IEEE P802.11
Wireless LANs

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| Proposed Text Changes for OBSS\_PD-based SR parameters |
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Abstract

This document provides proposals for spec changes for OBSS\_PD-based SR mode.

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.***

1. **Explanation of the proposed changes**
	1. **OBSS\_PD-based SR parameters**

The spec defines a spatial reuse mode that we call OBSS\_PD-based SR, and which is defined in 25.9.2 and 25.9.3.

In the SFD, we agreed that the TxPower and OBSS\_PD can be adjusted based on a proportional rule.

An 11ax STA regards a valid OBSS PPDU as not having been received at all (e.g., should not update its NAV), except that the medium condition shall indicate BUSY during the period of time that is taken by the receiving STA to validate that the PPDU is from an Inter-BSS, but not longer than the time indicated as the length of the PPDU payload if the RXPWR of the received PPDU is below the OBSS\_PD threshold and TBD conditions are met, noting that the OBSS\_PD threshold is accompanied by a TXPWR value following adjustment rules:



[SR Motion 4, September 17, 2015, see [137], modified with SR Motion 7, March 2016, see 16/414r0]

This document proposes to fill TBDs in the spec:

* Default parameters for this proportional rule
* how to set/adjust the different values in this proportional rule.

**Default parameters:**

This document proposes default parameters that are conservative:

* + OBSS\_Pdmin\_default = -82dBm for 20MHz
	+ OBSS\_Pdmax\_default = -62dBm for 20MHz
	+ PWRref = 21dBm for non-AP STAs or AP STAs with 1 and 2 SSs, 25dBm for AP STAs of 3 SSs or more

**how to set/adjust the different values in this proportional rule.**

This document proposes that the AP can define specific OBSS\_PDmin and OBSS\_Pdmax values that can be used by its STAs under TBD conditions

* + - OBSS\_PDmin\_default <= OBSS\_PDmin <= ED threshold
		- OBSS\_PDmin <= OBSS\_PDmax

The parameters OBSS\_PDmin and OBSS\_PDmax are defined in a new information element, called Spatial Reuse element

Note: the TBD conditions will define how to apply this only on managed networks.

* 1. **Allowing/disallowing SR modes:**

In the specification framework 11-15-0132-17-00ax, we have the following sentence:

Include the “SR\_allowed” signaling in HE-SIGA to indicate whether SR operation is allowed or not.

* use a value of Spatial Reuse field to indicate SR is disallowed
* The conditions to disallow SR are TBD

[SR Motion 6, March 2016, see 16/382r0]

We have 2 spatial reuse modes currently defined in the SFD:

* OBSS\_PD-based SR: which uses OBSS\_PD levels as defined in 25.9.2 and 25.9.3, and which don’t use information in SIG-A.
* SRP-based SR: defined in the SFD and which uses information in SIG-A SR field.

We propose:

* that the “SR disallowed” entry set in SR field in HE-SIGA only disallows SRP-based SR

We propose also that:

– non-AP STAs set “SR disallowed” entry in Spatial Reuse field when AP requests.

– non-AP STAs set “SR disallowed” entry in Spatial Reuse field in frame with NDP or FTM.

1. **Proposed changes**

***TGax editor: Add a new line for spatial reuse parameter set element in Table 9-76—Element IDs.***

***TGax editor: Insert a new subclause (Spatial reuse parameter set element) in 9.4.2***

**9.4.2.x Spatial reuse parameter set element**

The Spatial Reuse Parameter Set element provides information needed by STAs for proper operation when operating with OBSS\_PD-based spatial reuse as defined in section 25.9.2. The format of the Spatial Reuse Parameter Set element is defined in Figure xxxx (Spatial Reuse Parameter Set element).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Element ID | Length | Element ID Extension  | OBSS\_PDmin\_offset | OBSS\_PDmax\_offset | SRP-based SR parameters |
| Octets: | 1 | 1 |  | 1 | 1 | 1 |

 **Figure xxxx- Spatial Reuse parameter set element**

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

The OBSS\_PDmin\_offset value is used to represent OBSS\_PDmin level equal to (–82+value) dBm.

The OBSS\_PDmax\_offset value is used to represent OBSS\_PDmax level equal to (–82+value) dBm.

The AP defines OBSS\_PDmin and OBSS\_Pdmax values that shall be used by its STAs. The AP shall respect the following constraints when setting these parameters:

* OBSS\_PDmin\_default <= OBSS\_PDmin <= -62dBm
* OBSS\_PDmin <= OBSS\_PDmax

OBSS\_PDmin\_default is equal to -82dBm.

OBSS\_PDmax\_default is equal to -62dBm.

The AP can set non default OBSS\_PDmin and OBSS\_PDmax values under TBD conditions.

The SRP-based SR parameters field is defined in Figure xxxx (SRP-based SR parameters field format).

|  |  |  |
| --- | --- | --- |
|  | SR disallowed | Reserved |
| Bits: | 1 | 7 |

**Figure xxxx- SRP-based SR parameters field format**

The “SR disallowed” field in the “SRP-based SR parameters” field defines if SRP-based SR is allowed or not for the non-AP STAs that are associated with the AP that sends this element.

A non-AP STA that received the Spatial reuse parameter set element with the “SR disallowed” field in the “SRP-based SR parameters” field set to 1 from its associated AP shall set the SR field to the “SR disallowed” entry for all its transmitted PPDUs.

**25.9.3 Adaptive CCA and transmit power control**

***TGax editor: Add the following to section 25.9.3***

TX\_PWRref = 21dBm for non-AP STAs or for AP STAs with 1 and 2 spatial streams, 25dBm for AP STAs of 3 spatial streams or more.

A non-AP STA shall set the OBSS\_PDmin and OBSS\_PDmax based on the Spatial reuse parameter set element received from its associated AP. If the non-AP STA doesn’t receive OBSS\_PDmin and OBSS\_PDmax from its associated AP, then the STA shall set OBSS\_PDmin and OBSS\_PDmax to OBSS\_PDmin\_default, and OBSS\_PDmax\_default respectively.

The Spatial reuse parameter set element can be included in beacons, probe responses, authentication responses, and association responses. The AP can set non default OBSS\_PDmin and OBSS\_PDmax in the Spatial reuse parameter set element under TBD conditions.

**26.3.9.7 HE-SIG-A**

**26.3.9.7.2 Content**

***TGax editor: Change the following text in Table 26-15***

|  |
| --- |
| Table 26 15 - Fields in the HE-SIG-A for an HE SU PPDU and HE extended range SU PPDU |
| Two Parts of HE-SIG-A | Bit | Field | Number of bits | Description |
|  | TBD | Spatial Reuse | TBD | ~~“SR\_allowed” signaling indicates whether SR operation is allowed or not. A value of Spatial Reuse field is used to indicate SR is disallowed. The conditions to disallow SR are TBD. Multiple SR fields (>=2) are signaled, where each SR field corresponds to a different subband of the PPDU. Other details are TBD.~~~~Notes: this part needs further development.(#2169)~~The Spatial Reuse field has an “SR disallowed” entry. If the SR field is set to this “SR disallowed” entry, only SRP-based SR is disallowed.A non-AP STA that received the Spatial reuse parameter set element with the “SR disallowed” field in the “SRP-based SR parameters field” is set to 1 from its associated AP shall set the SR field to the “SR disallowed” entry for all its transmitted PPDUs. A STA shall set the SR field to the “SR disallowed” entry in NDP or FTM frames. |

***TGax editor: Change the following text in Table 26-16***

|  |
| --- |
| Table 26 16 - Fields in the HE-SIG-A for a HE MU PPDU |
| Two Parts of HE-SIG-A | Bit | Field | Number of bits | Description |
|  | TBD | Spatial Reuse | TBD | ~~“SR\_allowed” signaling indicates whether SR operation is allowed or not. A value of Spatial Reuse field is used to indicate SR is disallowed. The conditions to disallow SR are TBD. Multiple SR fields (>=2) are signaled, where each SR field corresponds to a different subband of the PPDU. Other details are TBD.~~~~Notes: this part needs further development.(#2169)~~The Spatial Reuse field has an “SR disallowed” entry. If the SR field is set to this “SR disallowed” entry, only SRP-based SR is disallowed.A non-AP STA that received the Spatial reuse parameter set element with the “SR disallowed” field in the “SRP-based SR parameters” field is set to 1 from its associated AP shall set the SR field to the “SR disallowed” entry for all its transmitted PPDUs. A STA shall set the SR field to the “SR disallowed” entry in NDP or FTM frames. |

***TGax editor: Change the following text in Table 26-17***

|  |
| --- |
| Table 26-17 Fields in the HE-SIG-A for an HE trigger-based PPDU  |
| Two Parts of HE-SIG-A | Bit | Field | Number of bits | Description |
|  | TBD | Spatial Reuse | TBD | ~~“SR\_allowed” signaling indicates whether SR operation is allowed or not. A value of Spatial Reuse field is used to indicate SR is disallowed. The conditions to disallow SR are TBD. Multiple SR fields (>=2) are signaled, where each SR field corresponds to a different subband of the PPDU. Other details are TBD.~~~~Notes: this part needs further development.(#2169)~~The Spatial Reuse field has an “SR disallowed” entry. If the SR field is set to this “SR disallowed” entry, only SRP-based SR is disallowed.A non-AP STA that received the Spatial reuse parameter set element with the “SR disallowed” field in the “SRP-based SR parameters” field is set to 1 from its associated AP shall set the SR field to the “SR disallowed” entry for all its transmitted PPDUs. A STA shall set the SR field to the “SR disallowed” entry in NDP or FTM frames. |