IEEE P802.11  
Wireless LANs

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| Comment Resolutions for 11bd D1.0 Clause 32.2 | | | | |
| Date: 2021-01-01 | | | | |
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Abstract

This submission provisions with resolutions to the following 29 CIDs related to clause 32.2 of IEEE P802.11bd D1.0 in WG LB 251, including suggested spec text modification to IEEE P802.11bd D1.0 to TGbd editor:

* CIDs: 1155, 1173, 1304, 1306, 1432, 1433, 1434, 1548, 1570, 1571, 1572, 1573, 1577, 1629, 1630, 1631, 1632, 1637, 1638, 1640, 1644, 1645, 1784, 1794, 1795, 1796, 1797, 1798, and 1799

Revisions:

* R0, comment resolutions initial draft.
* R1, 7 NGV-MCS CIDs re-assigned to Yujin: CID 1151/1173/1304/1548/1570/1631/1795; CID 1571 needs more discussion.
* R2, remove the redundant resolution to CID 1433 at the beginning of the document.

Interpretation of a Motion to Adopt

A motion or majority supported straw poll to approve this submission means that the editing instructions and any changed or added material are actioned in the TGbd Draft. When the baseline spec draft is an unapproved version, a majority supported straw poll to approve this submission means that the editing instructions and any changed or added material are actioned in the unapproved TGbd Draft. This introduction is not part of the adopted material.

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

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

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| **~~CID~~** | **~~Pg/Ln~~** | **~~Clause~~** | **~~Comment~~** | **~~Proposed Changed~~** | **~~Resolution~~** |
| ~~1433~~ | ~~39.51~~ | ~~32.2.5.3~~ | ~~"This mode allows an NGV STA to repeat one NON\_NGV\_10 PPDU multiple times with time gap of SIFS between every two transmissions. The number of repetition of NON\_NGV\_10 PPDU is decided by upper layer and indicated through radio environment request vector (Clause 5.3.1 (Radio Environment Request Vector) in MAC SAP. The MAC sets the number of repetition, N\_REP, via the PHY service interface using the PHY-TXSTART.request(TXVECTOR) primitive, as described in Table 32-1 (TXVECTOR and RXVECTOR parameters)." 1) upper layers irrelevant. 2) gap between ever 2 transmissions is confusing. 3) grammar~~ | ~~Change to "This mode allows an NGV STA to transmit an NON\_NGV\_10 PPDU multiple times, separated by SIFS. The number of repetitions is indicated in the radio environment request vector (see 5.3.1 (Radio Environment Request Vector). The MAC sets the number of repetitions in the TXVECTOR parameter N\_REP."~~ | **~~Accepted~~**  **~~Discussion:~~**  ~~Nice wording improvement.~~ |

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| **CID** | **Pg/Ln** | **Clause** | **Comment** | **Proposed Changed** | **Resolution** |
| 1794 | 43.46 | 32.2.2 | "Clause 17 PPDU format for 10 MHz channel spacing" is not clear. | NON\_NGV\_10 indicates PPDU format for 10 MHz channel spacing as defined Clause 17 or non-NGV duplicated PPDU format. | **Revised**  **Discussion:**  The addressed context is at ln36/pg43. The comment tries to clarify the definition for “NON\_NGV\_10” as one value of the parameter “FORMAT”. Agree in principle on the comment with small editorial update.  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1794 as in document **11-21/0003r1**. |
| 1629 | 44.11 | 32.2.2 | The function numberOfOctets(...) is not defined. Either define the function or use the same text as in REVmd D5.0 Table 21-1 for the TXPWR\_LEVEL\_INDEX | Replace " numberOfOctets(dot11TxPowerLevelExtended)/2" by "N/2, where N is the number of octets in dot11TxPowerLevelExtended" as in REVmd D5.0 Table 21-1 | **Revised**  **Discussion:**  Agree in principle on the comment. The similar issue has been pointed out and addressed in latest revision of Revmd and it’s suggested to follow the same text used in Revmd.  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1629 as in document **11-21/0003r1**. |
| 1304 | 44.18 | 32.2.2 | There are 11 MCSs from MCS 0 to MCS 10. Integer range of 0 to 9 is not sufficient to cover them. | Replace "0 to 9" with "0 to 10". | **Re-assigned to Yujin** |
| 1630 | 44.29 | 32.2.2 | RSSI "is a monotonically increasing": Unclear with respect to what the RSSI is monotonically increasing. Us the same explanation as in REVmd D5.0 Table 21-1 | Replace "is a monotonically increasing" with "shall be a monotonically increasing function of the received power" as in REVmd D5.0 Table 21-1 | **Accepted**  **Discussion:**  Agree on the comment. The similar issue has been addressed and clarified in latest Revmd revision. |
| 1155 | 44.37 | 32.2.2 | NGV PHY supports MCS 0 to 10 | change "range 0 to 9" to "range 0 to 10" | **Re-assigned to Yujin** |
| 1631 | 44.37 | 32.2.2 | According to Table 31-1 MCS has values 0 to 10, but the MCS parameter in Table 32-1 is only defined in the range 0 to 9 | Replace "range 0 to 9" with "range 0 to 10" | **Re-assigned to Yujin** |
| 1173 | 44.38 | Table 32-1 | Inconsistent MCS - Text states NGV PPDU can take on the MCS values 0-9. As stated in 32.3.15, NGV PPDU can take on the MCS values 0-10, with exceptions. MCS 9 is not allowed for 10MHz channels, and MCS 10 is not allowed for 2 spatial streams, at least according to Table 31-1 | Make MCS values consistent across Nss and bandwitdths in Tables 31-1 and Tables 32-18/19/20/21. | **Re-assigned to Yujin** |
| 1548 | 44.38 | 32.2.2 | According to 32.1.1, NGV supports NGV-MCS 0 to 10. Hence, the Parameter "MCS" in the TX/RXVECTOR should support integers in the range 0 to 10. | Change to range 0 to 10. Otherwise, if not all MCSs 0-10 are supported, indicate which MCSs are not supported and how they are mapped to the integers. | **Re-assigned to Yujin** |
| 1795 | 44.38 | 32.2.2 | NGV-MCS indices suppport up to 10 | "range 0 to 9" should be "range 0 to 10" | **Re-assigned to Yujin** |
| 1570 | 45.24 | 32.2.2 | When MCS10 is in use, NGV\_LTF\_2X\_repeat must be used regardless of this value. Need to add a note to show this rule. | Add "when the NGV-MCS index is not 10" following "NGV\_LTF." Also add a note after two "Set ..." statements to indicate what MGV\_LTF to use when MCS10 is in use. | **Revised**  **Discussion:**  First of all, NGV-MCS is 15 (not 10) to be consistent with rest part of the spec. And when NGV-MCS is 15, repeated NGV-LTF-2x is used regardless of the value of the NGV\_LTF\_TYPE parameter.  However, to make the conception clear, we can add a note to clarify the case of NGV-MCS 15.  Note, when parameter NGV-MCS is 15 in 10 MHz,  Repeated NGV-LTF-2x (see 32.3.8.3.6 (NGV-LTF definition)) is used in the transmitted PPDU. Definition is shown at P69L61  .  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1570 as in document **11-21/0003r1**  **Re-assigned to Yujin** |
| 1796 | 45.26 | 32.2.2 | terms to be consistent in use. NGV\_LTF\_1X is used once through the spec. | NGV\_LTF\_1X shoulc be NGV-LTF-1x | **Accepted** |
| 1797 | 45.28 | 32.2.2 | terms to be consistent in use. NGV\_LTF\_2X is used once through the spec. | NGV\_LTF\_2X shoulc be NGV-LTF-2x | **Accepted** |
| 1632 | 45.35 | 32.2.2 | Note that N\_REP is defined in 11az D2.3 as number of repetitions of HE-LTF symbols. Here N\_REP defines the number of NON\_NGV\_10 PPDU repetitive transmissions. The parameter should be renamed for clarification and to avoid confusion. | Rename all occurences of N\_REP to N\_PPDU\_REP | **Revised**  **Discussion:**  Though the definition of N\_REP could be differentiated by parameter FORMAT, considering 11bd may support some 11az positioning feature, it would be better to rename N\_REP in 11bd to avoid potential confusing when 11az positioning feature is brought into 11bd.  **TGbd Editor:**  Please replace “N\_REP” with “N\_PPDU\_REP” throughout IEEE P802.11bd D1.0. |
| 1434 | 45.36 | 32.2.2 | "number of repetitive transmissions of NON\_NGV\_10 PPDU" is not clear (does it include the initial transmission?) | Change to "number of additional transmissions of a NON\_NGV\_10 PPDU, after the initial transmission" | **Accepted**  **Discussion:**  In sub-clause 32.2.5.3, the parameter N\_REP is used to indicate the extra transmissions of a NON\_NGV\_10 PPDU other than the initial transmission. So the proposed change is correctly reflecting the usage of the parameter N\_REP.  **TGbd Editor:**  In the “Value” cell of “N\_REP” entry when “FORMAT is NON\_NGV\_10”, in Table 32-1 in IEEE P802.11bd D1.0, please replace “Indicates the number of repetitive transmissions of NON\_NGV\_10 PPDU” with “Indicates the number of repetitive transmissions of NON\_NGV\_10 PPDU after the initial transmission.” |
| 1798 | 45.50 | 32.2.2 | typo to indicate non-NGV PPDU | "received Non-NGV PPDU" should be "received non-NGV PPDU" | **Accepted** |
| 1799 | 45.57 | 32.2.2 | typo to indicate non-NGV duplicate PPDU | "indicates Non-NGV duplicate PPDU" should be "indicates non-NGV duplicate PPDU" | **Accepted** |
| 1571 | 47.18 | 32.2.3 | There are only two parameters in the PHY CONFIG\_VECTOR: OPERATING\_ CHANNEL and CHANNEL\_WIDTH. It is not clear which side (lower or higher frequency) is for the secondary channel with respect to the primary channel when NON\_NGV\_10\_DUP\_OFDM is specified. | Please clarify. | **Revised?**  **Discussion:**  Need group discussion to decide whether to support overlapping 20 MHz channelization or not. |
| 1572 | 47.51 | 32.2.4 | CH\_BANDWIDTH is not present when the format is NON\_NGC\_10. | Change CBW10 to N/A. | **Accepted**  **Discussion:**  The bandwidth indication for a non\_NGV\_10 PPDU is indicated by parameter CH\_BANDWIDTH\_IN\_NON\_NGV. |
| 1573 | 47.54 | 32.2.4 | CH\_BANDWIDTH is not present when the format is NON\_NGC\_10. | Change CBW20 to N/A. | **Accepted**  **Discussion:**  The bandwidth indication for a non\_NGV\_10 PPDU is indicated by parameter CH\_BANDWIDTH\_IN\_NON\_NGV. |
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*-----------------------****Proposed Spec Text Modifications for CID 1794/1629/1570****--------------------------*

***TGbd Editor: please implement following proposed modification to Table 32-1 (TXVECTOR and RXVECTOR parameters) in sub-clause 32.2.2 (TXVECTOR and RXVECTOR parameters) in IEEE P802.11bd D1.0 as proposed below as part of resolution to CID 1794, 1629 and 1570 respectively.***

**32.2.2 TXVECTOR and RXVECTOR parameters**

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**Table 32-1 -- TXVECTOR and RXVECTOR parameters**

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| --- | --- | --- | --- | --- |
| **Parameter** | **Condition** | **Value** | **TXVECTOR** | **RXVECTOR** |
| FORMAT |  | Determines the format of the PPDU.  Enumerated type:  NON\_NGV\_10 indicates PPDU format for 10 MHz channel spacing as defined in Clause 17 ~~PPDU format for 10 MHz~~  ~~channel spacing~~ or non-NGV duplicate PPDU format.  NGV indicates NGV PPDU format as defined in Clause 32 (Next Generation V2X (NGV) PHY specification). *[CID# 1794]* | Y | Y |
|  | ... | ... |  |  |
| TXPWR\_LEVEL\_INDEX | FORMAT is NGV | The allowed values for the TXPWR\_LEVEL\_INDEX parameter are in the range 1 to ~~numberOfOctets(dot11TxPowerLevelExtended)/2~~N/2, where N is the number of octets in dot11TxPowerLevelExtended. This parameter is used to indicate which of the available transmit output power levels defined in dot11TxPowerLevelExtended shall be used for the current transmission. *[CID 1629]* | Y | N |
| Otherwise | 1-8  Refer to 17.2.2.5 for the definition of TXPWR\_LEVEL\_INDEX. | Y | N |
| ... | ... | ... |  |  |
| NGV\_LTF\_TYPE | FORMAT is NGV | Indicates the type of NGV-LTF.  Set to 0 to indicate NGV\_LTF\_1X is used in the transmitted PPDU.  Set to 1 to indicate NGV\_LTF\_2X is used in the transmitted PPDU.  Note, when parameter NGV-MCS is 15 in 10 MHz, Repeated NGV-LTF-2x is used in the transmitted PPDU. See 32.3.8.3.6 (NGV-LTF definition).  *[CID 1570]* | Y | Y |
| Otherwise | Not present | N | N |
| … | … | … |  |  |
|  |  |  |  |  |
| NOTE 1—In the “TXVECTOR” and “RXVECTOR” columns, the following apply:  Y = Present;  N = Not present;  O = Optional; | | | | |

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-------------------- ***End of proposed changes for resolution to CID 1794/1629/1570*** *---------------------*

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| **CID** | **Pg/Ln** | **Clause** | **Comment** | **Proposed Changed** | **Resolution** |
| 1306 | 48.19 | 32.2.5.1 | In 32.1.1, it said "The NGV PHY preamble structure, dualcarrier modulation (DCM), and midamble structure are based on the HE PHY defined in Clause 28 (High Efficiency (HE) PHY specification).". These relationships are better to be illustrated in Figures 32-1, 32-2, and 32-3. | Incorporate the relationship between clause 28 in Figures 32-1, 32-2, and 32-3. | **Rejected**  **Reason:**  The design of DCM in NGV follows the same design principle as in HE, but the definition of DCM in NGV is complete without referring to HE. |
| 1637 | 49.4 | 32.2.5.1 | Figure 32-3, the arrows in the PHY-CONFIG.confirm figure are in the wrong direction. They should point from the Clause 17 PHY-CONFIG.confirm block to Configure confirmation of all PHYs Clause 32 to Clause 32 PHY-CONFIG.confirm. | As in comment | **Revised**  **Discussion:**  Agree on the comment. Revised figures are provided as part of the resolution.  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1637 as in document **11-21/0003r1**. |
| 1638 | 49.6 | 32.2.5.1 | Figure 32-3,the central block in the PHY-CONFIG.confirm figure should read as in REVmd D5.0 "Confirm configuration of all PHYs", but reads "Congiure confirmation of all PHYs". | Correct to "Confirm configuration of all PHYs" | **Revised**  **Discussion:**  Agree on the comment. Revised figures are provided as part of the resolution.  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1637 as in document **11-21/0003r1**. |
| 1640 | 49.8 | 32.2.5.1. | Figure 32-3, the Clause 32 PHY-CCARESET.request figure references "CCA requirement are defined in Clause 32 instead" should reference the specific subclaus 32.3.11.5 CCA sensitivity as specific NGV CCA requirements are only defined here. | Replace "Clause 32" with "Clause 32.3.11.5" | **Revised**  **Discussion:**  Agree on the comment. Revised figures are provided as part of the resolution.  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1637 as in document **11-21/0003r1**. |

*-----------------------****Proposed Spec Text Modifications for CID 1637/1638/1640****--------------------*

***TGbd Editor: please replace Figure 32-3 at ln2/pg49 in sub-clause 32.2.5.1 (General) in P802.11bd D1.0 with following figure.***

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**Figure 32-3—PHY-CONFIG and CCA interaction with Clause 17 (Orthogonal frequency multiplexing**

**(OFDM) and Clause 32 (Next Generation V2X (NGV) PHY specification)**

-------------------- ***End of proposed changes for resolution to CID 1637/1638/1640****-----------------*

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| **CID** | **Pg/Ln** | **Clause** | **Comment** | **Proposed Changed** | **Resolution** |
| 1784 | 50.31 | 32.2.5.3 | Repetition transmission is better described in the MAC subclause. As currently written, PHY has to save all the information (configuration and data bits) for a PPDU, and repeatedly transmit it. This is essentially a MAC re-transmission scheme w/o waiting for ACK, and is more of a MAC feature | Move the contents of 32.2.5.3 to Clause 31. | **Rejected**  **Reason:**  As described in 32.2.5.3, the repetition transmission is requested by MAC and performed by PHY without interruption. MAC doesn’t need to handle the repetition transmission process except invoking it with PHY primitive. |
| 1433 | 39.51 | 32.2.5.3 | "This mode allows an NGV STA to repeat one NON\_NGV\_10 PPDU multiple times with time gap of SIFS between every two transmissions. The number of repetition of NON\_NGV\_10 PPDU is decided by upper layer and indicated through radio environment request vector (Clause 5.3.1 (Radio Environment Request Vector) in MAC SAP. The MAC sets the number of repetition, N\_REP, via the PHY service interface using the PHY-TXSTART.request(TXVECTOR) primitive, as described in Table 32-1 (TXVECTOR and RXVECTOR parameters)." 1) upper layers irrelevant. 2) gap between ever 2 transmissions is confusing. 3) grammar | Change to "This mode allows an NGV STA to transmit an NON\_NGV\_10 PPDU multiple times, separated by SIFS. The number of repetitions is indicated in the radio environment request vector (see 5.3.1 (Radio Environment Request Vector). The MAC sets the number of repetitions in the TXVECTOR parameter N\_REP." | **Revised**  **Discussion:**  Agree on the comment that the narrative of the original addressed sentences in D1.0 needs improvement. And as addressed by the resolution to CID 1605, the mentioned sentences have been modified in D1.1 and clarified the ambiguous points addressed by this comment.  **TGbd Editor:**  The addressed context has been improved by resolution to CID 1605. No specific modification is needed for this resolution. |
| 1432 | 50.42 | 32.2.5.3 | This appears to be the only place it is specified that SIFS is 32 us! | Add a table of PHY characteristics, as in other PHYs | **Revised**  **Discussion:**  Agree on the comment. The PHY characteristics for NGV is provided as in Table 32-23. As suggested by the comment, a parameter aSIFSTime should be defined in Table 32-23 and be referred as the SIFS time.  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1432 as in document **11-21/0003r1**. |
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*---------------------------****Proposed Spec Text Modifications for CID 1432****----------------------------------*

***TGbd Editor: please implement the following modification to sub-clause 32.2.5.3 (Repetition transmission of NON\_NGV\_10 PPDU) in IEEE P802.11bd D1.0 as below as part of resolution to CID 1432.***

**32.2.5.3 Repetition transmission of NON\_NGV\_10 PPDU**

NGV STA shall support NON\_NGV\_10 PPDU repetition transmission mode. When a PHYTXSTART.request(TXVECTOR) primitive with the FORMAT parameter equal to NON\_NGV\_10 and N\_REP being non-zero, the NON\_NGV\_10 repetition transmission mode shall be used by the PHY layer.

In this mode, the NON\_NGV\_10 PPDU is transmitted 1+N\_REP times in sequence, where N\_REP is the number of repetition following the first transmission, and N\_REP is indicated through TXVECTOR.

The time separation between every two repeated transmissions is indicated by parameter aSIFSTime (see Table 32-23 NGV PHY characteristics) ~~32 (SIFS time)~~, as illustrated in Figure 32-4 (Example of NON\_NGV\_10 repetition transmission with N\_REP=2). *[CID 1432]*

***TGbd Editor: please replace “32 us” with “aSIFSTime” in Figure 32-4, as part of resolution to CID 1432***

***TGbd Editor: please implement the following modification to Table 32-23 (NGV PHY characteristics) to add a new parameter aSIFSTime in sub-clause 32.4.4 (NGV PHY) in IEEE P802.11bd D1.0 as below as part of resolution to CID 1432.***

**32.4.45 NGV PHY**

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**Table 32-23 – NGV PHY characteristics**

|  |  |
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| **Characteristics** | **Value** |
| aSlotTime | If dot11OperatingClassesRequired is false, 13 μs.  If dot11OperatingClassesRequired is true, 13 μs plus any coverage-class-dependent aAirPropagationTime (seeTable 9-97 (Coverage Class field parameters)). |
| aSIFSTime | 32 μs *[CID 1432]* |
| aCCAMidTime | 45 μs |
| … | … |

-------------------- ***End of proposed changes for resolution to CID 1432*** *---------------------*

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| **CID** | **Pg/Ln** | **Clause** | **Comment** | **Proposed Changed** | **Resolution** |
| 1577 | 51.5 | 32.2.5.4 | Cannot find the complete parameter list of PHY-TXSTART.confirm(TXSTATUS) in this document. | Please provide the list or specify the reference pointer. | **Rejected**  **Reason:**  All NGV-related TXSTATUS parameters are listed in Table 32-4. Refer to sub-clause 8.3.5.6 (PHY-TXSTART.confirm) in revmd D5.0 for detailed information of how TXSTATUS is used in primitive PHY-TXSTART.confirm. |
| 1644 | 51.13 | 32.2.5.4 | Table 32-4: Value range for TIME\_OF\_DEPARTURE is undefined. Comapre with REVmd D5.0 Table 17-3. | Table 32-4: Add for TIME\_OF\_DEPARTURE the following value range in the VALUE column: 0 to 232- 1 | **Revised**  **Discussion:**  Agree on the comment. Modification to the spec text is proposed in accordance with the comment.  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1644 as in document **11-21/0003r1**. |
| 1645 | 51.13 | 32.2.5.4 | Table 32-4: As the first sentence in Value column for TIME\_OF\_DEPARTURE is incomplete, its technical meaning is unclear. Compare with REVmd D5.0 Table 17-3. | Replace "When" with "The locally measured time when" | **Revised**  **Discussion:**  Agree on the comment. Modification to the spec text is proposed in accordance with the comment.  **TGbd Editor:**  Please implement the proposed spec text modification as part of resolution to CID 1645 as in document **11-21/0003r1**. |

*-----------------------****Proposed Spec Text Modifications for CID 1644/1645****--------------------------*

***TGbd Editor: please implement following proposed modification to Table 32-4 (TXSTATUS parameterss) in sub-clause 32.2.5.4 (TXSTATUS parameters) in IEEE P802.11bd D1.0 as proposed below as part of resolution to CID 1644 and 1645 respectively.***

**32.2.5.4 TXSTATUS parameters**

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**Table 32-4 – TXSTATUS parameters**

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| TIME\_OF\_DEPARTURE | 0 to 232–1. The locally measured time w~~W~~hen the first frame energy is sent by the transmitting port, in units equal to 1/TIME\_OF\_DEPARTURE\_ClockRate.  This parameter is present only if TIME\_OF\_DEPARTURE\_REQUESTED is true in the corresponding request. *[CID 1644/1645]* |
| TIME\_OF\_DEPARTURE\_ClockRate | 0 to 216–1. The clock rate, in units of MHz, is used to generate the TIME\_OF\_DEPARTURE value. This parameter is present only if TIME\_OF\_DEPARTURE\_REQUESTED is true in the corresponding request. |
| TX\_START\_OF\_FRAME\_OFFSET | 0 to 232–1. An estimate of the offset (in 10 nanosecond units) from the point in time at which the start of the preamble corresponding to the frame was transmitted at the transmit antenna connector to the point in time at which this primitive is issued to the MAC. |
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-------------------- ***End of proposed changes for resolution to CID 1644/1645*** *---------------------*

**References:**

1. **IEEE P802.11bd/D1.0, Oct 2020.**