IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Supplementary instructions related to OBSS\_PD spatial reuse Disallow / Prohibit | | | | |
| Date: 2017-05-10 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Sean Coffey | Realtek | 9120 Irvine Center Drive, Ste.200, Irvine, CA 92618 | + 1 415-572-6221 | coffey@realtek.com |
| Laurent Cariou | Intel |  |  | laurent.cariou@intel.com |

Abstract

This submission reconciles the definitions given in the previously approved documents 16/1476r21 and 17/500r0, and provides editing instructions for incorporation into the draft.

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Added two extra sentences in the changes in 27.11.6, to clarify that the “if” condition is in fact “if and only if”; added text for supporting change in 9.4.2.226 (Spatial Reuse Parameter set element); simplified the “aOBSSPDProhibitedWindow” functionality by changing to a not-in-same-beacon-period timeout instead; added extra author.

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.***

**Discussion:**

Documents 16/1476r21 and 17/500r0, previously approved, provide differing descriptions for the Spatial Reuse field. This presentation reconciles the different descriptions and provides editing instructions for incorporation into the draft.

In addition, compared to 17/500r0, the term “SRP\_and\_OBSS\_PD\_SR\_Disallowed” is changed to “SRP\_AND\_NON\_SRG\_OBSS\_PD\_SR\_PROHIBITED”, the parameter name “aOBSS\_PDDisallowedWindow” is changed to “aNonSRGOBSS\_PDProhibitedWindow”, and the term “SR Disallow” is changed to “SRP Disallow” throughout the draft.

The editing instructions below describe the changes relative to D1.2, except where otherwise explicitly noted.

**TGax Editor: *Change the term “SR\_DISALLOW” to “SRP\_DISALLOW” throughout the draft.***

***Note: the change above is shown as implemented wherever applicable in D1.2 text quoted below.***

**TGax Editor: *Modify Table 28.15 by adding the underlined material in the description of the bits B15-B18 in the place shown:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Two Parts of HE-SIG-A | Bit | Field | Number of bits | Description |
| HE-SIG-A1 | B15-B18 | Spatial Reuse | 4 | Indicates whether or not spatial reuse is allowed during the transmission of this PPDU, and if allowed, indicates a value that is used to determine a limit on the transmit power of a spatial reuse transmission.  Set to the value of the SPATIAL\_REUSE parameter of the TXVECTOR, which contains a value from Table 28-18 (Spatial Reuse subfield encoding for an HE SU PPDU, HE ER SU PPDU, and HE MU PPDU) subfield encoding for an HE MU PPDU, HE SU PPDU or HE ER SU PPDU, see 27.11.6 (SPATIAL\_REUSE).  Set to SRP\_DISALLOW to prohibit SRP-based spatial reuse during this PPDU. Set to SRP\_AND\_NON-SRG\_OBSS-PD\_PROHIBITED to prohibit both SRP-based spatial reuse and Non-SRG OBSS-PD-based spatial reuse during this PPDU. For the interpretation of other values see 27.11.6 (SPATIAL\_REUSE) and 27.9 (Spatial reuse operation).(#4997, #9462, #9181Differentiate an HE SU PPDU from an HE TB PPDU: |

**TGax Editor: *Modify Table 28.16 by adding the underlined material in the place shown:***

**Table 28-16―HE-SIG-A field of an HE MU PPDU**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Two Parts of HE-SIG-A | Bit | Field | Number of bits | Description |
| HE-SIG-A1 | B11-B14 | Spatial Reuse | 4 | Indicates whether or not spatial reuse is allowed during the transmission of this PPDU, and if allowed, indicates a value that is used to determine a limit on the transmit power of a spatial reuse transmission.  Set to the value of the SPATIAL\_REUSE parameter of the TXVECTOR, which contains a value from Table 28-19 Spatial Reuse subfield encoding for an HE MU PPDU, HE SU PPDU or HE ER SU PPDU, see 27.11.6 (SPATIAL\_REUSE).  Set to SRP\_DISALLOW to prohibit SRP-based spatial reuse during this PPDU. Set to SRP\_AND-NON-SRG\_OBSS\_PD\_PROHIBITED to prohibit both SRP-based spatial reuse and Non-SRG OBSS-PD-based spatial reuse during this PPDU. For the interpretation of other values see 27.11.6 (SPATIAL\_REUSE) and 27.9 (Spatial reuse operation) |

**TGax Editor: *Modify Table 28.17 by adding the underlined material in the place shown:***

**Table 28-17―HE-SIG-A field of an HE TB PPDU**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Two Parts of HE-SIG-A | Bit | Field | Number of bits | Description |
| HE-SIG-A1 | B7-B10 | Spatial Reuse 1 | 4 | Indicates whether or not spatial reuse is allowed in a subband of the PPDU during the transmission of this PPDU, and if allowed, indicates a value that is used to determine a limit on the transmit power of a spatial reuse transmission  If the Bandwidth field indicates 20 MHz, 40 MHz, or 80 MHz then this Spatial Reuse field applies to the first 20 MHz subband (see NOTE 1).  If the Bandwidth field indicates 160/80+80 MHz then this Spatial Reuse field applies to the first 40 MHz subband of the 160 MHz operating band (see NOTE 1).  Set to the value of the SPATIAL\_REUSE(1) parameter of the TXVECTOR, which contains a value from Table 28-19 (Spatial Reuse subfield encoding for an HE TB PPDU) for an HE TB PPDU, see 27.11.6 (SPATIAL\_REUSE).  Set to SRP\_DISALLOW to prohibit SRP-based spatial reuse during this PPDU. Set to SRP\_AND-NON-SRG\_OBSS\_PD\_PROHIBITED to prohibit both SRP-based spatial reuse and Non-SRG OBSS-PD-based spatial reuse during this PPDU. For the interpretation of other values see 27.11.6 (SPATIAL\_REUSE) and 27.9 (Spatial reuse operation). |
|  | B11-B14 | Spatial Reuse 2 | 4 | Indicates whether or not spatial reuse is allowed in a subband of the PPDU during the transmission of this PPDU, and if allowed, indicates a value that is used to determine a limit on the transmit power of a spatial reuse transmission.  If the Bandwidth field indicates 20 MHz, 40 MHz, or 80 MHz:  This Spatial Reuse field applies to the second 20 MHz subband (see NOTE 1).  When the STA operating channel width is 20 MHz, then this field is set to the same value as Spatial Reuse 1 field.  When the STA operating channel width is 40 MHz in the 2.4 GHz band, this field is set to the same value as Spatial Reuse 1 field.  If the Bandwidth field indicates 160/80+80 MHz the this Spatial Reuse field applies to the second 40 MHz subband of the 160 MHz operating band (see NOTE 1).  Set to the value of the SPATIAL\_REUSE(2) parameter of the TXVECTOR, which contains a value from Table 28-19 (Spatial Reuse subfield encoding for an HE TB PPDU) for an HE TB PPDU, see 27.11.6 (SPATIAL\_REUSE).  Set to SRP\_DISALLOW to prohibit SRP-based spatial reuse during this PPDU. Set to SRP\_AND-NON-SRG\_OBSS\_PD\_PROHIBITED to prohibit both SRP-based spatial reuse and Non-SRG OBSS-PD-based spatial reuse during this PPDU. For the interpretation of other values see 27.11.6 (SPATIAL\_REUSE) and 27.9 (Spatial reuse operation).(#10415) |
|  | B15-B18 | Spatial Reuse 3 | 4 | Indicates whether or not spatial reuse is allowed in a subband of the PPDU during the transmission of this PPDU, and if allowed, indicates a value that is used to determine a limit on the transmit power of a spatial reuse transmission.  If the Bandwidth field indicates 20 MHz, 40 MHz or 80 MHz:  This Spatial Reuse field applies to the third 20 MHz subband (see NOTE 1).  When the STA operating channel width is(#Ed) 20 MHz or 40 MHz, this field is set to the same value as Spatial Reuse 1 field.  If the Bandwidth field indicates 160/80+80 MHz:  This Spatial Reuse field applies to the third 40 MHz subband of the 160 MHz operating band (see NOTE 1).  When the STA operating channel width is 80+80 MHz, this field is set to the same value as Spatial Reuse 1 field.  Set to the value of the SPATIAL\_REUSE(3) parameter of the TXVECTOR, which contains a value from Table 28-19 (Spatial Reuse subfield encoding for an HE TB PPDU) for an HE TB PPDU, see 27.11.6 (SPATIAL\_REUSE).  Set to SRP\_DISALLOW to prohibit SRP-based spatial reuse during this PPDU. Set to SRP\_AND-NON-SRG\_OBSS\_PD\_PROHIBITED to prohibit both SRP-based spatial reuse and Non-SRG OBSS-PD-based spatial reuse during this PPDU. For the interpretation of other values see 27.11.6 (SPATIAL\_REUSE) and 27.9 (Spatial reuse operation). |
|  | B19-B22 | Spatial Reuse 4 | 4 | Indicates whether or not spatial reuse is allowed in a subband of the PPDU during the transmission of this PPDU, and if allowed, indicates a value that is used to determine a limit on the transmit power of a spatial reuse transmission.  If the Bandwidth field indicates 20 MHz, 40 MHz or 80 MHz:  This Spatial Reuse field applies to the fourth 20 MHz subband (see NOTE 1).  When the STA operating channel width is 20 MHz, then this field is set to the same value as Spatial Reuse 1 field.  When the STA operating channel width is 40 MHz, then this field is set to the same value as Spatial Reuse 2 field.  If the Bandwidth field indicates 160/80+80 MHz:  This Spatial Reuse field applies to the fourth 40 MHz subband of the 160 MHz operating band (see NOTE 1).  When the STA operating channel width is 80+80 MHz, then this field is set to same value as Spatial Reuse 2 field.  Set to the value of the SPATIAL\_REUSE(4) parameter of the TXVECTOR, which contains a value from Table 28-19 (Spatial Reuse subfield encoding for an HE TB PPDU) for an HE TB PPDU, see 27.11.6 (SPATIAL\_REUSE).  Set to SRP\_DISALLOW to prohibit SRP-based spatial reuse during this PPDU. Set to SRP\_AND-NON-SRG\_OBSS\_PD\_PROHIBITED to prohibit both SRP-based spatial reuse and Non-SRG OBSS-PD-based spatial reuse during this PPDU. For the interpretation of other values see 27.11.6 (SPATIAL\_REUSE) and 27.9 (Spatial reuse operation). |

**TGax Editor: *Modify Table 28-18 by adding the underlined material and deleting the strikethrough material in the places show:***

|  |  |
| --- | --- |
| * Spatial Reuse subfield encoding for an HE SU PPDU, HE ER SU PPDU, and HE MU PPDU | |
| **Value** | **Meaning** |
| 0 | SRP\_DISALLOW |
| 1-1~~3~~2 | Reserved |
| 143 | SR\_RESTRICTED |
| 1~~5~~4 | SR\_DELAY |
| 15 | SRP\_AND\_NON-SRG\_OBSS-PD\_PROHIBITED |

**TGax Editor: *Modify Table 28-19 by deleting the strikethrough material and adding the underlined material in the place indicated:***

|  |  |
| --- | --- |
| * Spatial Reuse subfield encoding for an HE TB PPDU | |
| **Value** | **Meaning** |
| 0 | SRP\_DISALLOW |
| 1 | SRP = 80 dBm |
| 2 | SRP = 74 dBm |
| 3 | SRP = 68 dBm |
| 4 | SRP = 62 dBm |
| 5 | SRP = 56 dBm |
| 6 | SRP = 50 dBm |
| 7 | SRP = 47 dBm |
| 8 | SRP = 44 dBm |
| 9 | SRP = 41 dBm |
| 10 | SRP = 38 dBm |
| 11 | SRP = 35 dBm |
| 12 | SRP = 32 dBm |
| 13 | SRP = 29 dBm |
| 14 | SRP  26 dBm |
| 15 | ~~Reserved~~  SRP\_AND\_NON-SRG\_OBSS-PD\_PROHIBITED |

**TGax Editor: *add the underlined material to 27.11.6 in the places shown:***

An HE STA with dot11HESRPOptionImplemented set to false may set the TXVECTOR parameter SPATIAL\_REUSE to SRP\_DISALLOW for any PPDU that is not an HE TB PPDU or an NDP PPDU or a PPDU containing an FTM or NDP Announcement frame.

An HE non-AP STA may set the TXVECTOR parameter SPATIAL\_REUSE of an HE PPDU to SRP\_AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED if the HESIGA\_Spatial\_reuse\_value15\_allowed subfield of the SR Control field of the most recently received Spatial Reuse Parameter Set element from its associated AP is equal to 1. If the HESIGA\_Spatial\_reuse\_value15\_allowed subfield of the SR Control field of the most recently received Spatial Reuse Parameter Set element from its associated AP is equal to 0, or if STA has not received a Spatial Reuse Parameter Set element from its associated AP, the STA shall not set the TXVECTOR parameter SPATIAL\_REUSE of any HE PPDU to SRP\_AND\_NON\_SRG\_OBSS\_PD\_PROHIBITED.

A STA shall set the TXVECTOR parameter SPATIAL\_REUSE of an HE PPDU to SRP\_DISALLOW or, if permitted, to SRP\_AND-NON-SRG\_OBSS\_PD\_PROHIBITED, if the STA is an HE non-AP STA and the SRP Disallowed subfield of the SR Control field of the most recently received Spatial Reuse Parameter Set element from its associated AP is equal to 1.

**TGax Editor: *add the underlined material to 27.9.2.1 in the places shown:***

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

* 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
* The received PPDU is an Inter-BSS PPDU (see 27.2.1 (Intra-BSS and inter-BSS frame determination))
* 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
* The received PPDU is not a non-HT PPDU carrying a response frame and the RXVECTOR parameter RSSI\_LEGACY in the PHY-RXSTART.indication primitive, which defines the received power level measured from the legacy portion of the PPDU is below the OBSS\_PD level (defined in 27.9.2.2 (Adjustment of OBSS\_PD and transmit power)). Or, the received PPDU is a non-HT PPDU carrying a response frame and the RXVECTOR parameter RSSI\_LEGACY in the PHY-RXSTART.indication primitive, which defines the received power level measured from the legacy portion of the PPDU is below the *OBSS\_PDmin\_default* level (defined in 27.9.2.2 (Adjustment of OBSS\_PD and transmit power)).
* The PPDU is not one of the following:
* A non-HT PPDU that carries an individually addressed Public Action frame where the RA field is equal to the STA MAC address
* A non-HT PPDU that carries a group addressed Public Action frame
* A non-HT PPDU that carries an NDP Announcement frame

A STA that takes actions (a) or (b) under the conditions of this paragraph is deemed to perform NON\_SRG-OBSS\_PD-based spatial reuse (see 27.11.6).

**TGax Editor: *in Section 9.4.2.226 (Spatial Reuse Parameter Set element), add subfield HESIGA\_Spatial\_reuse\_value15\_allowed to the SR Control field, converted from Reserved. Add paragraph immediately after the one beginning “The SRG Information Present subfield …” as follows:***

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 SRP-based SR transmissions.