comment is on the last paragraph of Annex O.5.1 (the paragraph highlighted by yellow below.)

REVme D3.0 P5727L36:

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| **O.5 20/40 MHz BSS establishment and maintenance**  **O.5.1 Signaling 20/40 MHz BSS capability and operation**  A BSS that occupies 40 MHz of bandwidth and that is administered by an HT AP is called a *20/40 MHz BSS*.  An HT AP that has dot11FortyMHzOperationImplemented equal to true sets the Supported Channel Width Set subfield of the HT Capabilities element to a nonzero value. The AP might also operate a 20/40 MHz BSS. The Supported Channel Width Set subfield of the HT Capabilities element that is transmitted by the AP indicates the possible operating mode of the BSS and of the AP, but the value in this field is not an indication of the current BSS bandwidth of either the AP or the BSS.  An HT AP signals the operating width of the BSS through the Secondary Channel offset field of the HT Operation element. A nonzero value in this field indicates that a secondary channel exists; in other words, the BSS is a 20/40 MHz BSS. A value of 0 in this field indicates that the BSS is operating as a 20 MHz BSS.  An HT AP that has dot11FortyMHzOperationActivated equal to true sets its STA Channel Width field of the HT Operation element to a nonzero value. This field signals the current operating mode of the AP, not the BSS. An HT AP might operate a 20/40 MHz BSS while it is operating as a 20 MHz device. |

Definition and normative text for dot11FortyMHzOperationActivated and “STA Channel Width” field are shown in the following three locations in REVme D3.0.

REVme D3.0 P5320L48:

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| Dot11FortyMHzOperationActivated OBJECT-TYPE  SYNTAX TruthValue  MAX-ACCESS read-write  STATUS current  DESCRIPTION  "This is a control variable.  It is written by an external management entity.  Changes take effect as soon as practical in the implementation.  This attribute, when true, indicates that the 40 MHz operation is enabled.  false or not present in a 20 MHz-only non-AP HE STA that is an HT STA.  true in a VHT STA that is not a 20 MHz-only non-AP HE STA."  DEFVAL { false }  ::= { dot11PhyHTEntry 2 } |

REVme D3.0 P1058:

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REVme D3.0 P2539L52:

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| An HT AP shall set the STA Channel Width field to 1 in frames in which it has set the Secondary Channel Offset field to SCA or SCB. An HT AP shall set the STA Channel Width field to 0 in frames in which it has set the Secondary Channel Offset field to SCN. |

Based on these, I agree with the commenter that the last paragraph of Annex O.5.1 is erroneous. If an HT BSS is operating in 40 MHz bandwidth mode, then it must set the STA Channel Width field to 1.

Searching through the history, Annex O.5.1 was first introduced in IEEE 802.11-2012 (P2664), where there was an additional sentence (see yellow below) which explained that the green scenario occurs for DLS.

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| An HT AP that has dot11FortyMHzOperationActivated equal to true sets its STA Channel Width field of the HT Operation element to a nonzero value. This field signals the current operating mode of the AP, not the BSS. An HT AP may operate a 20/40 MHz BSS while it is operating as a 20 MHz device. Such a situation would support, for example, 40 MHz bandwidth DLS traffic among associated STAs, but only 20 MHz bandwidth traffic between STAs and the AP. |

The above yellow sentence was removed in REVmd D1.0 by CID 59 of CC25 (<https://mentor.ieee.org/802.11/dcn/17/11-17-1518-03-000m-resolution-cids-59-62-remove-dls-stsl.docx>, <https://mentor.ieee.org/802.11/dcn/17/11-17-0914-13-000m-revmd-wg-cc-comments.xls>) which removed DLS from IEEE 802.11. The green sentences should also have been removed together with the DLS removal.

## Proposed Resolution: CID 4203

**REVISED**

**Instruction to TGme Editor:**

Implement the proposed text updates for CID 4203 in [https://mentor.ieee.org/802.11/dcn/23/11-23-1127-01-000m-lb273- misc-cids.docx](https://mentor.ieee.org/802.11/dcn/23/11-23-1127-01-000m-lb273-%20misc-cids.docx)

**Note to Commenter:**

The proposed text update removes the confusing sentences which should have been deleted as part of the DLS removal in REVmd (CID 59 of CC25).

## Proposed Text Update: CID 4203

*Instruction to TGme Editor: Update REVme D3.0 P5727L39 as shown below.*

An HT AP that has dot11FortyMHzOperationActivated equal to true sets its STA Channel Width field of the HT Operation element to 1.

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