IEEE P802.11  
Wireless LANs

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| --- | --- | --- | --- | --- |
| Extended NSS | | | | |
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Abstract

This document proposes changes to extended NSS support. Changes shown are relative to REVmc draft 5.2.

The proposed changes in this document are as follows:

1. OMN channel width 160 and 80+80 MHz is now signaled through a new 160 MHz field, at 80 MHz in the existing OMN channel width field. This change is proposed because 80 MHz devices have been observed to have parsing issues with the now deprecated 80+80 and 160 MHz signaling in the VHT Operation element, and the same issue is speculated to exist in the OMN signaling. This has not been experimentally established though, but a change is proposed regardless. An independent by-product of this change is that the 1-bit 160 MHz field replaces a 2-bit Dynamic Extended NSS field. This reduction in size is possible because 1/2 or 3/4 is merely an implementation capability rather than a dynamic capability between which switching would be needed.
2. A new center frequency CCFS2 is defined to signal the 160 or 80+80 MHz center frequency for NSS support at less than max NSS. CCFS2 is hidden for legacy devices that do not support extended NSS. CCFS2 is inserted into the HT Operation element, which has many reserved bits, and which is already used in the determination of the channel width and center frequency (through STA channel width an secondary channel offset).
3. The supported MCS and NSS set is now determined by calling sections 10.7.12.1 and 10.7.12.2 from 10.7.5.7 when a VHT Operation element or a subsequent OMN is received. This allows to reduce the number of tables related to Extended NSS, but effectively this should be an editorial change.

10.7.12.1 - Rx Supported VHT-MCS and NSS Set

10.7.12.2 - Tx Supported VHT-MCS and NSS Set

10.7.5.7 - Rate selection for other individually addressed Data and Management frames

1. The VHT Operation element table (Table 9-246) is lined up with the formatting of the OMN table (Table 9-74), but there is no change to the options listed in the original Table 9-246.

**9.4.1.53 Operating Mode field**

***Modify Figure 9-117 (Operating Mode field) by changing "Dynamic Extended NSS BW field" to "160 BW", and reducing it to 1 bit, making the second bit reserved.***

***Modify Table 9-73 (Subfield values of the Operating Mode field) as shown:***

|  |  |
| --- | --- |
| **Subfield** | **Description** |
| Channel Width | If the Rx NSS Type subfield is 0, indicates the supported channel width:  In a VHT STA see Table 9-74 (Setting of the Channel Width subfield and 160 BW subfield at a VHT STA transmitting the Operating Mode field).  In a TVHT STA:  Set to 0 for TVHT\_W  Set to 1 for TVHT\_2W and TVHT\_W+W  Set to 2 for TVHT\_4W and TVHT\_2W+2W  The value of 3 is reserved.  Reserved if the Rx NSS Type subfield is 1. |
| 160 BW | The 160 BW subfield, combined with the Channel Width field, Supported Channel Width Set field and the Supported VHT-MCS and NSS Set field indicates whether 80+80 MHz and 160 MHz operation is supported.  In addition, the 160 BW subfield, combined with the Supported VHT-MCS and NSS Set field indicates extensions to the maximum NSS supported for each bandwidth of operation.  In a VHT STA, see Table 9-74 (Setting of the Channel Width subfield and 160 BW subfield at a VHT STA transmitting the Operating Mode field).  In a TVHT STA, this field is reserved.  In a VHT STA with Extended NSS BW Capable set to 0, this field is set to 0. |

***Replace Table 9-74 (Setting of the Channel Width subfield and Dynamic Extended NSS BW subfield at a VHT STA transmitting the Operating Mode field) as shown:***

**Table 9-74—Setting of the Channel Width subfield and 160 BW subfield at a VHT STA transmitting the Operating Mode field**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Transmitted Operating Mode field** | | **VHT Capabilities of STA transmitting the Operating Mode field** | | **PPDU NSS support of STA transmitting the Operating Mode field** | | | | | **Location of a 160 center frequency** | **Location of a secondary 80 center frequency** |
| **Channel Width** | **160 BW** | **Supported Channel Width Set** | **Extended NSS BW Support** | **20 MHz** | **40 MHz** | **80 MHz** | **160 MHz** | **80+80 MHz** |  |  |
| 0 | 0 | 0-2 | 0-3 | 1x |  |  |  |  |  |  |
| 1 | 0 | 0-2 | 0-3 | 1x | 1x |  |  |  |  |  |
| 2 | 0 | 0 | 0 | 1x | 1x | 1x |  |  |  |  |
| 2 | 1 | 1 | 0 | 1x | 1x | 1x | 1x |  | CCFS1 |  |
| 2 | 1 | 2 | 0 | 1x | 1x | 1x | 1x | 1x | CCFS1 | CCFS1 |
| 2 | 1 | 0 | 1 | 1x | 1x | 1x | half |  | CCFS2 |  |
| 2 | 1 | 0 | 2 | 1x | 1x | 1x | half | half | CCFS2 | CCFS2 |
| 2 | 1 | 0 | 3 | 1x | 1x | 1x | 3/4 | 3/4 | CCFS2 | CCFS2 |
| 2 | 1 | 1 | 1 | 1x | 1x | 1x | 1x | half | CCFS1 | CCFS2 |
| 2 | 1 | 1 | 2 | 1x | 1x | 1x | 1x | 3/4 | CCFS1 | CCFS2 |
| 2 | 1 | 1 | 3 | twice | twice | twice | twice | 1x | CCFS1 | CCFS1 |
| 2 | 1 | 2 | 3 | twice | twice | twice | 1x | 1x | CCFS1 | CCFS1 |

NOTE 1—Transmitting STA refers to the STA transmitting the Channel Width and 160 BW subfields (as part of an Operating Mode field).

NOTE 2—'1x', 'twice', 'half' and '3/4' refer to the supported multiple of Max VHT NSS.

NOTE 3—Max VHT NSS is defined per MCS in 9.4.2.158.3 (Supported VHT-MCS and NSS Set field).

NOTE 4—Twice Max VHT NSS is equal to 2x Max VHT NSS.

NOTE 5—Half Max VHT NSS is equal to 1/2x Max VHT NSS rounded down to the nearest integer.

NOTE 6—3/4x Max VHT NSS is equal to 3/4x Max VHT NSS rounded down to the nearest integer.

NOTE 7—Any other combination than the ones listed in this table is reserved.

NOTE 8—OMN Channel Width 3 is deprecated. 160 or 80+80 MHz channel widths are signaled through the 160 BW subfield of the Operating Mode field.

NOTE 9—CCFS1 refers to the value of the Channel Center Frequency Segment 1 field of the most recently transmitted VHT Operation Element.

NOTE 10—CCFS2 refers to the value of the Channel Center Frequency Segment 2 field of the most recently transmitted HT Operation Element.

NOTE 11—CCFS1 is non-zero when the current operating channel width is 160 MHz or 80+80 MHz and the NSS support is 1x or twice Max VHT NSS. CCFS2 is zero in this case.

NOTE 12— CCFS2 is non-zero when the current operating channel width is 160 MHz or 80+80 MHz and the NSS support is 3/4 or half Max VHT NSS. CCFS1 is zero in this case.

NOTE 13—Extended NSS applies to both transmit and receive.

**9.4.2.57 HT Operation element**

***Modify the HT Operation Information field of the HT Operation element by changing the reserved bits B13-B20 of Figure 9-338 (HT Operation Information field) to become “Channel Center Frequency Segment 2”***

***Modify Table 9-167 (HT Operation element fields and subfields), by inserting a new row after “OBSS Non-HT STAs Present” as follows:***

**Table 9-167—HT Operation element fields and subfields**

|  |  |  |
| --- | --- | --- |
| Channel Center Frequency Segment 2 | Defines a channel center frequency for a 160 or 80+80 MHz channel width with extended NSS. See 21.3.14 (Channelization). | For a STA with dot11VHTExtendedNSSBWCapable equal to true: See Table 9-246 (Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field), otherwise this field is set to 0. |

**9.4.2.158.2 VHT Capabilities Information field**

***Modify the Extended NSS BW Support row of Table 9-245 (Subfields of the VHT Capabilities Information field) as shown:***

**Table 9-245—Subfields of the VHT Capabilities Information field**

|  |  |  |
| --- | --- | --- |
| Extended NSS BW Support | Together with the Supported Channel Width Set subfield and Supported VHT-MCS and NSS Set field, indicates the channel widths and maximum NSS values per width supported by the STA. See 11.40 (VHT BSS operation). | In a non-TVHT STA, see Table 9-246 (Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field).  In a TVHT STA, the field is reserved.  In a VHT STA with VHT Extended NSS BW Capable set to 0, this field is set to 0. |

***Replace Table 9-246 (Setting of the Supported Channel Width Set and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field) as shown:***

**Table 9-246—Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Transmitted VHT Capabilities Information field** | | **Transmitting STA PPDU NSS support at given BW** | | | | | **Location of a 160 MHz channel center frequency** | **Location of an 80+80 MHz center frequency** |
| **Supported Channel Width Set** | **Extended NSS BW Support** | **20 MHz** | **40 MHz** | **80 MHz** | **160 MHz** | **80+80 MHz** |  |  |
| 0 | 0 | 1x | 1x | 1x |  |  |  |  |
| 0 | 1 | 1x | 1x | 1x | half |  | CCFS2 |  |
| 0 | 2 | 1x | 1x | 1x | half | half | CCFS2 | CCFS2 |
| 0 | 3 | 1x | 1x | 1x | 3/4 | 3/4 | CCFS2 | CCFS2 |
| 1 | 0 | 1x | 1x | 1x | 1x |  | CCFS1 |  |
| 1 | 1 | 1x | 1x | 1x | 1x | half | CCFS1 | CCFS2 |
| 1 | 2 | 1x | 1x | 1x | 1x | 3/4 | CCFS1 | CCFS2 |
| 1 | 3 | twice | twice | twice | twice | 1x | CCFS1 | CCFS1 |
| 2 | 0 | 1x | 1x | 1x | 1x | 1x | CCFS1 | CCFS1 |
| 2 | 3 | twice | twice | twice | 1x | 1x | CCFS1 | CCFS1 |

NOTE 1—A transmitting STA refers to the STA transmitting the Supported Channel Width Set and Extended NSS BW Support bits of the VHT Capabilities Information field.

NOTE 2—'1x', 'twice', 'half' and '3/4' refer to the supported multiple of Max VHT NSS.

NOTE 3—Max VHT NSS is defined per MCS in 9.4.2.158.3 (Supported VHT-MCS and NSS Set field).

NOTE 4—Twice Max VHT NSS is equal to 2x Max VHT NSS.

NOTE 5—Half Max VHT NSS is equal to 1/2x Max VHT NSS rounded down to the nearest integer.

NOTE 6—3/4x Max VHT NSS is equal to 3/4x Max VHT NSS rounded down to the nearest integer.

NOTE 7—Any other combination than the ones listed in this table is reserved.

NOTE 8—CCFS1 refers to the value of the Channel Center Frequency Segment 1 field of the most recently transmitted VHT Operation Element.

NOTE 9—CCFS2 refers to the value of the Channel Center Frequency Segment 2 field of the most recently transmitted HT Operation Element.

NOTE 11—CCFS1 is non-zero when the current operating channel width is 160 MHz or 80+80 MHz and the NSS support is 1x or twice Max VHT NSS. CCFS2 is zero in this case.

NOTE 12— CCFS2 is non-zero when the current operating channel width is 160 MHz or 80+80 MHz and the NSS support is 3/4 or half Max VHT NSS. CCFS1 is zero in this case

NOTE 13—Extended NSS applies to both transmit and receive.

**9.4.2.158.3 Supported VHT-MCS and NSS Set field**

***Modify two entries in Table 9-247 (Supported VHT-MCS and NSS Set subfields) as shown:***

**Table 9-247—Supported VHT-MCS and NSS Set subfields**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Rx VHT-MCS  Map | Indicates the maximum value of the RXVECTOR parameter MCS of a PPDU that can be received at all channel widths supported by this STA for each number of spatial streams.  This parameter is further modified by the Extended NSS BW Support subfield as described in 9.4.2.158.2 (VHT Capabilities Information field) and the 160 BW subfield of the Operating Mode field in 9.4.1.53 (Operating Mode field). | The format and encoding of this subfield are defined in Figure 9-560 (Rx VHT-MCS Map and Tx VHT-MCS Map subfields and Basic VHT-MCS and NSS Set field) and the associated description. |
| Tx VHT-MCS  Map | If transmitted by a STA in which dot11VHTExtendedNSSBWCapable is not true, indicates the maximum value of the TXVECTOR parameter MCS of a PPDU that can be transmitted at all channel widths supported by this STA for each number of spatial streams.  If transmitted by a STA in which dot11VHTExtendedNSSBWCapable is true, this field combined with the Extended NSS BW Support subfield and the 160 BW subfield of the Operating Mode field determines the maximum value of the TXVECTOR parameter MCS of a PPDU as described in 9.4.2.158.2 (VHT Capabilities Information field) and 9.4.1.53 (Operating Mode field). | The format and encoding of this subfield are defined in Figure 9-560 (Rx VHT-MCS Map and Tx VHT-MCS Map subfields and Basic VHT-MCS and NSS Set field) and the associated description. |

***Modify the note at the end of subclause 9.4.2.158.3 (Supported VHT-MCS and NSS Set field) as shown:***

NOTE—A VHT-MCS indicated as supported in the VHT-MCS Map fields for a particular number of spatial streams might not be valid at all bandwidths (see 21.5 (Parameters for VHT-MCSs)) and might be limited by the declaration of Tx Highest Supported Long GI Data Rates and Rx Highest Supported Long GI Data Rates and might be affected by 10.7.12.3 (Additional rate selection constraints for VHT PPDUs) and the value of the Extended NSS BW Support field of the VHT Capabilities Information field in 9.4.2.158.2 (VHT Capabilities Information field) and the 160 BW subfield of the Operating Mode field in 9.4.1.53 (Operating Mode field).

**10.7.5.7 Rate selection for other individually addressed Data and Management frames**

***Modify 10.7.5.7 (Rate selection for other individually addressed Data and Management frames) as shown:***

A Data or Management frame not identified in 10.7.5.1 (Rate selection for non-STBC Beacon and non-STBC PSMP frames) through 10.7.5.6 (Rate selection for Data frames sent within an FMS stream) shall be sent using any data rate, MCS, or <VHT-MCS, NSS> tuple subject to the following constraints:

* A STA shall not transmit a frame using a rate or MCS that is not supported by the receiver STA or STAs, as reported in any Supported Rates and BSS Membership Selectors(#3508) element, Extended Supported Rates and BSS Membership Selectors(#3508) element, or Supported MCS Set(11ac) field in (#100)Management frames transmitted by the receiver STA.
* A STA shall not transmit a frame using a <VHT-MCS, NSS> tuple that is not supported by the receiver STA, as reported in any Supported VHT-MCS and NSS Set field in (Ed)Management frames transmitted by the receiver STA.(11ac)
* If at least one Operating Mode field with the Rx NSS Type subfield equal to 0 was received from the receiver STA:(11ac)
* A STA shall not transmit a frame with the number of spatial streams greater than that indicated in the Rx NSS subfield in the most recently received Operating Mode field with the Rx NSS Type subfield equal to 0 from the receiver STA.
* A STA shall redetermine the Rx and Tx Supported VHT-MCS and NSS Set with Max VHT NSS set to the value indicated by the Rx NSS subfield in the most recently received Operating Mode field with the Rx NSS Type subfield equal to 0 from the receiver STA, per 10.7.12.1 (Rx Supported VHT-MCS and NSS Set) and 10.7.12.2 (Tx Supported VHT-MCS and NSS Set), respectively.
* If at least one Operating Mode field with the Rx NSS Type subfield equal to 1 was received from the receiver STA:(11ac)
* A STA shall not transmit an SU PPDU frame using a beamforming steering matrix with the number of spatial streams greater than that indicated in the Rx NSS subfield in the most recently received Operating Mode field with the Rx NSS Type subfield equal to 1 from the receiver STA if the beamforming steering matrix was derived from a VHT Compressed Beamforming report with Feedback Type subfield indicating MU in the VHT Compressed Beamforming frame(s).

**10.7.12.1 Rx Supported VHT-MCS and NSS Set**

***Modify 10.7.12.1 (Rx Supported VHT-MCS and NSS Set) as shown:***

The Rx Supported VHT-MCS and NSS Set of a first VHT STA is determined by a second VHT STA for each <VHT-MCS, NSS> tuple NSS = 1,…, 8 and bandwidth (20 MHz, 40 MHz, 80 MHz, and 160 MHz or 80+80 MHz) from the Supported VHT-MCS and NSS Set field received from the first STA as follows:

— If support for the VHT-MCS for NSS spatial streams for a bandwidth is mandatory (see 21.5 (Parameters for VHT-MCSs)), then the <VHT-MCS, NSS> tuple at that bandwidth is supported by the first STA on receive.

— Otherwise, if the Max VHT-MCS For n SS subfield (n = NSS) in the Rx VHT-MCS Map subfield indicates support and the Rx Highest Supported Long GI Data Rate subfield is equal to 0, then the <VHT-MCS, NSS> tuple at that bandwidth is supported by the first STA on receive, except that if dot11VHTExtendedNSSBWCapable of the second STA is true, the supported bandwidth values and NSS values of each <VHT-MCS, NSS> tuple are updated according to Table 9-246 (Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field) if no OMN has been received from the first STA, otherwise, according to Table 9-74 (Setting of the Channel Width subfield at a VHT STA transmitting the Operating Mode field), wherein the VHT Capabilities Information field and the Operating Mode field have been transmitted by the first STA.

— Otherwise, if the Max VHT-MCS For n SS subfield (n = NSS) in the Rx VHT-MCS Map subfield indicates support and the data rate for long GI of the MCS for NSS spatial streams at that bandwidth (expressed as the largest integer in Mb/s that is less than or equal to the data rate) is less than or equal to the rate represented by the Rx Highest Supported Long GI Data Rate subfield, then the <VHT-MCS, NSS> tuple at that bandwidth is supported by the first STA on receive, except that if dot11VHTExtendedNSSBWCapable of the second STA is true, the supported bandwidth values and NSS values of each <VHT-MCS, NSS> tuple are updated according to Table 9-246 (Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field) if no OMN has been received from the first STA, otherwise, according to Table 9-74 (Setting of the Channel Width subfield at a VHT STA transmitting the Operating Mode field), wherein the VHT Capabilities Information field and the Operating Mode field have been transmitted by the first STA.

— Otherwise, the <VHT-MCS, NSS> tuple at that bandwidth is not supported by the first STA on receive.

The <VHT-MCS, NSS> tuples excluded by 10.7.12.3 (Additional rate selection constraints for VHT PPDUs) are also eliminated from the Rx Supported VHT-MCS and NSS Set.

A VHT STA shall not, unless explicitly stated otherwise, transmit a VHT PPDU unless the <VHT-MCS, NSS> tuple and bandwidth used are in the Rx Supported VHT-MCS and NSS Set of the receiving STA(s).

NOTE—Support for a <VHT-MCS, NSS> tuple at a given bandwidth implies support for both long GI and short GI on receive, if short GI is supported at that bandwidth.

NOTE – A STA can determine the expected interpretation of its Supported Channel Width Set and Channel Width and 160 BW and Extended NSS BW Support fields at a recipient by examining the VHT Extended NSS BW Capable field value in the Supported VHT-MCS and NSS Set field of the recipient.



**10.7.12.2 Tx Supported VHT-MCS and NSS Set**

***Modify 10.7.12.2 (Tx Supported VHT-MCS and NSS Set) as shown:***

The Tx Supported VHT-MCS and NSS Set of a first VHT STA is determined by a second STA for each <VHT-MCS, NSS> tuple NSS = 1,…, 8 and bandwidth (20 MHz, 40 MHz, 80 MHz, and 160 MHz or 80+80 MHz) from the Supported VHT-MCS and NSS Set field received from the first STA as follows:

— If support for the <VHT-MCS, NSS> tuple at for a bandwidth is mandatory (see 21.5 (Parameters for VHT-MCSs)), then the <VHT-MCS, NSS> tuple at that bandwidth is supported by the first STA on transmit.

— Otherwise, if the Max VHT-MCS for n SS subfield (n = NSS) in the Tx VHT-MCS Map subfield indicates support and the Tx Highest Supported Long GI Data Rate subfield is equal to 0, then the <VHT-MCS, NSS> tuple at that bandwidth is supported by the first STA on transmit, except that if dot11VHTExtendedNSSBWCapable of the second STA is true, the supported bandwidth values and NSS values of each <VHT-MCS, NSS> tuple are updated according to Table 9-246 (Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field) if no OMN has been received from the first STA, otherwise, according to Table 9-74 (Setting of the Channel Width subfield at a VHT STA transmitting the Operating Mode field), wherein the VHT Capabilities Information field and the Operating Mode field have been transmitted by the first STA.

— Otherwise, if the Max VHT-MCS for n SS subfield (n = NSS) in the Tx VHT-MCS Map subfield indicates support and the data rate for long GI of the <VHT-MCS, NSS> tuple at that bandwidth (expressed as the largest integer in Mb/s that is less than or equal to the data rate) is less than or equal to the rate represented by the Tx Highest Supported Long GI Data Rate subfield, then the <VHT-MCS, NSS> tuple at that bandwidth is supported by the first STA on transmit, except that if dot11VHTExtendedNSSBWCapable of the second STA is true, the supported bandwidth values and NSS values of each <VHT-MCS, NSS> tuple are updated according to Table 9-246 (Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field) if no OMN has been received from the first STA, otherwise, according to Table 9-74 (Setting of the Channel Width subfield at a VHT STA transmitting the Operating Mode field), wherein the VHT Capabilities Information field and the Operating Mode field have been transmitted by the first STA.

— Otherwise, the <VHT-MCS, NSS> tuple at that bandwidth is not supported by the first STA on transmit.

NOTE—In contrast to reception, support for short GI transmissions by a STA cannot be determined by other STAs.

NOTE—A STA can determine the expected interpretation of its Supported Channel Width Set and Channel Width and 160 BW and Extended NSS BW Support fields at a recipient by examining the VHT Extended NSS BW Capable field value in the Supported VHT-MCS and NSS Set field of the recipient.

**10.34.5.2 Rules for VHT sounding protocol sequences**

***Modify 10.34.5.2 (Rules for VHT sounding protocol sequences) as shown:***

(1486.16)

* The maximum number of supported spatial streams according to the Rx NSS subfield value and, when the value of the VHT Extended NSS BW Capable subfield received from the VHT beamformee is 1, the 160 BW value in the Operating Mode field of the most recently received Operating Mode Notification frame or Operating Mode Notification element with the Rx NSS Type subfield equal to 0 from the corresponding VHT beamformee, as computed according to 10.7.12.1 (Rx Supported VHT-MCS and NSS Set).

(1487.55)

* The maximum number of supported spatial streams according to the Rx NSS subfield value and, when the value of the most recently transmitted VHT Extended NSS BW Capable subfield is 1, the 160 BW value in the Operating Mode field of the most recently transmitted Operating Mode Notification frame or Operating Mode Notification element, as computed according to 10.7.12.1 (Rx Supported VHT-MCS and NSS Set).

**11.40.1 Basic VHT BSS functionality**

***Modify Table 11-25 (Setting of Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields) as shown:***

**Table 11-25—Setting of Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| BSS bandwidth | VHT Operation element Channel Width field | Setting of the Channel Center Frequency Segment 0 subfield | Setting of the Channel Center Frequency Segment 1 subfield | Setting of the Channel Center Frequency Segment 2 subfield |
| 20, 40 MHz | 0 | dot11CurrentChannelCenterFrequencyIndex0 | 0 | 0 |
| 80 MHz | 1 | dot11CurrentChannelCenterFrequencyIndex0 | 0 | 0 |
| 160 MHz  (No extended NSS) | 1 | if dot11CurrentPrimaryChannel > dot11CurrentChannelCenterFrequencyIndex0 then dot11CurrentChannelCenterFrequencyIndex0 + 8, else dot11CurrentChannelCenterFrequencyIndex0 - 8 | dot11CurrentChannelCenterFrequencyIndex0 | 0 |
| 160 MHz  (Extended NSS) | 1 | if dot11CurrentPrimaryChannel > dot11CurrentChannelCenterFrequencyIndex0 then dot11CurrentChannelCenterFrequencyIndex0 + 8, else dot11CurrentChannelCenterFrequencyIndex0 - 8 | 0 | dot11CurrentChannelCenterFrequencyIndex0 |
| 80+80 MHz  (No extended NSS) | 1 | dot11CurrentChannelCenterFrequencyIndex0 | dot11CurrentChannelCenterFrequencyIndex1 | 0 |
| 80+80 MHz  (Extended NSS) | 1 | dot11CurrentChannelCenterFrequencyIndex0 | 0 | dot11CurrentChannelCenterFrequencyIndex1 |
| 160 MHz  (deprecated) | 2 | dot11CurrentChannelCenterFrequencyIndex0 | 0 | 0 |
| 80+80 MHz  (deprecated) | 3 | dot11CurrentChannelCenterFrequencyIndex0 | dot11CurrentChannelCenterFrequencyIndex1 | dot11CurrentChannelCenterFrequencyIndex1 |

NOTE 1—No extended NSS means that the NSS support at 160 or 80+80 MHz is ≥1x Max VHT NSS, and therefore the secondary 80 or 160 MHz channel center frequency is signaled through CCFS1.

NOTE 2—Extended NSS means that the NSS support at 160 or 80+80 MHz is <1x Max VHT NSS, and therefore the secondary 80 or 160 MHz channel center frequency is signaled through CCFS2.

NOTE 3—For extended NSS support, see Table 9-74 (Setting of the Channel Width subfield and 160 BW subfield at a VHT STA transmitting the Operating Mode field) and Table 9-246 (Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field).

***Insert the following at the end of 11.40.1 (Basic VHT BSS functionality):***

VHT BSS operation with extended NSS is enabled as defined in Table 11-25a (Extended NSS channel width), and disabled otherwise, in which case CCFS2 shall be 0.

**Table 11-25a—Extended NSS channel width**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HT Operation element STA Channel Width field | VHT Operation element Channel Width field | VHT Operation element CCFS1 field | HT Operation element CCFS2 field | Extended NSS channel width |
| 1 | 1 | 0 | CCFS2 > 0 and  | CCFS2 – CCFS0 | = 8 | 160 MHz |
| 1 | 1 | 0 | CCFS2 > 0 and  | CCFS2 - CCFS0 | > 16 | 80+80 MHz |

When VHT BSS operation with Extended NSS is enabled, the NSS support is determined based on the Extended NSS channel width and the VHT capabilities element per Table 9-246 (Setting of the Supported Channel Width Set subfield and Extended NSS BW Support subfield at a STA transmitting the VHT Capabilities Information field).

**11.40.8 Extended NSS BW Support Signaling**

***Modify subclause 11.40.8 (Extended NSS BW Support Signaling) as shown:***

If dot11VHTExtendedNSSBWCapable is false, a STA shall set the Extended NSS BW Support subfield of the VHT Capabilities Information field to 0 in VHT Capability elements that it transmits, otherwise, the subfield may be set to 1, 2 or 3 as indicated in 9.4.2.158.2 (VHT Capabilities Information field).

If dot11VHTExtendedNSSBWCapable is false, a STA shall set the VHT Extended NSS BW Capable subfield of the Supported VHT-MCS and NSS Set field to 0 in VHT Capability elements that it transmits, otherwise, the subfield shall be set to 1.