IEEE P802.11  
Wireless LANs

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| CR for OBSS\_PD SR | | | | |
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Abstract

This document provides CR for CIDs related to OBSS\_PD SR.

12081, 11769, 11770, 12017, 11239, 11771, 13151, 13831, 14091, 14276, 13062, 11240, 12609, 12018, 13929, 11556, 14114, 12188, 14213, 13152, 11257, 11773, 11811, 13153, 14277, 13154, 13931, 13930, 12541, 11937, 12189, 14115, 14214, 12080, 11741, 12019, 14116, 14117, 14278, 11238, 11736, 11775, 14279, 11774, 12021, 13063, 14281, 11776, 11777, 11772, 14282, 11778, 11939, 13932, 11779, 13064, 13933, 12022, 11938, 14283, 11557, 12247, 11828, 11831, 13855, 11829, 11832, 14284, 11558, 11559, 14118, 11780, 14285, 11942, 11940, 11781, 13934, 14286, 13702, 13935, 14287, 12249, 12540, 13155, 11812, 13156, 12070, 13065, 14216, 11941, 13420, 11813, 12250, 14288, 14289, 12069, 14119, 12542

1. **Introduction**

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. The introduction and the explanation of the proposed changes are 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** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 12081 | Jinjing Jiang | 27.9.1 | 289.59 | Is there a mode on SRP\_AND\_SRG\_OBSS\_PD\_PROHIBITED? | Please clarify | Rejected – the commenter failed to identify an issue |
| 11769 | Graham Smith | 27.9.1 | 289.64 | "There are two independent spatial reuse modes, one called OBSS\_PD-based spatial reuse and the other called SRP-based spatial reuse." Bad wording, replace. | Replace ""There are two independent spatial reuse modes, one called OBSS\_PD-based spatial reuse and the other called SRP-based spatial reuse." with "There are two independent spatial reuse modes: OBSS\_PD and SRP." | Rejected – OBSSPD and SRP don’t define the SR mode, but a threshold and a parameter field. The name of the SR mode has therefore been defined to be clear with that regard. |
| 11770 | Graham Smith | 27.9.1 | 290.01 | What a long winded way to describe a possible way to find out the Color of neighboring APs and of APs that are hidden form the originating AP. I can see that the AP might like to chose a color that none of its STAs sees but in this case the STA is straying from the network area. If you want to do this simply say words to the effect that "an AP may use a Beacon request to establish the color of neighnboring networks." | Delete P290 L1 to L16. | Revised – beacon reports are also used in this context to collect information to define SRG and SRG OBSSPD parameters. The procedure is detailed here as there are slight changes compared to section 11.11. We however need to modify the text to ensure that the changes are limited to spatial reuse operation. Apply the changes as proposed in doc 1852r0. |
| 12017 | James Yee | 27.9.1 | 290.03 | In the sentence "An HE AP shall not set a measurement mode in a Beacon request to an associated STA to a mode that the STA has not explicitly indicated support for via the RM Enabled Capabilities element ...", the word "for" is redundant. | As provided in comment. | Rejected – indicate support for seems to be the right way to say it. |
| 11239 | Albert Petrick | 27.9.2.1 | 290.09 | Missing periods | add missing periods the end of all subbullet text in this clause | Revised – agree with the commenter. Make the changes as in doc 1852r0 |
| 11771 | Graham Smith | 27.9.1 | 290.21 | "A non-AP HE STA that performs spatial reuse operation shall respond to a Beacon request from its associated AP with a Beacon report as described in 11.11 (Radio measurement procedures)." In the sentence aboive this t says that an HE AP may use the Beacon report for spatial reuse,, but here it says that a non-AP HE STA shall respond to a Beacon request. Hence a STA must support it, but an AP need not. Why can't the AP simply use a STA that does support it? Delete | Delete cited text | Rejected – there is a requirement for the HE STA to respond to the beacon request. The AP is obviously free to use this mechanism or not, reason why it is a may. |
| 13151 | Qi Xue | 27.9.1 | 290.21 | Change this to a 'should' requirement:  "A non-AP HE STA that performs spatial reuse operation shall respond to a Beacon request..." | As in the comment | Rejected – The current requirement is reasonable, as it keeps the AP from making multiple requests if a STA does not respond. Note that the STA has the option of providing no information in the response. |
| 13831 | Yasuhiko Inoue | 27.9.2.1 | 290.31 | "... with a value equal to BUSY followed by an RXSTART.indication due to a PPDU reception then ..."  "an RXSTART.indication" should be "a PHY-RXSTART.indication". | As in the comment. | Revised – agree with the commenter. Apply the proposed changes in doc 1852r0. |
| 14091 | Yuchen Guo | 27.9.2.1 | 290.31 | There is no "RXSTART.indication" defined in the SPEC | change "RXSTART.indication" to "PHY-RXSTART.indication" | Revised – agree with the commenter. Apply the proposed changes in doc 1852r0. |
| 14276 | Yusuke Tanaka | 27.9.2.1 | 290.31 | "an RXSTART.indication" should be "a PHY-RXSTART.indication". | As commented. | Revised – agree with the commenter. Apply the proposed changes in doc 1852r0. |
| 13062 | Osama Aboulmagd | 27.9.2.1 | 290.32 | The two actions on page 290, it is not clear if it is (a) and (b) as in line 32 or (a) or (b) as in line 60. Need to make it clear. | as in comment | Revised – agree with the commenter. Split the subclause in 2 subclauses for clarity. Add a sentence to clarify that a STA can use only one or the 2 modes simultaneously. IF the commenter also intends to clarify if the STA can do a) or b) or both), make the change to clarify that all is possible. and apply the proposed changes in doc 1852r0. |
| 11240 | Albert Petrick | 27.9.2.1 | 290.35 | Missing periods | add missing periods the end of all subbullet text in this clause | Revised – agree with the commenter. Apply the proposed changes in doc 1852r0. |
| 12609 | Mark RISON | 27.9.2.1 | 290.35 | There is no such value SRP\_and\_NON\_SRG\_OBSS\_PD\_PROHIBITED | Change \_and\_ to \_AND\_ | Accept – apply the proposed changes in doc 1852r0. |
| 12018 | James Yee | 27.9.2.l | 290.38 | In the bullet "The received PPDU is an inter-BSS PPDU (see 27.2.2 (Intra-BSS and inter-BSS frame determination)) and the received PPDU is not a non-HT PPDU carrying a response frame (Ack, BlockAck or CTS frame), or the received PPDU contains a CTS and a PHY-CCA.indication transition from BUSY to IDLE occurred within the PIFS time immediately preceding the received CTS and that transition corresponded to the end of an inter-BSS PPDU that contained an RTS that was ignored following this procedure", it is not clear why the prior RTS can affect the STA's decision on later the received CTS and what if the this prior RTS is never received by the STA. | Please clarify. | Rejected – This defines that if you receive both the RTS and the CTS, you can still do SR. If you receive only CTS, you can not do SR. |
| 13929 | Yongho Seok | 27.9.2.1 | 290.39 | "The received PPDU is an inter-BSS PPDU (see 27.2.2 (Intra-BSS and inter-BSS frame determination)) and the received PPDU is not a non-HT PPDU carrying a response frame (Ack, BlockAck or CTS frame),..." The prerequisite of the second condition is that the received PPDU is an inter-BSS PPDU. Because the Ack and CTS frame can't be classifed as an inter-BSS PPDU, the prerequisite of the second condition never be met. Please remove the unnecessay example. | Change as the following: "The received PPDU is an inter-BSS PPDU (see 27.2.2 (Intra-BSS and inter-BSS frame determination)) and the received PPDU is not a non-HT PPDU carrying a response frame (BlockAck),..." | Revised – partially agree with the commenter. Only BA can be classified as inter-BSS PPDU. Ack and CTS can not. Remove CTS and apply the changes as in doc 1852r0 |
| 11556 | Dorothy Stanley | 27.9.2.1 | 290.40 | regarding "or the received PPDU contains a CTS and a PHY-CCA.indication transition from BUSY to IDLE occurred within the PIFS time immediately preceding the received CTS and that transition corresponded to the end of an inter-BSS PPDU that contained an RTS that was ignored following this procedure.", this was predicated on PHY of STA issues PHY-CCA.indication with a value equal to BUSY. Is this trying to say that you can't ignore an RTS/CTS? | as in comment | Rejected – it is saying that you can ignore RTS/CTS, but not CTS alone. |
| 14114 | Yuichi Morioka | 27.9.2.1 | 290.40 | "the received PPDU is not a non HT PPDU carrying a response frame...". The recipient only knows the content of the PPDU at the end of the PPDU, which contradicts with line 32 "a) issue a PHY-CCA-RESET.request primitive before the end of the PPDU" | Remove part that reads "carrying a response frame" | Revised – there is no contradiction. a) can be done only before the end of the PPDU as it is CCA reset, b) can be done after the end of the PPDU. However, it is true that it is not clear that the STA may do a) and may do b), meaning that it can do only a), only b) or a) and b). Make the changes as proposed in doc 1852r0. |
| 12188 | kaiying Lv | 27.9.2.1 | 290.51 | An HE STA with dot11HESRPOptionImplemented should follow the OBSS\_PD level based on 27.9.4 | Change the following condition to "(defined in 27.9.2.2 (Adjustment of OBSS\_PD and transmit power) or 27.9.4 (Interaction of OBSS\_PD and SRP-based spatial reuse)). | Revised – agree with the commenter. make the changes as proposed in doc 1852r0 |
| 14213 | Yunbo Li | 27.9.2.1 | 290.53 | HE PPDU should not be excluded in the first three sub bullets. | delete "non-HE" in all the sub bullets. | Rejected – this would be redundant as the if carried in an HE PPDU, these frames can not be classified as inter-BSS PPDU, which is already a condition |
| 13152 | Qi Xue | 27.9.2.1 | 290.58 | Change to "An NDP frame" | As in the comment | Rejected – NDP is not carrying any frames and is simply called NDP in the spec. |
| 11257 | Albert Petrick | 27.9.2.1 | 290.60 | Text states "A STA that takes actions (a) or (b) under the conditions ...." Actions (a) or (b) not defined, need more clarity. | Sentence needs to be rewritten. What are actions (a) or (b) | Revised – as we now propose to define 2 subclauses, we can find a new formulation. Apply the changes as in doc 1852r0. |
| 11773 | Graham Smith | 27.9.2.1 | 290.60 | "PHY-CCARE-SET.request" should be "PHY-CCARESET.request"A STA that takes actions (a) or (b) under the conditions of the previous paragraph is deemed to perform NON\_SRG-OBSS\_PD-based spatial reuse (see 27.11.6 (SPATIAL\_REUSE))."PHY-CCARE-SET.request" should be "PHY-CCARESET.request" OK, but what about the next set of criteria which follows a PHY-RXSTART, what is that deemed to be? Is this SRG-OBSS\_PD-based? If not why the distinction? | Please clarify | Revised – clarify the spec for this sentence.  The second procedure describe SRG-OBSS\_PD-based spatial reuse, the spec does not currently need to reference that in other sections.  Apply the changes as in doc 1852r0. |
| 11811 | Guoqing Li | 27.9.2.1 | 290.60 | There is listed action (a) or (b). | Clarify | Revised – agree with the commenter. Apply the changes as in doc 1852r0. |
| 13153 | Qi Xue | 27.9.2.1 | 290.60 | Conditions (a) & (b) are not defined in the previous paragraph. Suggest rewording.  "A STA that takes actions (a) or (b) under the conditions of the previous paragraph..." | As in the comment | Revised – agree with the commenter. Apply the changes as in doc 1852r0. |
| 14277 | Yusuke Tanaka | 27.9.2.1 | 290.61 | NON\_SRG-OBSS\_PD-based spatial reuse operation is not written in 27.11.6 (SPATIAL\_REUSE). | Delete(see 27.11.6 (SPATIAL\_REUSE)). | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0. |
| 13154 | Qi Xue | 27.9.2.1 | 290.65 | Change PHY-CCARESET.request to PHY-CCA-RESET.request | As in the comment | Rejected – current spec uses PHY-CCARESET.request |
| 13931 | Yongho Seok | 27.9.2.1 | 291.03 | "The received PPDU is an Inter-BSS PPDU (see 27.2.2 (Intra-BSS and inter-BSS frame determination))" Because the prerequisite of an SRG PPDU is an Inter-BSS PPDU, the above sentence is not needed. | Remove the cited sentence. | Revised – agree with the commenter. Apply the changes as in doc 1852r0. |
| 13930 | Yongho Seok | 27.9.2.1 | 291.07 | Similar to the NON\_SRG-OBSS\_PD-based spatial reuse, If an HE STA receives a CTS frame immediately after an RTS (e.g., MU-RTS frame) that is a SRG frame, the SRG-OBSS\_PD-based spatial reuse can be applied to the CTS frame. | Insert the following sentence: "The received PPDU contains a CTS and a PHY-CCA.indication transition from BUSY to IDLE occurred within the PIFS time immediately preceding the received CTS and that transition corresponded to the end of an SRG PPDU that contained an RTS (including a MU-RTS) that was ignored following this procedure." | Rejected – current assumption is that for SRG OBSS\_PD, it is not possible to ignore RTS/CTS, because the OBSS\_PD thresholds can be more aggressive. |
| 12541 | Liwen Chu | 27.9.2.1 | 291.08 | I assume that AP also follows trhe same rules. | Fix the issue mentioned in comment. | Rejected – the current text clarifies this point already |
| 11937 | James June Wang | 27.9.2.1 | 291.10 | Parameter names in Figure 29-9 not consistent with (27-3) | Change "OBSS\_PDmax" to "OBSSPDmax", "OBSS\_PDmin" to "OBSSPDmin", ... in Figure 27-9 to be consistent with parameters in (27-3) | Revised – agree in principal with the comment. Modify OBSSPDmax and OBSSPDmin to OBSS\_PDmax and OBSS\_PDmin. Apply the changes as in doc 1852r0. |
| 12189 | kaiying Lv | 27.9.2.1 | 291.15 | An HE STA with dot11HESRPOptionImplemented should follow the OBSS\_PD level based on 27.9.4 | Change the following condition to "(defined in 27.9.2.2 (Adjustment of OBSS\_PD and transmit power) or 27.9.4 (Interaction of OBSS\_PD and SRP-based spatial reuse)). | Revised – agree with the comment. Make the changes as proposed by doc 1852r0. |
| 14115 | Yuichi Morioka | 27.9.2.1 | 291.17 | There is no way for HE STA to know that the non-HT PPDU does not carry a certain frame before the end of the PPDU. | Remove conditions that will not be known to the receiving STA until the end of the PPDU. | Rejected – this is the case for HE PPDUs, but for non-HE PPDUs, we allow conditions that are known at the end of the PPDU. |
| 14214 | Yunbo Li | 27.9.2.1 | 291.18 | HE PPDU should not be excluded in the first three sub bullets. | delete "non-HE" in all the sub bullets. | Rejected – non-HE is needed here, as the problem is already solved for HE PPDUs, where the BSS\_color is set accordingly. |
| 12080 | Jinjing Jiang | 27.9.2.1 | 291.20 | Public Action frame includes the FTM frame, duplicate items in the bullets? | Remove "or an FTM frame" | Rejected – only group addressed public action frames are redundant. FTM can be unicast public action frame so should be explicitly mentioned here. |
| 11741 | GEORGE CHERIAN | 27.9.2 | 291.30 | Currently, SR\_DELAY and SR\_RESTRICTED is applicable for both SRP & OBSS-PD. Remove the applicability of SR\_DELAY and SR\_RESTRICTED for OBSS-PD | As in the comment | Rejected – SR\_delay and SR\_restricted are also useful for OBSS\_PD SR. |
| 12019 | James Yee | 27.9.2.l | 291.30 | P. 290 line 30-61 are defining NON\_SRG\_OBSS\_PD-based spatial reuses, here the spec should also require the PPDU received is not from a SRG STA. | As provided in comment. | Rejected – even if the PPDU is an SRG PPDU, the STA can decide to apply NON-SRG OBSS\_PD spatial reuse. Therefore, the condition is not a requirement. |
| 14116 | Yuichi Morioka | 27.9.2.1 | 291.33 | In order to allow efficient use of SR resource, STA should be allowed to subtract the time it took to determine that the received PPDU is an inter-BSS PPDU from its BO timer. This is especially important to effectively utilize the SR resource, because by the time the BO expires in many cases the OBSS PPDU would be already be finished. | Add "If the PHYCCARESET.request primitive is issued before the end of the PPDU, the Backoff counter of the STA may be decremented by the time it took from the beginning of the PPDU until the PHYCCARESET.request primitive was issued" | Rejected – the concept is interesting, but the proposed resolution is incomplete because it creates a new problem – i.e. the simple subtraction proposed will cause all STAs with a backoff count less than the the determination time to hit zero at the same time causing a multi-way collision – a complete proposal needs to deal with this problem. |
| 14117 | Yuichi Morioka | 27.9.2.1 | 291.34 | Even if the TXOP is limited to the duration of the PPDU, the STA is allowed to send an SR PPDU that extends beyond the end of the TXOP. This SR PPDU will collide with the response frame of the MU transmission. | Add description as to how the SR PPDU will not collide with response to MU transmission. | Revise – see resolution for CID 14278 which adds further restriction. |
| 14278 | Yusuke Tanaka | 27.9.2.1 | 291.34 | This rule limits the TXOP obtained by the OBSS\_PD mechanism to the duration of the HE MU PPDU to prevent interfering. According to IEEE802.11 2016, start of PPDU shall be within TXOP but end of PPDU could exceed the end of TXOP so limitation of TXOP is not enough and the duration of PPDU must be limited as well. | Add "and the duration of transmitting PPDU shall not exceed the end of the PPDU" after "the TXOP shall be limited to the duration of the PPDU" | Revised – agree with the commenter. Apply the changes as proposed in doc 1852r0. |
| 11238 | Albert Petrick | 27.9.2 | 291.36 | Missing periods | add missing periods the end of all subbullet text in this clause | Revised – agree with the comment. Apply the changes as in doc 1852r0. |
| 11736 | Geonjung Ko | 27.9.2.1 | 291.37 | According to the subclass 27.11.6 (SPATIAL\_REUSE), when a STA transmits a Trigger frame, it is recommended to set the TXVECTOR parameter SPATIAL\_REUSE to SR\_DELAY or SR\_RESTRICTED. Since a Trigger frame is allowed to be sent in a HT or VHT PPDU, there may be other frames aggregated to the Trigger frame in the same PPDU. If an inter-BSS STA transmits a frame based on the OBSS\_PD-based SR on the PPDU, STAs solicited by the Trigger frame may not be able to respond to the Trigger frame after the CCA. Therefore, we can define the operation for a STA which received a Trigger frame, for example, the similar operation when the Spatial Reuse field is set to SR\_DELAY or SR\_RESTRICTED. | Add "If the PHY-CCARESET.request primitive is issued before the end of the PPDU, and a TXOP is initiated within the duration of the PPDU, then the TXOP should be limited to the duration of the PPDU if a Trigger frame is in the PPDU." | Revised - Protection with SR restricted is mostly for the cascaded case (as in the non-cascaded case, the trigger will mostly be for Acks and will set CS required to 0). Cascaded only applies to HE MU PPDUs.  Now there could be a single trigger frame carried in VHT of HT format that triggers a long PPDU and we want to make sure that the TB PPDu is protected. For HE, we set it to SR\_DELAY. For HT format, the classification as inter-BSS PPDU can only be done at the end of the PPDU when decoding the MAC header, so the SR will effectively be delayed at the end of the PPDU, which will then naturally protect the TB PPDUs.  For a trigger carried in VHT, it is true that a STA can classify it as inter-BSS PPDU based on the VHT-SIG field, so we could have an issue here. But there does not seem to be any reason why we would use VHT PPDU to send a trigger frame. The proposed resolution is therefore to include a note to recommend the AP not to transmit trigger frames in VHT PPDU format. |
| 11775 | Graham Smith | 27.9.2.2 | 291.39 | 27.9.2.2. Adjustment of OBSS\_PD and transmit power. 17/0582 clearly shows problems withj this method and in reality no-one would or should implement it. If they did they would soon switch it off. It sounds good that reducing the poower makes you less of an interefer, but if you reduce the power, you reduce the SNIR of the wanted transmission, hence you decrease the MCS , you still have a good possibility of not being successful. Hence you slow down the network. How this is supposed to be an improvement for HE defeats me. In addition there are no rules for transmission other than reducing the power. 17/582 clearly shows that it can only work if a dynamic CCA threshold (DSC) is used but the lobby has refused to allow that. This is a bad feature as it stands and either should be deleted or the text in 17/1003 should be adopted which at least makes it work over a greater set of conditions. | Adopt text in 17/1003 | Rejected – Current OBSS\_PD protocol does not describe how a STA chooses its TxPower and OBSS\_PD level and leaves that to the implementer. This is comparable to MCS selection algorithms that are not described in the spec and left to the implementer. Doc 582 describes that if the STA uses a wrong proprietary solution to derive its OBSS\_PD level and TxPower, performance can be bad. A similar presentation can be made to show that a wrong MCS selection algorithm can lead to bad performance.  This does not prove that the mechanism is bad and that we need to specify the algorithm to select OBSS\_PD and TxPower, similarly that we don’t need to specify the MCS selection algorithms. |
| 14279 | Yusuke Tanaka | 27.9.2.2 | 291.39 | When a HE STA lowers the transmission power based on OBSS-PD, the transmission may not be heard by another STA in the BSS and it could cause inter-BSS collision more than regular transmission. | Define a mechanism to adjust RTS threshold based on modified transmission power or OBSS-PD levels. | Rejected – if HE STAs decides to lower its TxPower, it takes such risk and need to take that into account in its algorithm to set its TxPower. |
| 11774 | Graham Smith | 27.9.2.2 | 291.41 | "Adjusting the OBSS\_PD level and transmit power can improve the system level performance and the utilization of the spectrum." It has been shown that this is not true, 17/0582 shows pretty clearly that this does not work. If the lobby insists on retaining this feature, then at least avoid alternative truths. Delete | Delete "Adjusting the OBSS\_PD level and transmit power can improve the system level performance and the utilization of the spectrum." | Revised – disagree with the statement of the commenter. It has been shown in many presentations that this can improve this.  However, this sentence is not needed and can be removed.  Apply the changes as proposed in doc 1852r0. |
| 12021 | James Yee | 27.9.2.2 | 291.46 | In Equation (27-3), replace "OBSSPDmin" with "OBSS\_PDmin" and "OBSSPDmax" with "OBSS\_PDmax" since these are the right terms used in other parts of the spec(e.g. figure 27-9). | As provided in comment. | Revised – agree with the comment. Make the changes as proposed in doc 1852r0. |
| 13063 | Osama Aboulmagd | 27.9.2.2 | 291.46 | This clause provides the rules for adjusting OBSS\_PD value. However it doesn't state when this change is requested, i.e. what event does trigger this adjustment? | as in comment | Rejected – a STA is allowed to apply OBSS\_PD SR under specific conditions. If it meets these conditions it can apply this mechanism. In such case, it needs to select OBSS\_PD and TxPower values. The selection process is implementation dependent but must adhere to the rules defined in this subclause. |
| 14281 | Yusuke Tanaka | 27.9.2.2 | 291.46 | "OBSSPD" and "OBSS PD" should be unified to "OBSS\_PD" | As commented. | Revised – agree with the comment. Make the changes as proposed in doc 1852r0. |
| 11776 | Graham Smith | 27.9.2.2 | 291.47 | "...and shall respect the condition defined in Equation". I can't find any other use of this expression in 11md or this document. Replace | Replace cited text with "in accordance with Equation" | Revised – agree with the comment. Make the changes as proposed in doc 1852r0. |
| 11777 | Graham Smith | 27.9.2.2 | 291.47 | Equation 27-3 indicates that the TX power may be less than the simple rule and could, in fact, be set to zero. Seems pretty dumb to me to have the < sign there as it is bad enough already and can one really see devices using less than the permitted power if they were dumb enough to do this anyway? | Replace Γëñ with = | Rejected – one must ask and answer the following question: what are the consequences of a STA using a TXP value less than what is permitted? Is it a net positive or negative for the individual STA, and is it a net positive or negative for the system? Unless someone knows the answer to that question, a proposal to disallow TXP below the maximum computed value cannot be considered. One argument to be made is that any action that causes a net increase in hidden nodes must be bad and therefore should be avoided, but this delta positive gain must be weighed against the gain of the feature, and again, the value of delta is unknown and should a problem arise, the feature can be tailored/tapered or otherwise adjusted later when such information is known. |
| 11772 | Graham Smith | 27.9.2.1 | 291.65 | "PHY-CCARE-SET.request" should be "PHY-CCARESET.request" | Replace "PHY-CCARE-SET.request" with "PHY-CCARESET.request" | Rejected – can’t find any PHY-CCARE-set |
| 14282 | Yusuke Tanaka | 27.9.2.2 | 292.05 | "TX\_PWR" should be "TXPWR" | As commented. | Revised – agree with the comment on the harmonization issue, but propose to do the contrary. Make the changes as proposed in doc 1852r0. |
| 11778 | Graham Smith | 27.9.2.2 | 292.06 | Figure 27-9 indicates that the TX power may be less than the simple rule and could, in fact, be set to zero. Seems pretty dumb to me t as it is bad enough already and can one really see devices using less than the permitted power if they were dumb enough to do this anyway? | Delete the shading and change the arrow on "Allowable OBSS\_Pdlevel" to point at the edge. | Rejected – see CID 11777. |
| 11939 | James June Wang | 27.9.2.2 | 292.31 | RSSI\_LEGACY is a relative value with value 0 to 277. It is not clear that it can be used to compare with OBSS\_PD. | Please clarify it. | Revised – agree with the commenter. Suppress the mention to RSSI\_legacy and mention receive signal strength, which is used in the receive operation subclause. Apply the changes as in 1852r0. |
| 13932 | Yongho Seok | 27.9.2.2 | 292.32 | "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)." More exactly, apply a floor to a log. | As in comment. | Revised – not certain exactly what the commenter is requesting, but the term bandwidth has no reference, so formalizaing that term to CH\_BANDWIDTH and removing the units (MHz). Apply the changes proposed in doc 1852r0. |
| 11779 | Graham Smith | 27.9.2.2 | 292.45 | "output of the antenna connector" What about printed antennas? | Replace cited text with "at the input to the antenna" or better still check with 11md where this has come up. | Rejected – “output of the antenna connector” is used throughout 802.11 2016. |
| 13064 | Osama Aboulmagd | 27.9.2.2 | 292.46 | The two terms SRG OBSS\_PD and Non-SRG OBSS\_PD appear suddenly in the middle of page 292. Need to at least introduce the terms and why two of them are needed. | as in comment | Revised – the terms are actually introduced sooner in the section. For clarity, the general section is now split in 2 subclauses to clarify the differences between SRG and non-SRG operation. Apply the changes as proposed in 1852r0. |
| 13933 | Yongho Seok | 27.9.2.2 | 292.47 | "An AP may define SRG OBSS PD Min Offset and SRG OBSS PD Max Offset values that are used by its associated STAs and by the AP to derive an SRG OBSS\_PD level for determining reception behavior for inter-BSS PPDUs that are determined to be SRG PPDUs." An AP can makes different SRG OBSS PD Min Offset and SRG OBSS PD Max Offset values for different SRG BSSs.  For supporting this, an AP may include one or more Spatial Reuse Parameter Set element. | Sepcify that an AP can include one or more Spatial Reuse Parameter Set element. | Revised – agree with the commenter. Add a note and apply the changes as proposed in 1852r0. |
| 12022 | James Yee | 27.9.2.2 | 292.57 | Throughout the spec, it is never explained how the SRG indicated by a Spatial Reuse Parameter Set elementan is formed by an HE AP STA. The spec should either provide some information or say this is not within the scope of this spec. | Please clarify. | Reject – the requested change is to insert text that is outside of the scope of the standard. |
| 11938 | James June Wang | 27.9.2.2 | 292.63 | Why do we have this condition "Non-SRG OBSS PD Max Offset Γëñ SRG OBSS PD Max Offset" ? It is not clear they are related. | Please clarify or remove | Revised – the logic is that SRG can be more aggressive than Non-SRG. It is true that the condition for Max is not so important, but it follows this logic. |
| 14283 | Yusuke Tanaka | 27.9.2.2 | 293.09 | "OBSS\_PD SR Disallowed" should be "Non-SRG OBSS\_PD Disallowed" | As commented. | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 11557 | Dorothy Stanley | 27.9.2.2 | 293.12 | Table 27-6, what is "OBSS\_PD SR Disallowed"? | as in comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 12247 | kaiying Lv | 27.9.2.2 | 293.12 | Change "OBSS\_PD SR Disallowed" to "Non-SRG OBSS\_PD SR Disallowed" | as comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 11828 | Guoqing Li | 27.9.2.2 | 293.15 | InTable 27-6, the use of "Spatial Reuse Paraeter Set element not received" set to 0 is not a natural way to say this paramemeter set is receive. Change the wording to "Spatial Reuse parameter set element received" and change the "0" and "1" in this table accordingly. | Change the wording to "Spatial Reuse parameter set element received" and change the "0" and "1" in this table accordingly. | Revised – the value 0 or 1 is for the Non-SRG OBSS\_PD SR disallowed field. Clarify by modifying the title of the column. Apply the changes as proposed in doc 1852r0. |
| 11831 | Guoqing Li | 27.9.2.2 | 293.15 | In Table 27-6, the use of 0 and 1 is understood, but this is not setting a value for a particular field. Change 0 and 1 to "yes" or "no". | Change 0 and 1 to "yes" or "no". | Revised – agree with the comment. Modify the title of the column to make the 0 and 1 values applicable. Apply the changes proposed in doc 1852r0. |
| 13855 | Yonggang Fang | 27.9.2.2 | 293.24 | Is the value of Non-SRG OBSS PD Max -82 or -62 for the case of OBSS\_PD\_SR Disallowed = 1? |  | Revised – it’s written in the table: -82dBm |
| 11829 | Guoqing Li | 27.9.2.2 | 293.41 | In Table 27-7, The use of "Spatial Reuse Paraeter Set element not received" set to 0 is not a natural way to say this paramemeter set is receive. Change the wording to "Spatial Reuse parameter set element received" and change the "0" and "1" in this table accordingly. | Change the wording to "Spatial Reuse parameter set element received" and change the "0" and "1" in this table accordingly. | Revised – agree with the comment. Clarify the title of the column. Apply the changes proposed in doc 1852r0. |
| 11832 | Guoqing Li | 27.9.2.2 | 293.41 | In Table 27-7, the use of 0 and 1 is understood, but this is not setting a value for a particular field. Change 0 and 1 to "yes" or "no". | Change 0 and 1 to "yes" or "no". | Revised – agree with the comment. Clarify by modifying the title of the column. Apply the changes proposed in doc 1852r0. |
| 14284 | Yusuke Tanaka | 27.9.2.2 | 293.55 | This sentence should be in 27.9.3 SRP-based spatial reuse operation | As commented. | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 11558 | Dorothy Stanley | 27.9.2.2 | 293.56 | regarding "shall not perform SRP-based SR transmissions", why is this in the OBSS\_PD-based section? | as in comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 11559 | Dorothy Stanley | 27.9.2.3 | 294.03 | the grammar in the paragraph is undecipherable | as in comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 14118 | Yuichi Morioka | 27.9.2.3 | 294.03 | What happens to the case where the HE STA ignores an inter-BSS PPDU but does not initiate countdown because it has nothing to send? The power restriction period should not start in this case. | Add description that the power restriction period only starts when the STA starts countdown. | Rejected – the power restriction is needed even if the count is already zero with an empty queue because the STA might be triggered during this time and needs to to follow the power restrictions because it declared the medium to be IDLE based on SR. In the non-zero count case with an empty queue, the countdown begins anyway, because if you have a non-zero count and you have what is indicated to be an idle medium, you count down, regardless of your TX queue condition. |
| 11780 | Graham Smith | 27.9.2.3 | 294.04 | "If a STA ignores an inter-BSS PPDU following the procedure in 27.9.2.1 (General), using a chosen SRG OBSS\_PD level, or a chosen non-SRG OBSS\_PD level shall start an OBSS\_PD SR transmit power restriction period." Does not read right. . | Replace cited text with "If a STA ignores an inter-BSS PPDU following the procedure in 27.9.2.1 (General), using a chosen SRG OBSS\_PD level, or a chosen non-SRG OBSS\_PD level, then the STA shall start an OBSS\_PD SR transmit power restriction period. " | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 14285 | Yusuke Tanaka | 27.9.2.3 | 294.04 | We should consider the case a STA whose queue is empty ignored an inter-BSS PPDU for receiving opportunity. The STA does not intend transmission which would cause interference, so the OBSS\_PD SR transmit power restriction period should not be applied to the STA. Otherwise the restriction period for such a STA, e.g. a light traffic device, is going to be unreasonably long. | Two suggestion. 1. OBSS\_PD SR transmit power restriction period shall be applied to only a STA which starts countdown of backoff. 2. Define upper limit of OBSS\_PD SR transmit power restriction period. | Rejected – commenter does not state how the STA would know that it will not cause interference, without this, the proposed change is incomplete. As for applying only when there is a non-zero count, see the resolution for CID 14118. Regarding the proposal for an upper bound, there is no clear answer as to what that upper bound should be, especially given that the EDCA parameters are dynamic. A STA can choose to not use OBSS\_PD and thereby avoid the risk of a long restriction period. |
| 11942 | James June Wang | 27.9.2.3 | 294.06 | Should have a maximum value (such as maximum allowable TXOP duration) for OBSS\_PD SR transmit power restriction period regardless when STA gains TXOP its backoff reaches zero. Since it might take a long time for backoff to reach zero in some cases. | Recommend to change to --- This OBSS\_PD SR transmit power restriction period shall be terminated at the end of the TXOP that the STA gains once its backoff reaches zero or TBD duration whichever is sooner". | Rejected – this is not considered as the TxOP duration is not always available and in order to push the STA to use a static operating point of TxPower/OBSSPD level. And there is no clear answer as to what that upper bound should be, especially given that the EDCA parameters are dynamic. A STA can choose to not use OBSS\_PD and thereby avoid the risk of a long restriction period. |
| 11940 | James June Wang | 27.9.2.3 | 294.07 | Note 1 and Note 2 should be nomative text. | Change to nomative text | Rejected – this is a note because the normative text above covers these conditions. These notes are just to clarify the normative text above. |
| 11781 | Graham Smith | 27.9.2.3 | 294.11 | "TXP-Wrmax" should not have the "-" | Delete "-" | Revised – Harmonize to TX\_PWRmax. Apply the changes proposed in doc 1852r0. |
| 13934 | Yongho Seok | 27.9.2.3 | 294.14 | The TXPWR\_max that calculated with the chosen non-SRG SRG OBSS\_PD level have to also limit the maximum transmit power of the UPH calculation, depending on the CS Required subfield. | Insert the following sentence: "If a Trigger frame is received within an ongoing OBSS\_PD SR transmit power restriction period, the maximum UL transmit power of an HE TB PPDU in Equation (27-1) shall be equal or lower than the TXPWRmax, calculated with the chosen non-SRG OBSS\_PD or SRG OBSS\_PD level with Equation (27-4), except when the CS Required subfield of the Common Info field of the Trigger frame is set to 0. In which case, the maximum UL transmit power of an HE TB PPDU is not constrained by TXPWRmax of the OBSS\_PD SR transmit power restriction. | Rejected – the current normative text covers this point already. |
| 14286 | Yusuke Tanaka | 27.9.2.3 | 294.16 | It is better for readability to separate this paragraph into 2 by adding line break between "period." and "If a STA". | As commented. | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 13702 | Tomoko Adachi | 27.9.2.3 | 294.22 | "(including HE Trigger-Based PPDU)" Use TB. | Change to "(including HE TB PPDU)". | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 13935 | Yongho Seok | 27.9.2.3 | 294.22 | "...for the transmissions of any PPDU (including HE Trigger-Based PPDU) until the end of the OBSS\_PD SR transmit power restriction period." As same with non-SRG OBSS\_PD, please include the following exception case. "including HE Trigger-Based PPDU, except when the HE TB PPDU is triggered by a Trigger frame having the CS Required subfield set to 0" | Change as the following: "...for the transmissions of any PPDU (including HE Trigger-Based PPDU, except when the HE TB PPDU is triggered by a Trigger frame having the CS Required subfield set to 0) until the end of the OBSS\_PD SR transmit power restriction period." | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 14287 | Yusuke Tanaka | 27.9.2.3 | 294.22 | "(including HE Trigger-Based PPDU)" should be "(including an HE TB PPDU, expect when the HE TB PPDU is triggered by a Trigger frame having the CS Required subfield set to 0)" | As commented. | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 12249 | kaiying Lv | 27.9.2.3 | 294.23 | Change to "including HE Trigger-Based PPDU, except when the HE TB PPDU is triggered by a Trigger frame having the CS Required subfield set to 0" | as comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 12540 | Liwen Chu | 27.9.2.3 | 294.27 | the notes are too weak. Transferring them to normative requirement. | Fix the issue mentioned in comment. | Rejected – this is a note because the normative text above covers these conditions. These notes are just to clarify the normative text above. |
| 13155 | Qi Xue | 27.9.2.3 | 294.27 | Add a normative text to cover the following two notes:  NOTE 1--The STA can increase but not decrease the chosen SRG OBSS\_PD level or non-SRG OBSS\_PD level during an OBSS\_PD SR transmit power restriction period. NOTE 2--The STA's power is always equal or lower than the minimum TXPWRmax among all TXPWRmax from ongoing OBSS\_PD SR transmit power restriction periods. | As in the comment | Rejected – this is a note because the normative text above covers these conditions – see in particular, the equation 27-4. These notes are just to clarify the normative text above. |
| 11812 | Guoqing Li | 27.9.2.3 | 294.29 | Note 1 is unnecessary. STA should be allowed to decrease its OBSS\_PD level to be more conservative. This restriction does not not seem necessary. | Remove NOTE 1. | Revised – Agree that the note is confusing. Normative text seems clear enough. TGax editor to make changes identified by CID 11812 in doc 1852r0. |
| 13156 | Qi Xue | 27.9.2.3 | 294.37 | Repeated Note 1 & Note 2 in lines 37-40 and lines 27-31 | As in the comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 12070 | Jing Ma | 27.9.2.3 | 295.00 | It is a little confusing by "Inter-BSS S1" and "Inter-BSS D1" in the figure. Cause "Inter-BSS Intra-SRG S1" and "Inter-BSS Intra-SRG D1" are used in the same figure to represent inter-BSS STAs which are belong to the same SRG, in same sense it'd be more clear to use "Inter-BSS Inter-SRG S1" and "Inter-BSS Inter-SRG D1" instead of the current "Inter-BSS S1" and "Inter-BSS D1" | as in the comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 13065 | Osama Aboulmagd | 27.9.2.3 | 295.01 | Figure 27-10 is an enigma to me. It needs some explanation and those S1 and D1. | as in comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 14216 | Yunbo Li | 27.9.2.3 | 295.01 | Since restriction period 1, 2 and 3 terminated at the same time, why do we need to introduce multiple restriction periods in the mechanism? | Can we keep only single restriction period during the OBSS\_PD\_SR? | Rejected – it is one way of representing the normative rules in the specification. |
| 11941 | James June Wang | 27.9.2.3 | 295.10 | In Figure 27-10 "S2 max TXPWR is equal to max (..." should be change to "min (... " | as indicated | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 13420 | Sigurd Schelstraete | 27.9.2.3 | 295.20 | In Figure 27-10, SR S2 detects all inter-BSS packets and resumes its AIFS/BO processing once it has established that SR can be applied. However, in the figure inter-BSS transmission OBSS PPDU D1'-S1' is ignored by SR S2, even though the AIFS/BO counter has not yet reached zero. Why is this? | Clarify | Revised – add some text to clarify that S2 does not receive OBSS PPDU from D1’ and therefore continues decrementing backoff. Apply the changes as proposed in 1852r0. |
| 11813 | Guoqing Li | 27.9.2.4 | 295.40 | In this figure It is more reasonable that the S2 max TXPWR is equal to min (...), not max (...). The STA should honor the power contraint calculated over all the previous ignored OBSS PPDU. | change max (...) to min (...) | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 12250 | kaiying Lv | 27.9.2.3 | 295.46 | Change the " max (NON SRG TXPWRmax1, NON SRG TXPWRmax 2, SRG TXPWRmax 3)" in the figure to "min (NON SRG TXPWRmax1, NON SRG TXPWRmax 2, SRG TXPWRmax 3)" | as comment | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 14288 | Yusuke Tanaka | 27.9.2.3 | 295.46 | In Figure 27-10, S2 max TXPWR should be equal or lower than the minimum TXPWERmax among all TXPWRmax from ongoing OBSS\_PD SR transmit power restriction periods. | Change "S2 max TXPWR is equal to max" to "S2 max TXPWR is equal to min" in Figure 27-10 | Revised – agree with the comment. Apply the changes proposed in doc 1852r0. |
| 14289 | Yusuke Tanaka | 27.9.2.4 | 295.55 | The specification needs to define a way for a STA to detect other PPDUs under receiving ongoing PPDU after PHYCCARESET.request is issued before the end of the inter-BSS PPDU | Define a threshold at which a STA's PHY will issue PHY-CCA.indication with a value equal to BUSY upon detection of energy above the threshold during the inter-BSS PPDU. The threshold shall be relative to the reception power of the inter-BSS PPDU. If the threshold is same as OBSS\_PD, SINR could be low not to detect a preamble. | Rejected – a receiver will already do this – any signal that arrives with a high enough power above the existing ongoing PPDU should cause a detection and decode event – no explicit statement in the specification is needed. The performance of each receiver might differ, but in general, detection can occur. |
| 12069 | Jing Ma | 27.9.2.4 | 295.57 | The MAC may not be able to determine whether continue backoff countdown because the MAC may not get the clear BUSY/IDLE indication about the medium from the PHY regarding procedure described in 27.9.2 and 28.3.21 HE receive procedure. Further details about the interaction between the MAC and PHY should be added. According to the precedure in 27.9.2.1(General), the MAC issues and sends PHY-CCARESET.request primitive to the PHY. Then no further description about how the PHY reacts and indicates MAC the medium "BUSY" or "IDLE" in current ax draft. If follow the specification of PHY-CCARESET.request(IPI-STATE) primitive in baseline (see 8.3.5.10 in 802.11-2016), the PHY reset the CCA state machine and send a PHY-CCARESET.confirm to the MAC with observed IPI values which are the values not a BUSY/IDLE indication. As a result, the MAC may not be able to determine whether continue backoff countdown because there seems no clear indication from the PHY saying the medium is BUSY/IDLE | Please add specification about how the MAC determines whether continue backoff countdown based on the IPI values provided by the PHY after issue PHY-CCARESET.request. Or add a STATE parameter indicating the medium "BUSY/IDLE" to PHY-CCARESET.confirm primitive which is similar with PHY.CCA.indication primitive | Rejected – section 27.9.2.4 already clarifies this point. |
| 14119 | Yuichi Morioka | 27.9.2.4 | 295.58 | There is no requirement on when the STA that issued the CCARESET.request primitive during the inter-BSS PPDU re-issues the BUSY indication. If there is no such requirement, multiple SR transmissions will just collide with one another. | Define requirement on how the HE STA issues the BUSY indication when a) the inter-BSS is still being sent and b)another HE STA starts an SR PPDU transmission. | Rejected – the normal rules for BUSY indication apply. |
| 12542 | Liwen Chu | 27.9.2.4 | 303.01 | Add the rule that the AIFS rule still needs to be respected. | As in comment | Revised – AIFS does not need to be explicitly mentioned because it is implicit when naming the “EDCAF” which is always gated by the medium condition. Apply the changes as defined in doc 1852r0. |

**CIDs for clause 9.4.2.243**

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| **CID** | **Commenter** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 11256 | Albert Petrick | 9.4.2.243 | 157.09 | In Figure 9-589dd-(SR Control field format) the Reserved field shows bits (B5-57) as Reserved. Text is missing of logical default setting. | In the text define the default value of the (B3-B7) "Reserved. Set to 1." | Rejected – In section 9.2.2, it is written that “reserved bits and fields are set to 0” |
| 11470 | Carol Ansley | 9.4.2.243 | 157.46 | missing word | missing "during" before "SRP-based SR transmissions." | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0. |
| 11548 | Dorothy Stanley | 9.4.2.243 | 156.48 | Regarding, "The Spatial Reuse Parameter Set element provides information needed by STAs when performing OBSS\_PD-based spatial reuse", what about SRP Disallowed in the SR Control Field? I do not believe it applies to OBSS\_PD-based SR. | as in comment | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0 |
| 11549 | Dorothy Stanley | 9.4.2.243 | 157.25 | what is "Non-OBSS\_PD SR Disallowed"? | as in comment | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0 |
| 11550 | Dorothy Stanley | 9.4.2.243 | 157.44 | what are the values of HESIGA\_Spatial\_reuse\_value15\_allowed? | as in comment | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0 |
| 12232 | kaiying Lv | 9.4.2.243 | 157.46 | Change "SRP\_AND\_NON-SRG-OBSS-PD\_PROHIBITED " to "SRP\_AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED " | as comment | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0 |
| 12429 | Liwen Chu | 9.4.2.243 | 156.43 | The definition of Non-SRG OBSS\_PD SR Disallowed is just used for Tx control. However it seems the field is used for setting HE SIG-A also in clause 27. | make two places consistent. | Rejected – HE—SIGA\_value15 is the one used in clause 27 for setting HE-SIG-A so the 2 cases seem to be clearly separated. |
| 12606 | Mark RISON | 9.4.2.243 | 157.44 | " set the TXVECTOR parameter SPA- TIAL\_REUSE to SRP\_AND\_NON-SRG-OBSS-PD\_PROHIBITED SRP-based SR transmissions." – garbled | Deleted "SRP-based SR transmissions" in the cited text | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0 |
| 12655 | Mark RISON | 9.4.2.243 | 157.06 | "HESIGA\_Spatial\_reuse\_value15\_allowed" is a very odd field name | Change to "SRP\_AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED Allowed" throughout | Rejected – this field is set by the AP to allow its STAs to set the bit in SIG-A for their PPDU to the value 15 which is SRP and non-SRG OBSS\_PD. Otherwise, its STAs can not set the SIG-A SR value to 15. The proposed new name is therefore less clear than the current one. Propose yoReject unless there is a better proposed name. |
| 14226 | Yusuke Tanaka | 9.4.2.243 | 156.46 | This element also provides information needed by STAs when performing SRP-based spatial reuse. | Add SRP-based spatial reuse. | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0 |
| 14227 | Yusuke Tanaka | 9.4.2.243 | 157.46 | Delete "SRP-based SR transmissions". | As commented. | Revised – agree with the comment. Apply the changes as proposed in doc 1852r0 |

1. **Proposed changes**

***11ax Editor: Modify 27.9 Spatial reuse operation as follows:***

* Spatial reuse operation
* General

The objective of HE spatial reuse operation is to allow the medium to be reused more often between OBSSs in dense deployment scenarios by the early identification of signals from overlapping basic service sets (OBSSs) and interference management.(#5480, #5481, #5487, #6018)

There are two independent spatial reuse modes, one called OBSS\_PD-based spatial reuse and the other called SRP-based spatial reuse.(#5480)

(#5163)An HE AP participating in spatial reuse may request an associated non-AP HE STA to gather information regarding the neighborhood by sending a Beacon request (see 9.4.2.21.7 (Beacon request)) by following the procedure described in 11.11 (Radio measurement procedures). An HE AP shall not set a measurement mode in a Beacon request to an associated STA to a mode that the STA has not explicitly indicated support for via the RM Enabled Capabilities element (see 9.4.2.45 (RM Enabled Capabilities element)). An HE AP that sends a Beacon request for this purpose (#11770):

* May request that the non-AP HE STA gather information of BSSs matching a particular BSSID and/or SSID.
* May request that the non-AP HE STA generate a report only for the channel the requesting AP is operating on or is considering switching to.
* Shall request that the non-AP HE STA include the HE Operation element of neighboring HE APs in order to help determine the BSS Color information of the neighboring APs.

An HE AP may use information from Beacon reports from associated STAs to make decisions related to spatial reuse. The exact algorithm is beyond the scope of this specification.

A non-AP HE STA that performs spatial reuse operation shall respond to a Beacon request from its associated AP with a Beacon report as described in 11.11 (Radio measurement procedures).

* OBSS\_PD-based spatial reuse operation

OBSS\_PD-based spatial reuse operation comprises two modes. The first mode is defined in 27.9.2.1 (General operation with Non-SRG OBSS\_PD level). The first mode allows a STA, under specific conditions, to ignore an inter-BSS PPDU using a Non-SRG OBSS\_PD level. The second mode is defined in 27.9.2.2 (General operation with SRG OBSS\_PD level) and allows a STA, under specific conditions, to ignore inter-BSS PPDUs that are identified as being SRG PPDUs, using an SRG OBSS\_PD level. Within a single Beacon interval of the BSS with which the STA is associated, a STA may operate using one of the two modes or neither mode, or both modes simultaneously.

* General operation with Non-SRG OBSS\_PD level

If the PHY of a STA issues a PHY-CCA.indication with a value equal to BUSY followed by a PHY-RXSTART.indication due to a PPDU reception then the STA’s MAC sublayer may a) issue a PHY-CCARESET.request primitive before the end of the PPDU(#9728) and may b) not update its NAV timers based on frames carried in the PPDU if all the following conditions are met: (#13062)

* The STA has not set the TXVECTOR parameter SPATIAL\_REUSE to the value SRP\_AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED in any HE PPDU it has transmitted in the current beacon period(#6768).
* The received PPDU is an inter-BSS PPDU (see 27.2.2 (Intra-BSS and inter-BSS frame determination)) and the received PPDU is not a non-HT PPDU carrying a BlockAck response frame, or the received PPDU contains a CTS and a PHY-CCA.indication transition from BUSY to IDLE occurred within the PIFS time immediately preceding the received CTS and that transition corresponded to the end of an inter-BSS PPDU that contained an RTS that was ignored following this procedure.(#9728). (#13929)
* The SPATIAL\_REUSE subfield in the HE-SIG-A (if present) of the received PPDU is not set to SRP\_ AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED(#6768).
* The received signal strength level, which is measured from the legacy portion of the PPDU and which is used to determine PHY-CCA.indication, is below the Non-SRG OBSS\_PD level. The Non-SRG OBSS\_PD level is defined in 27.9.2.2 (Adjustment of OBSS\_PD and transmit power) if the STA has dot11HESRPOptionImplemented set to false and is defined in 27.9.2.2 (Adjustment of OBSS\_PD and transmit power) or in 27.9.4 (Interaction of OBSS\_PD and SRP-based spatial reuse) if the STA has dot11HESRPOptionImplemented set to true.(#9728). (#12188)
* The PPDU is not one of the following:
* A non-HE PPDU that carries a frame where the RA field is equal to the STA MAC address.
* A non-HE PPDU that carries a group addressed Public Action frame.
* A non-HE PPDU that carries an NDP Announcement frame(#8111) or FTM frame.
* An NDP(#9761).

(#8087)If the inter-BSS frame is carried in an HE ER SU PPDU (where power of the L-STF/L-LTF symbols is boosted 3 dB), the received signal strength measured based on the non-HE portion of the HE PPDU preamble(#3609) shall be decreased by 3 dB to compensate for the power boost factor when compared to the OBSS PD level.(#8111)

The PHY-CCARESET.request(#7118) primitive shall be issued at the end of the PPDU if the PPDU is an HE SU PPDU or an HE ER SU PPDU and the RXVECTOR parameter SPATIAL\_REUSE indicates SR\_DELAY, or if the PPDU is a VHT PPDU and contains a trigger frame.

NOTE - If an AP want to get the protection equivalent to SR\_DELAY, when transmitting a trigger frame in non-HE format, it should not transmit the trigger frame in a VHT PPDU, but in a non-HT or an HT PPDU. (#11736)

If the PHY-CCARESET.request(#7118) primitive is issued before the end of the received PPDU, and a TXOP is initiated within the duration of the received PPDU, then the TXOP and the duration of the transmitted PPDU within that TxOP shall be limited to the duration of the received PPDU if the received PPDU is HE MU PPDU and the RXVECTOR parameter SPATIAL\_REUSE indicates SR\_RESTRICTED. (#14278)

A STA that ignores a PPDU following the procedure described in this subclause is deemed to perform NON\_SRG-OBSS\_PD-based spatial reuse . (#13062, #11257, #14277)

27.9.2.2 General operation with SRG OBSS\_PD level (#6768)

(#8111)If the PHY of a STA issues a PHY-CCA.indication with a value equal to BUSY followed by a PHY-RXSTART.indication due to a PPDU reception then the STA's MAC sublayer may a) issue a PHY-CCARESET.request primitive before the end of the PPDU(#9728) and may b) not update its NAV timers based on frames carried in the PPDU if all the following conditions are met: (#13062)

* (#13931)The received PPDU is an SRG PPDU (see 27.2.3 (SRG and non-SRG frame determination).
* The most recently received Spatial Reuse Parameter Set element from the AP associated with the STA had the SRG Information Present subfield equal to 1 or the STA is an AP and its most recently transmitted Spatial Reuse Parameter Set element had the SRG Information Present subfield equal to 1.
* The received signal strength level, which is measured from the legacy portion of the PPDU and which is used to determine PHY-CCA.indication, is below the SRG OBSS\_PD level. The SRG OBSS\_PD level is defined in 27.9.2.2 (Adjustment of OBSS\_PD and transmit power) if the STA has dot11HESRPOptionImplemented set to false and is defined in 27.9.2.2 (Adjustment of OBSS\_PD and transmit power) or in 27.9.4 (Interaction of OBSS\_PD and SRP-based spatial reuse) if the STA has dot11HESRPOptionImplemented set to true. (#12188)
* The PPDU is not one of the following:
* A non-HE PPDU that carries a frame where the RA field is equal to the STA MAC address.
* A non-HE PPDU that carries a Public Action frame.
* A non-HE PPDU that carries an NDP Announcement frame or an FTM frame.
* An NDP(#9728).

(#8087)If the inter-BSS frame is carried in an HE ER SU PPDU (where power of the L-STF/L-LTF symbols is boosted 3 dB), the received signal strength measured based on the non-HE portion of the HE PPDU preamble(#3609) shall be decreased by 3 dB to compensate for the power boost factor when compared to the OBSS PD level.(#8111)

The PHY-CCARESET.request(#7118) primitive shall be issued at the end of the PPDU if the PPDU is an HE SU PPDU or an HE ER SU PPDU and the RXVECTOR parameter SPATIAL\_REUSE indicates SR\_DELAY.

NOTE - If an AP want to get the protection equivalent to SR\_DELAY, when transmitting a trigger frame in non-HE format, it should not transmit the trigger frame in a VHT PPDU, but in a non-HT or an HT PPDU. (#11736)

(#9728)(#5941)

If the PHY-CCARESET.request(#7118) primitive is issued before the end of the received PPDU, and a TXOP is initiated within the duration of the received PPDU, then the TXOP and the duration of the transmitted PPDU within that TxOP shall be limited to the duration of the received PPDU if the received PPDU is HE MU PPDU and the RXVECTOR parameter SPATIAL\_REUSE indicates SR\_RESTRICTED.

27.9.2.3 Adjustment of OBSS\_PD and transmit power

(#11774) When using OBSS\_PD-based spatial reuse, an HE STA may(#9728) adjust the OBSS\_PD level in conjunction with its transmit power in accordance with (#11776) Equation (27-3).(#5489, #9315)



The adjustment rule is illustrated in Figure 27-9 (Illustration of the adjustment rules for OBSS\_PD and TX\_PWR).

|  |
| --- |
|  |
| * Illustration of the adjustment rules for OBSS\_PD and TX\_PWR |

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 (CH\_BANDWIDTH/20). (#13932)(#5490, #5491)

*TX\_PWRref* = 21 dBm for non-AP STAs.

*TX\_PWRref* = 21 dBm for an AP with the Highest NSS Supported M1 subfield in the Supported HE-MCS and NSS Set field(#5518) of its HE Capabilities element field equal to or less than 1.

*TX\_PWRref* = 25 dBm for an AP with the Highest NSS Supported M1 subfield in the Supported HE-MCS and NSS Set field(#5518) of its HE Capabilities element field equal to or greater than 2.

(#5494)*TX\_PWR* is the STA transmission power in dBm at the output of the antenna connector(#10285).

(#5494)(#8111)An AP may define SRG OBSS PD Min Offset and SRG OBSS PD Max Offset values that are used by its associated STAs and by the AP to derive an SRG OBSS\_PD level for determining reception behavior for inter-BSS PPDUs that are determined to be SRG PPDUs. An AP may define a Non-SRG OBSS PD Max Offset value that is used by its associated STAs and by the AP to derive a Non-SRG OBSS\_PD level for determining reception behavior for inter-BSS PPDUs that are not determined to be SRG PPDUs. The values of SRG OBSS PD Min Offset, SRG OBSS PD Max Offset and Non-SRG OBSS PD Max Offset are transmitted to associated STAs within the Spatial Reuse Parameter Set element.

An AP transmitting a Spatial Reuse Parameter Set element shall respect the following constraints:

* 82 dBm  82 + SRG OBSS PD Min Offset dBm  62dBm(#5205, #8073, #5484).
* SRG OBSS PD Min Offset  SRG OBSS PD Max Offset.
* SRG OBSS PD Max Offset + 82 dBm  62 dBm.
* Non-SRG OBSS PD Max Offset  SRG OBSS PD Max Offset.
* Non-SRG OBSS PD Max Offset + 82 dBm  62 dBm.

HE STAs shall maintain a Non-SRG OBSS\_PD level, with its value selected by respecting the OBSS\_PD level condition in Equation (27-3) but with Non-SRG OBSS PD Min and Non-SRG OBSS PD Max in place of OBSS\_PDmin and OBSS\_PDmax, respectively, where Non-SRG OBSS PD Min and Non-SRG OBSS PD Max are determined according to Table 27-6 (Determining Non-SRG OBSS PD Min and Non-SRG OBSS PD Max values).

|  |  |  |  |
| --- | --- | --- | --- |
| * Determining Non-SRG OBSS PD Min and Non-SRG OBSS PD Max values | | | |
| Non-SRG OBSS\_PD SR Disallowed field in Spatial Reuse Parameter Set element (#14283, #11555) | Non-SRG Offset Present field in Spatial Reuse Parameter Set element | Value of Non-SRG OBSS PD Min | Value of Non-SRG OBSS PD Max |
| Spatial Reuse Parameter Set element not received | Spatial Reuse Parameter Set element not received | 82 | 62 |
| 0 | 0 | 82 | 62 |
| 0 | 1 | 82 | 82 + Non-SRG OBSS PD Max Offset |
| 1 | Don’t care | 82 | -82 |

(#3198, #3199, #3200, #9944)

HE STAs shall maintain a SRG OBSS\_PD level, with its value selected by respecting the OBSS\_PD level condition in Equation (27-3) but with SRG OBSS PD Min and SRG OBSS PD Max in place of OBSS\_PDmin and OBSS\_PDmax, respectively, where SRG OBSS PD Min and SRG OBSS PD Max are determined according to Table 2 7-7 (Determining SRG OBSS PD Min and SRG OBSS PD Max values).

|  |  |  |
| --- | --- | --- |
| * Determining SRG OBSS PD Min and SRG OBSS PD Max values | | |
| SRG Information Present field in Spatial Reuse Parameter Set element | Value of SRG OBSS PD Min | Value of SRG OBSS PD Max |
| Spatial Reuse Parameter Set element not received | N/A  see NOTE | N/A  see NOTE |
| 0 | N/A  see NOTE | N/A  see NOTE |
| 1 | 82 + SRG OBSS PD Min Offset | 82 + SRG OBSS PD Max Offset |
| NOTE—When SRG Information is not present, a STA cannot determine a PPDU to be SRG and so will not use SRG OBSS PD Min or SRG OBSS PD Max values. | | |

(#14284)The Spatial Reuse Parameter Set element is optionally present in Beacons, Probe Responses and (Re)Association responses.

If an AP, that is part of multiple SRGs, includes multiple Spatial Reuse Parameter Set elements (one for each SRG) in its beacons. the SRP Disallowed subfield, the Non-SRG OBSS\_PD SR Disallowed subfield, the NON-SRG Offset Present subfield and the Non-SRG OBSS PD Max Offset subfield shall be the same in all Spatial Reuse Parameter Set elements. (#13933)

27.9.3.4 OBSS\_PD SR transmit power restriction period

(#5494, #5500, #5503, #7406, #8104, #9947, #7125, #3197, #5689, #9541, #6025)If a STA ignores an inter-BSS PPDU following the procedure in 27.9.2.1 (General operation with Non-SRG OBSS\_PD level) using a chosen SRG OBSS\_PD level, or following the procedure in 27.9.2.1 (General operation with Non-SRG OBSS\_PD level) using a chosen non-SRG OBSS\_PD level, then the STA (#11780) shall start an OBSS\_PD SR transmit power restriction period. This OBSS\_PD SR transmit power restriction period shall be terminated at the end of the TXOP that the STA gains once its backoff reaches zero.

If a STA starts an OBSS\_PD SR transmit power restriction period with a chosen non-SRG OBSS\_PD level, the STA’s transmit power as measured at the output of the antenna connector shall be equal or lower than the *TX\_PWRmax*, calculated with this chosen non-SRG OBSS\_PD level with Equation (27-4), with the appropriate non-SRG parameters according to Table 27-6 (Determining Non-SRG OBSS PD Min and Non-SRG OBSS PD Max values), for the transmissions of any PPDU (including an HE TB PPDU, except when the HE TB PPDU is triggered by a Trigger frame having the CS Required subfield set to 0(#5491)) until the end of the OBSS\_PD SR transmit power restriction period.

If a STA starts an OBSS\_PD SR transmit power restriction period with a chosen SRG OBSS\_PD level, the STA’s transmit power as measured at the output of the antenna connector, shall be equal or lower than the *TX\_PWRmax*, calculated with this chosen SRG OBSS\_PD level with Equation (27-4), with the appropriate SRG parameters according to Table 27-7 (Determining SRG OBSS PD Min and SRG OBSS PD Max values), for the transmissions of any PPDU (including an HE TB PPDU, except when the HE TB PPDU is triggered by a Trigger frame having the CS Required subfield set to 0) until the end of the OBSS\_PD SR transmit power restriction period.(#5870)

Multiple ongoing OBSS\_PD SR transmit power restriction periods may overlap in time.

(#11812)

NOTE 2—The STA’s power is always equal or lower than the minimum *TX\_PWRmax* among all *TX\_PWRmax* from ongoing OBSS\_PD SR transmit power restriction periods.



(#5207, #5496, #9315, #9946)NOTE 3—Equation (27-4) is equivalent to the condition defined in Equation (27-3).

NOTE 4—Anytime, even if *TX\_PWRmax* is unconstrained, the STA has to respect the transmit power restrictions defined by 11.8.6 Transmit power selection.

An example of OBSS\_PD SR operation is shown in Figure 27-10 (Example of OBSS\_PD SR operation). In this example:

* STA SR S2 receives the PPDU from S1 and, when it classifies it as inter-BSS PPDU, ignores it using OBSS\_PD-based spatial reuse with Non-SRG OBSS\_PD, starts the OBSS\_PD restriction period 1 with TX\_PWRmax 1 and decrements its backoff counter until the reception of the PPDU from D1.
* When it classifies the PPDU from D1 as inter-BSS PPDU, it ignores it using OBSS\_PD-based spatial reuse with Non-SRG OBSS\_PD, starts the OBSS\_PD restriction period 2 with TX\_PWRmax 2 and decrements its backoff counter until the reception of the PPDU from S1’’.
* It defers during the TxOP S1’’ set by the intra-BSS PPDU from S1’’ which belongs to its own BSS. At the end of the TxOP S1’’, it resumes its backoff decrement until the reception of the PPDU from S1’.
* When it classifies the PPDU from S1’ as SRG PPDU, it ignores it using OBSS\_PD-based spatial reuse with SRG OBSS\_PD, starts the OBSS\_PD restriction period 3 with TX\_PWRmax 3 and decrements its backoff counter until it reaches zero, as it does not receive the PPDU from D1’.
* It starts transmitting a PPDU with a TX\_PWRmax equal to min(TX\_PWRmax 1, TX\_PWRmax 2, TX\_PWRmax3) and respect this transmit power restriction until the end of the SR TxOP. (#13065, #13420)

|  |
| --- |
| (#12070, #11941) |
| * Example of OBSS\_PD SR operation |

27.9.2.5 OBSS\_PD-based spatial reuse backoff procedure

(#9942, #9539, #7121)If an HE STA ignores an inter-BSS PPDU following the procedure in 27.9.2.1 (General), the HE STA may resume EDCAF procedures after the PHY-CCARESET.request primitive is sent, provided that the medium condition is not otherwise indicated as BUSY.

***11ax Editor: Modify 27.9.3 SRP-based spatial reuse operation as follows:***

* SRP-based spatial reuse operation

(#6178, #5043, #5873, #5940, #7117, #7174, #5385, #9508, #10040, #10039, #10080, #8094, #5504, #6845, #6115, #6127, #6143, #6142, #6842, #6843, #4997, #9462, #9180, #9183, #9209, #10412, #10413, #10414, #10415, #10406, #10305, #8568, #8914, #8909)

When the conditions specified in 27.9.3 (SRP-based spatial reuse operation) are met that allow the transmission of an SR PPDU, an HE STA may transmit an SR PPDU to a STA that has indicated support for the role of SR Responder.

STAs which receive a Spatial Reuse Parameter Set information element from their associated AP that has a value of 1 in the SRP Disallowed subfield shall not perform SRP-based SR transmissions. (#14284) (#9730, #8087, #8091, #8092)(#5200)

SRP-based SR opportunities are identified from the value of the RXVECTOR parameter SPATIAL\_REUSE and/or the contents of a Trigger frame. An HE STA may initiate an SR transmission during an SRP-based SR opportunity using an adjusted transmit power level for the duration of an ongoing PPDU when certain conditions, designed to avoid interfering with the reception of the ongoing PPDU at the recipient are met. When the RXVECTOR parameter SPATIAL\_REUSE of the ongoing PPDU has the value SRP\_DISALLOW(#6768) or SRP\_ AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED(#5200), no SRP-based SR transmission is allowed for the duration of that PPDU.

An HE-STA supporting SRP-based SR operation indicates support for SRP-based SR operation by setting the SR Responder subfield to 1 in the HE MAC Capabilities Information field(#5873) of the HE Capabilities element (see Table 9-262aa (Subfields of the HE PHY Capabilities Information field)).

An AP sending a Trigger frame may set the SR field in the Common Info field of the Trigger frame to SRP\_DISALLOW(#6768) or, if permitted, to SRP\_ AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED(#5200) to forbid OBSS STAs from performing SRP-based SR transmission during the ensuing uplink SRP\_PPDU duration. An AP sending a trigger frame shall not set the SR field in the Common Info field of the trigger frame to SR\_DELAY.

***11ax Editor: Modify 9.4.2.243 Spatial reuse parameter set element as follows:***

* Spatial Reuse Parameter Set element(#8111)

The Spatial Reuse Parameter Set element provides information needed by STAs when performing OBSS\_PD-based spatial reuse as defined in 27.9.2 (OBSS\_PD-based spatial reuse operation), and SRP-based spatial reuse as defined in 27.9.3 (SRP-based spatial reuse operation). The format of the Spatial Reuse Parameter Set element is defined in Figure 9-589dc (Spatial Reuse Parameter Set element). (#14226)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  | Element ID | Length | Element ID Extension | SR Control | Non-SRG OBSS PD Max Offset | SRG OBSS PD Min Offset | SRG OBSS PD Max Offset | SRG BSS Color Bitmap | SRG Partial BSSID Bitmap |
| Octets: | 1 | 1 | 1 | 1 | 0 or 1 | 0 or 1 | 0 or 1 | 0 or 8 | 0 or 8 |
| * Spatial Reuse Parameter Set element | | | | | | | | | |

The Element ID, Element ID extension and Length fields are defined in 9.4.2.1 (General).

The SR Control field is defined in Figure 9-589dd (SR Control field format).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 | B5         B7 |
|  | SRP Disallowed | Non-SRG OBSS\_PD SR Disallowed | Non-SRG Offset Present | SRG Information Present | HESIGA\_Spatial\_reuse\_value15\_allowed | Reserved |
| Bits: | 1 | 1 | 1 | 1 | 1(#6768) | 3 |
| * SR Control field format | | | | | | |

The SRP Disallowed subfield in the SR Control field indicates whether SRP-based SR transmissions are allowed or not at non-AP STAs that are associated with the AP that transmitted this element. SRP-based SR transmissions are disallowed when the SRP Disallowed subfield has the value 1. SRP-based SR transmissions are allowed when the SRP Disallowed subfield has the value 0.

The Non-SRG OBSS\_PD SR Disallowed subfield in the SR Control field indicates whether non-SRG OBSS\_PD SR transmissions are allowed or not at non-AP STAs that are associated with the AP that transmitted this element. Non-SRG OBSS\_PD SR transmissions are disallowed when the Non-SRG OBSS\_PD SR Disallowed subfield has the value 1. Non-SRG OBSS\_PD SR transmissions are allowed when the Non-SRG OBSS\_PD SR Disallowed subfield has the value 0. (#11549)(17/267r5)

The Non-SRG Offset Present subfield indicates whether the Non-SRG OBSS PD Max Offset subfield is present in the element. When this bit is set to 1, the Non-SRG OBSS PD Max Offset subfield is present. When this bit is set to 0, the Non-SRG OBSS PD Max Offset subfield is not present.

The SRG Information Present subfield indicates whether the SRG OBSS PD MIN Offset, SRG OBSS PD Max Offset, SRG BSS Color Bitmap and SRG Partial BSSID Bitmap subfields are present in the element. When this bit is set to 1, the SRG OBSS PD Min Offset, SRG OBSS PD Max Offset, SRG BSS Color Bitmap and SRG Partial BSSID Bitmap subfields are present. When this bit is set to 0, the SRG OBSS PD Min Offset, SRG OBSS PD Max Offset, SRG BSS Color Bitmap and SRG Partial BSSID Bitmap subfields are not present.

The HESIGA\_Spatial\_reuse\_value15\_allowed subfield in the SR Control field indicates whether non-AP STAs that are associated with the AP that transmitted this element may set the TXVECTOR parameter SPATIAL\_REUSE to SRP\_AND\_NON-SRG-OBSS-PD\_PROHIBITED. (#11470, #12606, #14227),(#6768) Non-AP STAs that are associated with the AP that transmitted this element may set the TXVECTOR parameter SPATIAL\_REUSE to SRP\_AND\_NON-SRG-OBSS-PD\_PROHIBITED only when the bit is set to 1. (#11550)

The Non-SRG OBSS PD Max Offset subfield is present when the value of the Non-SRG Offset Present subfield is equal to 1; otherwise the Non-SRG OBSS PD Max Offset subfield is not present. The Non-SRG OBSS PD Max Offset field contains an unsigned integer which is added to the value 82 dBm to generate the value of the Non-SRG OBSS PD Max parameter.

The SRG OBSS PD Min Offset subfield is present when the value of the SRG Information Present subfield is equal to 1; Otherwise the SRG OBSS PD Min Offset subfield is not present. The SRG OBSS PD Min Offset field contains an unsigned integer which is added to the value 82 dBm to generate the value of the SRG OBSS PD Min parameter.

The SRG OBSS PD Max Offset subfield is present when the value of the SRG Information Present subfield is equal to 1; Otherwise the SRG OBSS PD MAX Offset subfield is not present. The SRG OBSS PD MAX Offset field contains an unsigned integer which is added to the value 82 dBm to generate the value of the SRG OBSS PD Max parameter.

The SRG BSS Color Bitmap subfield is present when the value of the SRG Information Present subfield is equal to 1; Otherwise the SRG BSS Color Bitmap subfield is not present. The SRG BSS Color Bitmap subfield is a bitmap that indicates which BSS Color values are used by members of the SRG of which the transmitting STA is a member. Each bit of the bitmap corresponds to one of the 63 available BSS Colors, where the lowest numbered bit corresponds to BSS Color value 0 and the highest numbered bit corresponds to BSS Color value 63. A BSS Color value is used by at least one BSS that is a member of the same SRG of the transmitting STA if the corresponding bit of the bitmap is set to 1. If a bit in the bitmap is set to 0, then no BSS in the same SRG of the transmitting STA uses the corresponding BSS Color value.

The SRG Partial BSSID Bitmap subfield is present when the value of the SRG Information Present subfield is equal to 1; otherwise the SRG Partial BSSID Bitmap subfield is not present. The SRG Partial BSSID Bitmap subfield is a bitmap that indicates which Partial BSSID values are used by members of the SRG of which the transmitting STA is a member. Each bit of the bitmap corresponds to one of the 26 possible values of BSSID[39:44], where the lowest numbered bit corresponds to Partial BSSID value 0 and the highest numbered bit corresponds to Partial BSSID value 63. A Partial BSSID value is used by at least one BSS that is a member of the same SRG of the transmitting STA if the corresponding bit of the bitmap is set to 1. If a bit in the bitmap is set to 0, then no BSS in the same SRG of the transmitting STA uses the corresponding Partial BSSID value.