IEEE P802.11
Wireless LANs

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| CCA CID 25036, 25047 |
| Date: 2020-09-22 |
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Abstract

This submission proposes resolutions for the following comments from the SA2 on P802.11ax D7.0:

25036, 25047

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: Updated during 9/22/2020 teleconference.

# CID 25036, 25047

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| **CID** | **Clause** | **Page.Line** | **Comment** | **Proposed Change** |
| 25036 | 27.3.20.6.3 | 689.10 | "The start of a 20 MHz HE PPDU in the primary 20 MHz channel at or above –82 dBm." The HE STA supporting a reception of a 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz HE PPDU can operating in a 20 MHz operation mode. The condition does not cover this case. | Please apply the similar change as in 11-20/1475 that was discussed in TGmd. |
| 25047 | 27.3.20.6.3 | 689.07 | Table 27-53 does not cover cases such at what level an 80 MHz operating STA needs to detect the start of a 160 MHz PPDU. Furthermore, Table 27-53 as currently written is not easy to understand. For example, does the row “The start of a 160 MHz or 80+80 MHz non-HT duplicate, VHT or HE PPDU at or above –73 dBm.” mean that a receiver must measure the preamble power over 160 MHz, and run the preamble detector over 160 MHz? Note that TGmd has adopted the changes in 11-20/1475r0 to clause 21.3.18.5.3, which has essentially the same content as subclause 27.3.20.6.3. | Commenter will submit a document similar to 11-20/1475r0 to make the same changes in subclause 27.3.20.6.3. |

**Background**

D7.0 P688-689

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| 27.3.20.6.3 CCA sensitivity for the primary 20 MHz channelThe PHY shall issue a PHY-CCA.indication primitive with the STATUS parameter set to BUSY if one of the conditions listed in Table 27-53 (Conditions for CCA BUSY on the primary 20 MHz channel) is met in an otherwise idle 20 MHz, 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz operating channel width. The channel-list parameter is present and set to {primary} if the operating channel width is greater than 20 MHz. With > 90% probability, the PHY shall detect the start of a PPDU that occupies at least the primary 20 MHz channel under the conditions listed in Table 27-53 (Conditions for CCA BUSY on the primary 20 MHz channel) within a period of aCCATime (see 21.4.4 (VHT PHY)) and hold the CCA signal busy (not issue a PHY-CCA.indication primitive with the STATUS parameter set to IDLE) for the duration of the PPDU, unless it receives a CCARESET.request primitive before the end of the PPDU for instance during spatial reuse operation as described in 26.10 (Spatial reuse operation).

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| Table 27-53 - Conditions for CCA BUSY on the primary 20 MHz channel(#Ed) |
| Operating Channel Width | Conditions |
| 20 MHz, 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz | The start of a 20 MHz non-HT PPDU in the primary 20 MHz channel as defined in 17.3.10.6 (CCA requirements).The start of an HT PPDU under the conditions defined in 19.3.19.5 (CCA sensitivity).The start of a 20 MHz VHT PPDU in the primary 20 MHz channel at or above –82 dBm.The start of a 20 MHz HE PPDU in the primary 20 MHz channel at or above –82 dBm. |
| 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz | The start of a 40 MHz non-HT duplicate, VHT or HE PPDU in the primary 40 MHz channel at or above –79 dBm.The start of an HT PPDU under the conditions defined in 19.3.19.5 (CCA sensitivity). |
| 80 MHz, 160 MHz, or 80+80 MHz | The start of an 80 MHz non-HT duplicate, VHT or HE PPDU in the primary 80 MHz channel at or above –76 dBm. |
| 160 MHz or 80+80 MHz | The start of a 160 MHz or 80+80 MHz non-HT duplicate, VHT or HE PPDU at or above –73 dBm. |

The receiver shall issue a PHY-CCA.indication primitive with the STATUS parameter set to BUSY for any signal that exceeds a threshold equal to 20 dB above the minimum modulation and coding rate sensitivity (–82 + 20 = –62 dBm) in the primary 20 MHz channel within a period of aCCATime after the signal arrives at the receiver’s antenna(s). If the operating channel width is greater than 20 MHz, then the channel-list parameter is present and shall be set to {primary}. Following the indication and while the threshold continues to be exceeded, the receiver shall not issue a PHY-CCA.indication primitive with the STATUS parameter set to IDLE or with a change in the channel-list parameter. |

**Proposed Resolution: CIDs 25036, 25047**

**Revised**.

**Note to Commenter:**

The main point the commenter is making is that a STA in a X1 MHz operating mode needs to be able to detect the start of PPDUs with X2 MHz bandwidth, including cases where X2 > X1. For example, a STA in 80 MHz operating mode needs to be able to detect the start of a 160 MHz PPDU and defer appropriately, even though the 80 MHz operating STA will not be able to demodulate the data portion of the 160 MHz PPDU. And Table 27-53 does not capture this point.

Furthermore, Table 27-53 as currently written is not easy to understand. For example, does the row “The start of a 160 MHz or 80+80 MHz non-HT duplicate, VHT or HE PPDU at or above –73 dBm.” mean that a HE receiver must measure the preamble power over 160 MHz, and run the preamble detector over 160 MHz? The intention of that row was that even for 160 MHz PPDUs, if you see energy in the primary 20 MHz greater than or equal to -82 dBm (the requirement for 20 MHz HE PPDU detection), then you need to detect those 160 MHz PPDUs as well. And assuming flat power spectral density, -82 dBm in primary 20 MHz translates to -73 dBm over 160 MHz – hence the limit of -73 dBm in the last row of Table 27-53.

Instruction to Editor below updates the text such that it states directly that start of PPDUs needed to be detected regardless of the PPDU bandwidth if the power measured within the primary 20 MHz is at or above -82 dBm. Note that subclause 27.3.20.6.3 is essentially a copy and paste of 21.3.18.5.3, and TGmd has passed motion to accept the changes as specified in <https://mentor.ieee.org/802.11/dcn/20/11-20-1475-00-000m-sa2-cids-5009-5010-5011.docx>. Proposed resolution here is identical to that adopted in TGmd in spirit.

**Instruction to Editor:**

Implement the proposed text updates for CIDs 25036 and 25047 in <https://mentor.ieee.org/802.11/dcn/20/11-20-1517-01-00ax-cca-cid-25036-25047.docx>

**Proposed Text Updates: CIDs 25036, 25047**

*Instruction to Editor: Update D7.0 P688L40 as shown below.*

27.3.20.6.3 CCA sensitivity for the primary 20 MHz channel

 An HE STA with a *W* MHz operating channel width shall detect, with >90% probability, the start of a PPDU that occupies at least the primary 20 MHz channel in an otherwise idle *W* MHz operating channel width, and issue a PHY-CCA.indication with the STATUS parameter set to BUSY within a period of aCCATime (see 21.4.4 (VHT PHY)) if one of the following conditions is met:

* The start of a non-HT PPDU as defined in 17.3.10.6 (CCA requirements) when operating in the 5 or 6 GHz band and 18.4.6 (CCA performance) when operating in the 2.4 GHz band.
* The start of an HT PPDU as defined in 19.3.19.5 (CCA sensitivity).
* The start of a non-HT duplicate, VHT or HE PPDU for which the power measured within the primary 20 MHz channel is at or above –82 dBm.

The channel-list parameter is present and set to {primary} if the operating channel width is greater than 20 MHz. The CCA signal shall be held busy (not issue a PHY-CCA.indication primitive with the STATUS parameter set to IDLE) for the duration of the PPDU, unless it receives a CCARESET.request primitive before the end of the PPDU for instance during spatial reuse operation as described in 26.10 (Spatial reuse operation).

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