IEEE P802.11
Wireless LANs

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| LB230 CR Spatial Reuse Operation on Secondary Channel  |
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Abstract

This submission proposes resolutions of comments received from TGax LB230.

(The proposed change is based on TGax Draft 2.2.)

* CIDs: 13514, 13954, 13955, 13956, 13957, 13958, 13959, 13960, 13961, 13962, 13963, 13964 (12 CID)

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.***

| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 13514 | 502.21 | 28.3.19.6.5 | Incorrect section reference | Change reference to 28.4.4. | Revised- Fix the incorrect section reference as suggested by the commenter. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13960 | 502.23 | 28.3.19.6.5 | "A 40 MHz non-HT duplicate, HT\_MF, HT\_GF, VHT or HE PPDU detected in any 40 MHz subchannel of the secondary 80 MHz channel at or above max(-72 dBm, OBSS\_PDlevel(40 MHz)) with > 90% probability within a period aCCAMidTime."Secondary 40 MHz channel is missed. | Change as the following:"A 40 MHz non-HT duplicate, HT\_MF, HT\_GF, VHT or HE PPDU detected in any 40 MHz subchannel of the secondary 40 MHz or the secondary 80 MHz channel at or above max(-72 dBm, OBSS\_PDlevel(40 MHz)) with > 90% probability within a period aCCAMidTime." | Revised- Agree in principle. Because a 40 MHz non-HT duplicate, HT\_MF, HT\_GF, VHT or HE PPDU can be detected in a secondary 40 MHz channel, fix the incorrect sentence as as suggested by the commenter.TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13961 | 502.28 | 28.3.19.6.5 | "A 20 MHz NON\_HT, HT\_MF, HT\_GF, VHT, or HE PPDU detected in the any 20 MHz subchannel of secondary 20 MHz, secondary 40 MHz or secondary 80 MHz at or above max(-72 dBm, OBSS\_PDlevel) with >90% probability within a period aCCAMidTime (see 28.4.4 (HE PHY))."In the secondary 80 MHz channel, "channel" is missed. | Change as the following:"A 20 MHz NON\_HT, HT\_MF, HT\_GF, VHT, or HE PPDU detected in the any 20 MHz subchannel of secondary 20 MHz, secondary 40 MHz or secondary 80 MHz channel at or above max(-72 dBm, OBSS\_PDlevel) with >90% probability within a period aCCAMidTime (see 28.4.4 (HE PHY))." | Revised- Agree in principle. “channel” is missed accidently. Fix the incorrect sentence as as suggested by the commenter. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13954 | 501.21 | 28.3.19.6.4 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13955 | 501.38 | 28.3.19.6.4 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13956 | 501.42 | 28.3.19.6.4 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13957 | 501.55 | 28.3.19.6.4 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13958 | 501.59 | 28.3.19.6.4 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13959 | 501.63 | 28.3.19.6.4 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13962 | 502.20 | 28.3.19.6.5 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13963 | 502.24 | 28.3.19.6.5 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |
| 13964 | 502.29 | 28.3.19.6.5 | How is the OBSS\_PD determined if there is no signals occupying the primary 20 MHz channel?Is adjustment of OBSS\_PD and transmit power possbile?How can SRG SRG-OBSS\_PD-based spatial reuse be applied?Please clarify the procedure to use the OBSS\_PD on secondary channels. | As in comment. | Revised- Agree in principle. OBSS\_PD-based spatial reuse operation on secondary channels is not clearly defined. TGax editor makes changes as shown in the as specified in 11-18/106r1. |

**Discusssion:**

TGax draft 1.0 defined *OBSS\_PDlevel*, *OBSS\_PDlevel(40 MHz)* and *OBSS\_PDlevel(80 MHz)* as the following.

“The *OBSS\_PDlevel* is applicable to the start of a 20 MHz PPDU received on the primary 20 MHz channel. The *OBSS\_PDlevel*(40 MHz) which is applicable to the start of a 40 MHz PPDU received on the primary 40 MHz channel, the *OBSS\_PDlevel*(80 MHz) which is applicable to the start of a 80 MHz PPDU received on the primary 80 MHz channel and the *OBSS\_PDlevel*(160 MHz or 80+80 MHz) which is applicable to the start of a 160 MHz or 80+80 MHz PPDU, can be derived by the following equations:

* *OBSS\_PDlevel*(40 MHz)= *OBSS\_PDlevel* + 3 dB
* *OBSS\_PDlevel*(80 MHz)= *OBSS\_PDlevel* + 6 dB
* *OBSS\_PDlevel*(160 MHz or 80+80 MHz) = *OBSS\_PDlevel* + 9 dB”

But, those definitions were removed and the related spec texts have been changed as the following in TGax draft 2.2.

“The value of the *OBSS\_PDlevel* is applicable to the start of a 20 MHz PPDU received on the primary 20 MHz channel. If the bandwidth of the received PPDU differs from 20 MHz, then the value of the *OBSS\_PDlevel* is increased by 10 log (bandwidth/20 MHz), using the bandwidth in MHz indicated by the value of RXVECTOR parameter CH\_BANDWIDTH or CH\_BANDWIDTH\_IN\_NON\_HT when present.(#13932)”

But, 28.3.19.6.4 (CCA sensitivity for signals not occupying the primary 20 MHz channel) and 28.3.19.6.5 (Per 20 MHz CCA sensitivity) still refer the *OBSS\_PDlevel*, *OBSS\_PDlevel(40 MHz)* and *OBSS\_PDlevel(80 MHz).*

This document fixes some inconsistency between SR MAC section and SR PHY section.

***TGax editor: change the sub-clause 28.3.19.6.4 as the following:***

**28.3.19.6.4 CCA sensitivity for signals not occupying the primary 20 MHz channel**

When the dot11HECCAIndicationMode is equal to 0 (singleelement), the PHY shall issue a PHY-CCA.indication(BUSY, {secondary}) primitive if the conditions for issuing PHY-CCA.indication(BUSY, {primary}) primitive are not present and one of the following conditions are present in an otherwise idle 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz operating channel width:

— Any signal within the secondary 20 MHz channel at or above a threshold of –62 dBm within a period of aCCATime after the signal arrives at the receiver’s antenna(s); then the PHY shall not issue a PHY-CCA.indication(BUSY, {secondary40}), PHY-CCA.indication(BUSY, {secondary80}), or PHY-CCA.indication(IDLE) primitive while the threshold continues to be exceeded.

— A 20 MHz NON\_HT, HT\_MF, HT\_GF, VHT PPDU or HE PPDU detected in the secondary 20 MHz channel at or above max(–72 dBm, *~~OBSS\_PDlevel~~ OBSS\_PDlevel*) with >90% probability within a period aCCAMidTime (see 28.4.4 (HE PHY)).

When the dot11HECCAIndicationMode is equal to 0 (singleelement), the PHY shall issue a PHY-CCA.indication(BUSY, {secondary40}) primitive if the conditions for issuing a PHY-CCA.indica-tion(BUSY, {primary}) and PHY-CCA.indication(BUSY, {secondary}) primitive are not present and one of the following conditions are present in an otherwise idle 80 MHz, 160 MHz, or 80+80 MHz operating chan-nel width:

— Any signal within the secondary 40 MHz channel at or above a threshold of –59 dBm within a period of aCCATime after the signal arrives at the receiver’s antenna(s); then the PHY shall not issue a PHY-CCA.indication(BUSY, {secondary80}) primitive or PHY-CCA.indication(IDLE) primitive while the threshold continues to be exceeded.

— A 40 MHz non-HT duplicate, HT\_MF, HT\_GF, VHT PPDU or HE PPDU detected in the secondary 40 MHz channel at or above max(–72 dBm, *~~OBSS\_PDlevel(40 MHz)~~ OBSS\_PDlevel* +3 dB) with >90% probability within a period aCCAMidTime (see 28.4.4 (HE PHY)).

— A 20 MHz non-HT, HT\_MF, HT\_GF, VHT PPDU or HE PPDU detected in any 20 MHz sub-chan-nel of the secondary 40 MHz channel at or above max(–72 dBm, *~~OBSS\_PDlevel~~ OBSS\_PDlevel*) with >90% proba-bility within a period aCCAMidTime.

When the dot11HECCAIndicationMode is equal to 0 (singleelement), the PHY shall issue a PHY-CCA.indication(BUSY, {secondary80}) primitive if the conditions for PHYCCA.indication(BUSY, {pri-mary}), PHY-CCA.indication(BUSY, {secondary}), and PHYCCA.indication(BUSY, {secondary40}) primitive are not present and one of the following conditions are present in an otherwise idle 160 MHz or 80+80 MHz operating channel width:

— Any signal within the secondary 80 MHz channel at or above –56 dBm.

— An 80 MHz non-HT duplicate, VHT PPDU or HE PPDU detected in the secondary 80 MHz channel at or above max(–69 dBm, *~~OBSS\_PDlevel(80 MHz)~~ OBSS\_PDlevel* +6 dB) with >90% probability within a period aCCAMidTime (see 28.4.4 (HE PHY)).

— A 40 MHz non-HT duplicate, HT\_MF, HT\_GF, VHT or HE PPDU detected in any 40 MHz sub-channel of the secondary 80 MHz channel at or above max(–72 dBm, *~~OBSS\_PDlevel(40 MHz)~~ OBSS\_PDlevel*+3 dB) with >90% probability within a period aCCAMidTime.

— A 20 MHz NON\_HT, HT\_MF, HT\_GF, VHT or HE PPDU detected in any 20 MHz sub-channel of the secondary 80 MHz channel at or above max(–72 dBm, *~~OBSS\_PDlevel~~ OBSS\_PDlevel*) with >90% probability within a period aCCAMidTime.

*~~OBSS\_PDlevel~~*~~,~~ *~~OBSS\_PDlevel(40 MHz)~~* ~~and~~ *~~OBSS\_PDlevel(80 MHz)~~* ~~are~~ *OBSS\_PDlevel* is define in 27.9.2.~~2~~4 (Adjustment of OBSS\_PD and transmit power) and only applied in the equations to define the detection level in this subclause when an HE STA ignored a 40MHz/80MH/160MHz/80+80MHz inter-BSS PPDU following the procedure in 27.9.2.2 (General operation with non-SRG OBSS\_PD level) or 27.9.2.3 (General operation with SRG OBSS\_PD leve). 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.

***TGax editor: change the sub-clause 28.3.19.6.5 as the following:***

**28.3.19.6.5 Per 20 MHz CCA sensitivity**

When the dot11HECCAIndicationMode is equal to 1 (per20bitmap), the PHY shall issue a PHY-CCA.indi-cation(BUSY, {per20MHzbitmap}) primitive if the conditions for issuing PHY-CCA.indication(BUSY, {primary}) primitive are not present and one of the following conditions are present in an otherwise idle 80 MHz, 160 MHz, or 80+80 MHz operating channel width:

— Any signal within the any 20 MHz subchannel of secondary 20 MHz, secondary 40 MHz or second-ary 80 MHz at or above a threshold of –62 dBm within a period of aCCATime after the signal arrives at the receiver's antenna(s); then the PHY shall not issue PHY-CCA.indication(IDLE) primitive while the threshold continues to be exceeded.

— An 80 MHz non-HT duplicate, VHT PPDU or HE PPDU detected in the secondary 80 MHz channel at or above max(–69 dBm, *~~OBSS\_PDlevel(80 MHz)~~ OBSS\_PDlevel* +6 dB) with > 90% probability within a period aCCAMidTime (see 28.4.~~3~~4 (HE PHY)). (#13514)

— A 40 MHz non-HT duplicate, HT\_MF, HT\_GF, VHT or HE PPDU detected in any 40 MHz sub-channel of the secondary 40 MHz or (#13960) the secondary 80 MHz channel at or above max(–72 dBm, *~~OBSS\_PDlevel(40 MHz)~~ OBSS\_PDlevel* +3 dB) with > 90% probability within a period aCCAMidTime.

— A 20 MHz NON\_HT, HT\_MF, HT\_GF, VHT, or HE PPDU detected in the any 20 MHz subchannel of secondary 20 MHz, secondary 40 MHz or secondary 80 MHz channel (#13961) at or above max(–72 dBm, *~~OBSS\_PDlevel~~ OBSS\_PDlevel*) with >90% probability within a period aCCAMidTime (see 28.4.4 (HE PHY)).

*OBSS\_PDlevel* is defined in 27.9.2.4 (Adjustment of OBSS\_PD and transmit power) and only applied in the equations to define the detection level in this subclause when an HE STA ignored a 40MHz/80MH/160MHz/80+80MHz inter-BSS PPDU following the procedure in 27.9.2.2 (General operation with non-SRG OBSS\_PD level) or 27.9.2.3 (General operation with SRG OBSS\_PD leve). 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.

When the dot11HECCAIndicationMode is equal to 2 (per20bitmapsifs), the PHY shall issue a PHY-CCA.indication(BUSY, {per20MHzbitmap}) primitive if one of the following conditions are present in an otherwise idle 20 MHz, 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz operating channel width:

— Any signal within any 20 MHz subchannel of primary 20 MHz, secondary 20 MHz, secondary 40 MHz or secondary 80 MHz at or above a threshold of –62 dBm within a period of aCCATime after the signal arrives at the receiver's antenna(s); then the PHY shall not issue PHY-CCA.indica-tion(IDLE) primitive while the threshold continues to be exceeded.