IEEE P802.11
Wireless LANs

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| Proposed Changes to D2.2 Clause 28.3.20, 28.3.21 |
| Date: 2018-03-01 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Xiaogang Chen | Intel | 2111 NE 25th Ave, Hillsboro, OR, 97124 |  | Xiaogang.c.chen@Intel.com |

Abstract

This submission proposes resolutions for comments of TGax **Draft 2.2** with the following CIDs:

CID 11392, 11393, 11394, 11395, 11396, 11397, 11398, 11443, 11717, 12562, 12563, 12603, 12800, 12877, 13018, 13019, 13380, 13381, 13501, 14089, 14046, 13349

Revisions:

* Rev 0: Initial version of the document.

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 TGax Draft. This introduction is not part of the adopted material.

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

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

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| --- | --- | --- | --- | --- | --- | --- |
| CID | Commenter | Page | Clause | Comment | Proposed Change | Resolution |
| 11392 | Bin Tian | 508.07 | 28.3.21 | "The PHY has also been configured with BSS identification information and STA identification information (i.e., BSS Color value and STA ID in the cell) so that it can receive data intended for the STA in the specific cell.". Change the "cell" to "BSS" | as in the comment | Revised-As suggested.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 11392. |
| 11393 | Bin Tian | 511.12 | 28.3.21 | "Detect SIG for non-HT, HT, and VHT" after BPSK detection of the 1st symbol after L-SIG is incorrect. HT shouldn't apprear in this branch since its 1st symbol after L-SIG is QBPSK modulated | as in the comment | Rejected-Determine BPSK or not is after L-LTF not L-SIG as in the figure.  |
| 11394 | Bin Tian | 511.62 | 28.3.21 | "as an initial indication of receptionof a signal as specified in 21.3.18.5 (CCA sensitivity).". Change the reference to clause 28 | as in the comment | Revised-As suggested.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 11394. |
| 11395 | Bin Tian | 512.09 | 28.3.21 | "The PHY includes the measured RSSI and RSSI\_LEGACY value ..". In the previous text and figures 28-56 to 58 doesn't differentiate the RSSI and RSSI\_Legacy. May want to change those figures and add some texts to clarify the measuremnt of two RSSIs. | as in the comment | Revised-Modify figure 28-55 to figure 28-58 to differentiate two RSSI types.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 11395. |
| 11396 | Bin Tian | 512.59 | 28.3.21 | "or any other VHT-SIG-A field bit combinationsthat do not correspond to modes of PHY operation defined in Clause 28". Should be HE-SIG-A instead of VHT-SIG\_A | as in the comment | Revised-As suggested.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 11396. |
| 11397 | Bin Tian | 513.28 | 28.3.21 | "or any other VHT-SIG-A field bit combinationsthat do not correspond to modes of PHY operation defined in Clause 28". Should be HE-SIG-A instead of VHT-SIG\_A | as in the comment | Revised-As suggested.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 11397. |
| 11398 | Bin Tian | 514.02 | 28.3.21 | "or any other VHT-SIG-A field bit combinationsthat do not correspond to modes of PHY operation defined in Clause 28". Should be HE-SIG-A instead of VHT-SIG\_A | as in the comment | Revised-As suggested.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 11398. |
| 11443 | Bo Sun | 502.58 | 28.3.20 | In case of transmitting a triger frame and receiving HE TB PPDU, the spec should specify the procecess that MAC indicates the receiving parameter to PHY for receiving the HE TB PPDU. | In section 28.3.20 or section 28.3.21, adding description for the process as in comment | Revised-TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 11443. |
| 11717 | Evgeny Khorov | 511.37 | 28.3.21 | The current PHY receive state machine forbids looking for the new preamble while receiving a frame. This can decrease performance in dense networks, since having started reception of a weak frame a STA cannot switch to a stronger frame which comes later and overlaps the weaker frame. | Correct figure 28-59 to allow parallel reception | Rejected-The state machine focuses on the flow of PPDU reception. Parrelell processing is implementation issue. It doesn’t prohibit parallel processing of new preamble. |
| 12562 | Lochan Verma | 509.40 | 28.3.20 | RSSI is also measured over HE Training Symbols and indicated by PHY to MAC. It is not shown in Fig.28-57. (Please refer to Fig. 28-56, second 'measure rssi' arrow) | As in comment | Revised-Sloved in 11395 |
| 12563 | Lochan Verma | 510.10 | 28.3.20 | RSSI is also measured over HE Training Symbols and indicated by PHY to MAC. It is not shown in Fig.28-58. (Please refer to Fig. 28-56, second 'measure rssi' arrow) | As in comment | Revised-Sloved in 11395 |
| 12603 | Mark RISON | 503.01 | 28.3.20 | It says "HT\_TRIG" | Change to "HE\_TB" (not HE\_TRIG; see other comment) | Revised-As suggested.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 12603. |
| 12800 | Mark RISON | 506.40 | 28.3.20 | "When a packet extension and/or a signal extension present, the PHY-TXEND.confirmprimitive is generated at the end of the packet extension or signal extension." -- this is not an implementation choice | Change the para at the referenced location to "A packet extension and/or a signal extension may be present in the PPDU. The PHY-TXEND.confirm primitive is generated at the latest of the end of the last symbol of the PPDU, the packet extension if present and the signal extension if present." | Rejected-Read like the same thing expressed in different ways. |
| 12877 | Mark RISON | 514.17 | 28.3.21 | "THE\_PREAMBLE, NSYM, TPE and NMA are defined in Equation (28-114), Equation (28-115) andEquation (28-116), respectively." -- 4 parameters but only 3 equations, so "respectively" doesn't work | Number the T\_HE\_PREAMBLE equation and add it to the start of the list of equations cited | Revised-The issue has been resolved in 11-18/0057r1 by adding a new equation. The new equation index is added accordingly.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 12877. |
| 13018 | Massinissa Lalam | 505.33 | 28.3.20 | For an non-HT transmission, shouldn't the Clause 18 be also supported in the 2.4 GHz band and not only Clause 17 which is defined for 5 GHz only? | Add support of Clause 18 (leading to six options instead of five) in subclause 28.3.20. | Revised-As suggested.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 13018. |
| 13019 | Massinissa Lalam | 507.55 | 28.3.21 | For an non-HT reception, shouldn't the Clause 18 be also supported in the 2.4 GHz band and not only Clause 17 which is defined for 5 GHz only? | Add support of Clause 18 in subclause 28.3.21. | Revised-As suggested.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 13019. |
| 13380 | ron porat | 507.00 | 28.3.20 | HE\_EXT\_SU should be HE\_ER\_SU | Change abbreviation for Extended Range PPDU as indicated in comment. | Rejected-HE\_EXT\_SU is used in format indication. |
| 13381 | ron porat | 511.00 | 28.3.21 | 28.3.21 HE receive procedure, Figure, 28-59 PHY receive state machine, under "End of Wait". Please fix equation number | Change equation number 28-128 and 28-129 to 28-125 and 28.126 | Revised-As suggestedTGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 13381. |
| 13501 | Sigurd Schelstraete | 514.12 | 28.3.21 | Two definitions of RXTIME are given in 28.3.21 (equations (28-125) and (28-126)). Probably (28-125) should be removed. (28-125) is TXTIME and uses variables like N\_SYM, ... that re not a priori known at the receiver. They have to be derived from RXTIME. | Delete lines 12-24 | Rejected-Equation 28-126 is for HE TB PPDU to derive the Tx time and 28-125 is for other HE PPDU type |
| 14089 | Youhan Kim | 512.21 | 28.3.21 | Is there an "MCS0" in non-HT? | Change "MCS0" to "6 Mbps" on lines 21 and 22. | Revised-As suggestedTGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 14089. |
| 14046 | Youhan Kim | 28.2.6.3 | 354.60 | The additional requirements on HT format (coming from VHT) should be applicable only for 5 GHz operation. | Add "when operating in the 5 GHz band" at the end of P354L60 and 62. | Revised.The reference is only to the related module regardless of operating band. We have many such reference in 11ax.TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 14046. |
| 13349 | ron porat | 28.3.5 | 374.00 | Duplication over multiple 20MHz is subject to conditions when using preamble puncturing (HE MU PPDU).HE TB PPDU has a separate figure (28-15) for having distinct duplication requirements, so it would be logical to add a separate figure for HE MU PPDU with preamble puncturing. | Add a note to fig 28-13 for duplication when preamble puncturing in HE MU PPDU or add separate fig for HE MU PPDU with preamble puncturing.. | Revised – TGax editor to make the changes shown in 11-18/0463r0 under all headings that include CID 13349. |

**Propose:** Revised for CID 11392, CID 11394, CID 11396, CID 11397, CID 11398, CID 11395, CID 12603, CID 12877, CID 13381, CID 14089 per editing instructions in 11-18/0463r0.

*To the TGax Editor: modify P.L. 533.07 as following (CID 11392).*

The PHY has also been configured with BSS identification information and STA identification information (i.e., BSS
Color value and STA ID in the ~~cell~~ BSS) so that it can receive data intended for the STA in the specific ~~cell~~ BSS.

*To the TGax Editor: modify P.L. 536.62 as following (CID 11394).*

A PHY-CCA.indication(BUSY, channel-list) primitive is also issued as an initial indication of reception of a signal as specified in ~~21.3.18.5~~ 28.3.19.6 (CCA sensitivity).

*To the TGax Editor: modify P.L. 537.59 as following (CID 11396).*

Reserved HE-SIG-A Indication is defined as an HE-SIG-A with Reserved bits equal to 0 or any other ~~VHT-SIG-A~~ HE-SIG-A field bit combinations that do not correspond to modes of PHY operation defined in Clause 28 (High Efficiency (HE) PHY specification).

*To the TGax Editor: modify P.L. 538.28 as following (CID 11397).*

Reserved HE-SIG-A Indication is defined as an HE-SIG-A with Reserved bits equal to 0 or any other ~~VHT-SIG-A~~ HE-SIG-A field bit combinations that do not correspond to modes of PHY operation defined in Clause 28 (High Efficiency (HE) PHY specification).

*To the TGax Editor: modify P.L. 539.02 as following (CID 11398).*

Reserved HE-SIG-A Indication is defined as an HE-SIG-A with Reserved bits equal to 0 or any other ~~VHT-SIG-A~~ HE-SIG-A field bit combinations that do not correspond to modes of PHY operation defined in Clause 28 (High Efficiency (HE) PHY specification).

*To the TGax Editor: Replace figure 28-56 to figure 28-59 with the following figures respectively (CID 11395).*



**Figure 28-55—PHY receive procedure for an HE SU PPDU**



**Figure 28-56—PHY receive procedure for an HE ER SU PPDU**



**Figure 28-57—PHY receive procedure for an HE MU PPDU**



**Figure 28-58—PHY receive procedure for an HE TB PPDU**

*To the TGax Editor: Modify P.L. 528.01 as following (CID 12603).*

are selected if the FORMAT field of the PHY-TXSTART.request(TXVECTOR) primitive is equal to HE\_SU, HE\_MU, HE\_EXT\_SU, or ~~HT\_TRIG~~ HE\_TRIG, respectively.

*To the TGax Editor: Modify P.L. 539.17 as following. Note that equation (28-115a) should have been reindexed (CID 12877).*

*~~T~~*~~HE\_PREAMBLE~~ *T*HE-PREAMBLE, *NSYM*, *TPE* and *NMA* are defined in Equation (28-119), Equation (28-120), Equation (28-121) and Equation (28-122), respectively, respectively.

*To the TGax Editor: Replace figure 28-59 with the figure below. (CID 13381)*



**Figure 28-59—PHY receive state machine.**

*To the TGax Editor: Modify P.L. 537.21 as following (CID 14089).*

If either the check of the parity bit is invalid or the RATE field is not set to ~~MCS0 in non-HT~~ 6 Mbps, a PHY-RXSTART.indication primitive is not issued. If the check of the parity bit is valid and the RATE field is set to ~~MCS0~~ 6 Mbps but the LENGTH field value in L-SIG is a multiple of 3, a PHY-RXSTART.indication primitive is not issued.

*To the TGax Editor: Modify P.L. 530.33 as following (CID 13018, CID 13019)*

The fifth option is to follow the transmit procedure in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) or Clause 18 (Extended Rate PHY (ERP) specification) if the FORMAT parameter of the PHYTXSTART.request (TXVECTOR) primitive is NON\_HT. In addition, if the FORMAT parameter is NON\_HT and the NON\_HT\_MODULATION parameter is set to OFDM the transmit procedure follows Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification). if the FORMAT parameter ~~of the PHYTXSTART.request (TXVECTOR) primitive~~ is NON\_HT and the NON\_HT\_MODULATION parameter is set to NON\_HT\_DUP\_OFDM the transmit procedure follows Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) except that the signal referred to in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) is instead generated simultaneously on each of the 20 MHz channels that are indicated by the CH\_BANDWIDTH parameter as defined in 28.3.10 (HE preamble) and 28.3.13 (Non-HT duplicate transmission). If the FORMAT field is equal to NON\_HT, CH\_BANDWIDTH indicates NON\_HT\_CBW20, and NON\_HT\_MODULATION indicates other than OFDM, follow the transmit procedure in Clause 18 (Extended Rate PHY (ERP) specification).

*In addition, insert the following in P.L. 532.63 (CID 13018, CID 13019)*

If the detected format indicates a non-HT PPDU, refer to the receive procedure and state machine in Clause 17 (Orthogonal frequency division multiplexing (OFDM) PHY specification) or Clause 18 (Extended Rate PHY (ERP) specification).

*To the TGax Editor: Modify P.L. 505.57 as following (CID 11443)*

Other transmit parameters, such as HE-MCS Coding types and transmit power, are set via the PHY-SAP using the
PHYTXSTART.request(TXVECTOR) primitive, as described in 28.2.2 (TXVECTOR and RXVECTOR parameters). If HE TB PPDU is transmitted, after issuing PHY-TXSTART.request MAC sublayer issues a PHY-TRIGGER.request with TRIGVECTOR parameter which provide the PHY entity with the information needed to demodulate the expected HE TB PPDU. The remainder of the clause applies to the first four options.

*To the TGax Editor: Remove the following note in P.L. 391.41 (CID 13349)*

~~NOTE—For an HE MU PPDU, the duplication on 20MHz channels is subject to the availability of 20 MHz channels in
case of preamble puncturing.~~

*To the TGax Editor: modify P.L. 354.60 as following (CID 14046).*

When a PHY-TXSTART.request(TXVECTOR) primitive is received with the TXVECTOR parameter FORMAT equal to HT\_MF or HT\_GF, the behavior of the PHY is defined by Clause 19 (High Throughput (HT) PHY specification) with additional requirements defined in the following subclauses:

— 21.3.9.2 (Transmission of HT PPDUs with more than four transmit chains)
— ~~21.3.17.1 (Transmit spectrum mask) instead of 19.3.18.1 (Transmit spectrum mask)~~
— 28.3.~~20~~18.3 (Transmit center frequency leakage) instead of 19.3.18.4 (Transmit center frequency tolerance)

*In addition, modify P.L. 353.18 as following (CID 14046)*

When a PHY-TXSTART.request(TXVECTOR) primitive with the FORMAT parameter equal to NON\_HT, the behavior of the HE PHY is defined in 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), Clause 18 (Extended Rate PHY (ERP) specification) PHYs respectively depends on the ~~PPDU format~~ parameter NON\_HT\_MODULATION. If the NON\_HT\_MODULATION is OFDM or NON\_HT\_DUP\_OFDM, there are additional requirements described in the following subclauses:
— 21.3.9.1 (Transmission of 20 MHz NON\_HT PPDUs with more than one transmit chain)
— 21.3.17.1 (Transmit spectrum mask) instead of 17.3.9.3 (Transmit spectrum mask)
— 28.3.~~20~~18.3 (Transmit center frequency leakage) instead of 17.3.9.7.2 (Transmitter center frequency
leakage)