IEEE P802.11
Wireless LANs

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| Proposed Draft Text (PDT-PHY): CCA Sensitivity |
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Abstract

This submission proposed the draft text on CCA sensitivity for TGbe D0.2, based on TGax D8.0 and passed motion 137 [1]

References:

[1] 802.11-20/0566r89 Compendium of Straw Polls and Potential Changes to the Specification Framework Document

36.3.19.6 CCA sensitivity

36.3.19.6.1 General

The thresholds in this subclause are compared with the signal level at each receiving antenna.

36.3.19.6.2 CCA sensitivity for operating classes requiring CCA-ED

For the operating classes requiring CCA-Energy Detect (CCA-ED), the PHY shall indicate a medium busy condition if CCA-ED detects a channel busy condition. For improved spectrum sharing, CCA-ED is required in some bands. The behavior class indicating CCA-ED is given in Table D-2 (Behavior limits). The operating classes requiring the corresponding CCA-ED behavior class are given in E.1 (Country information and operating classes). The PHY of a STA that is operating within an operating class that requires CCA-ED shall operate with CCA-ED.

CCA-ED shall detect a channel busy condition if the received signal strength exceeds the CCA-ED threshold as given by dot11OFDMEDThreshold for the primary 20 MHz channel and dot11OFDMEDThreshold for each nonprimary 20 MHz subchannel. The CCA-ED thresholds for the operating classes requiring CCA-ED are subject to the criteria in D.2.5 (CCA-ED threshold).

For the EHT TB PPDU transmission, for each of 20 MHz sub-channels that require CCA, CCA-ED shall detect a channel busy condition if the received signal strength exceeds the CCA-ED threshold as given by dot11OFDMEDThreshold. The CCA-ED thresholds for the operating classes requiring CCA-ED are subject to the criteria in D.2.5 (CCA-ED threshold).

For transmissions that carry a frame that includes a BQR Control subfield (see 9.2.4.6a (Control subfield variants of an A-Control subfield)), CCA-ED shall detect a channel busy condition if the received signal strength exceeds the CCA-ED threshold as given by dot11OFDMEDThreshold for primary 20 MHz channel and dot11OFDMEDThreshold for each nonprimary 20 MHz channel (if present). The CCA-ED thresholds for the operating classes requiring CCA-ED are subject to the criteria in D.2.5 (CCA-ED threshold).

NOTE—The requirement to detect a channel busy condition as stated in 36.3.19.6.3 (CCA sensitivity for the primary 20 MHz channel) and 36.3.19.6.4 (Per 20 MHz CCA sensitivity) is a mandatory energy detect requirement on all Clause 36 (Extremely high throughput (EHT) PHY specification) receivers. Support for CCA-ED is an additional requirement that relates specifically to the sensitivities described in D.2.5 (CCA-ED threshold).

36.3.19.6.3 CCA sensitivity for occupying the primary 20 MHz channel

An EHT 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 HE, or EHT 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 35.xx (Spatial reuse operation).

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.

36.3.19.6.4 Per 20 MHz CCA sensitivity

If the operating channel width is greater than 20 MHz and the PHY issues a PHY-CCA.indication primitive, the PHY shall set the per20bitmap to indicate the busy/idle status of each 20 MHz subchannel. A 20 MHz subchannel is busy if at least one of the following conditions is present:

* A signal is present on the 20 MHz subchannel at or above a threshold of –62 dBm at the receiver's antenna(s). The PHY shall indicate that the 20 MHz subchannel is busy a period aCCATime after the signal starts and shall continue to indicate the 20 MHz subchannel is busy while the threshold continues to be exceeded.
* A non-HT, HT\_MF, HT\_GF, VHT, HE, or EHT PPDU for which the power measured within this 20 MHz subchannel is at or above max(–72 dBm, OBSS\_PDlevel) at the receiver's antenna(s). The PHY shall indicate that the 20 MHz subchannel is busy with > 90% probability within a period aCCAMidTime (see 36.3 (EHT PHY)))

NOTE—Following the receipt of a Trigger frame with the CS Required subfield in the Common Info field set to 1, the EHT PHY is only required to detect a signal at the –62 dBm threshold since the other conditions require more time than is available before the response is expected.

*OBSS\_PDlevel* is defined in 35.xx.x.x (Adjustment of OBSS PD and transmit power) and applied in the equations to define the detection level in this subclause if an EHT STA has ignored a 40 MHz, 80 MHz, 160 MHz inter-BSS PPDU following the procedure in 35.xx.x.x (General operation with non-SRG OBSS PD level) or 35.xx.x.x (General operation with SRG OBSS PD level). It is applied to any secondary channels within the PPDU bandwidth of the inter-BSS PPDU and during the RXTIME of the inter-BSS PPDU. Otherwise, *OBSS\_PDlevel* is not applied in the equations to define the detection level in this subclause.