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, as a conservative approach. An independent by-product of this change is that the 1-bit 160 MHz field replaces a 2-bit Dynamic Extended NSS BW field. This reduction in size was possible because 1/2 or 3/4 NSS 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 number of tables related to Extended NSS has been reduced, which effectively is an editorial change.
4. The VHT Operation element table (Table 9-246) is lined up with the formatting of the new OMN table (Table 9-74), but there is no change to the options listed in the original Table 9-246 (editorial change).

**9.4.1.53 Operating Mode field**

***Modify Figure 9-117 (Operating Mode field) by changing "Dynamic Extended NSS BW field" to "160/80+80 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 160/80+80 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. |
| 160/80+80 BW | This subfield, combined with the Channel Width subfield, the Supported Channel Width Set subfield and the Supported VHT-MCS and NSS Set subfield indicates whether 80+80 MHz and 160 MHz operation is supported.  In a VHT STA, see Table 9-74 (Setting of the Channel Width subfield and 160/80+80 BW subfield at a VHT STA transmitting the Operating Mode field).  In a TVHT STA, this field is reserved.  In a STA with dot11VHTExtendedNSSBWCapable either equal to false or not present, this field is set to 0. |
| Rx NSS | If the Rx NSS Type subfield is 0, the value of this field, combined with other information described in 9.4.2.158.3 (Supported VHT-MCS and NSS Set field), indicates the maximum number of spatial streams that the STA can receive.  If the Rx NSS Type subfield is 1, the value of this field, combined with other information described in 9.4.2.158.3 (Supported VHT-MCS and NSS Set field), indicates the maximum number of spatial streams that the STA can receive as a beamformee in an SU PPDU using a beamforming steering matrix derived from a VHT Compressed Beamforming report with Feedback Type subfield indicating MU in the corresponding VHT Compressed Beamforming frame sent by the STA.  Set to 0 for NSS = 1  Set to 1 for NSS = 2  ...  Set to 7 for NSS = 8  In a STA with dot11VHTExtendedNSSBWCapable equal to true, NSS might be further modified per Table 9-47 (Setting of the Channel Width subfield and 160/80+80 BW subfield at a VHT STA transmitting the Operating Mode field). |
| Rx NSS Type | Set to 0 to indicate that the Rx NSS subfield carries the maximum number of spatial streams that the STA can receive in any PPDU.  Set to 1 to indicate that the Rx NSS subfield carries the maximum number of spatial streams that the STA can receive as a beamformee in an SU PPDU using a beamforming steering matrix derived from a VHT Compressed Beamforming report with the Feedback Type subfield indicating MU in the corresponding VHT Compressed Beamforming frame sent by the STA.  NOTE—An AP always sets this field 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 160/80+80 BW subfield at a VHT STA transmitting the Operating Mode field**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Transmitted Operating Mode field** | | **VHT Capabilities of STA transmitting the Operating Mode field** | | **NSS support of STA transmitting the Operating Mode field as a function of the PPDU bandwidth (**×**Max VHT NSS)** | | | | | **Location of 160 MHz center frequency if BSS bandwidth is 160 MHz** | **Location of secondary 80 MHz center frequency if BSS bandwidth is 80+80 MHz** |
| **Channel Width** | **160/80+80 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 | 1 |  |  |  |  |  |  |
| 1 | 0 | 0-2 | 0-3 | 1 | 1 |  |  |  |  |  |
| 2 | 0 | 0-2 | 0-3 | 1 | 1 | 1 |  |  |  |  |
| 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1/2 |  | CCFS2 |  |
| 2 | 1 | 0 | 2 | 1 | 1 | 1 | 1/2 | 1/2 | CCFS2 | CCFS2 |
| 2 | 1 | 0 | 3 | 1 | 1 | 1 | 3/4 | 3/4 | CCFS2 | CCFS2 |
| 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |  | CCFS1 |  |
| 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1/2 | CCFS1 | CCFS2 |
| 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 3/4 | CCFS1 | CCFS2 |
| 2 | 1 | 1 | 3 | 2 | 2 | 2 | 2 | 1 | CCFS1 | CCFS1 |
| 2 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | CCFS1 | CCFS1 |
| 2 | 1 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | CCFS1 | CCFS1 |
| NOTE 1—Max VHT NSS is defined per MCS in 9.4.2.158.3 (Supported VHT-MCS and NSS Set field).  NOTE 2—NSS support is rounded down to the nearest integer.  NOTE 3—1/2× or 3/4× Max VHT NSS support might end up being 0, indicating no support.  NOTE 4—The maximum NSS support is 8.  NOTE 5—Any other combination than the ones listed in this table is reserved.  NOTE 6—CCFS1 refers to the value of the Channel Center Frequency Segment 1 field of the most recently transmitted VHT Operation element.  NOTE 7—CCFS2 refers to the value of the Channel Center Frequency Segment 2 field of the most recently transmitted HT Operation element.  NOTE 8—CCFS1 is non-zero when the current BSS bandwidth is 160 MHz or 80+80 MHz and the NSS support is at least Max VHT NSS. CCFS2 is zero in this case.  NOTE 9—CCFS2 is non-zero when the current BSS bandwidth is 160 MHz or 80+80 MHz and the NSS support is less than Max VHT NSS. CCFS1 is zero in this case.  NOTE 10—At most one of CCFS0 and CCFS1 is non-zero.  NOTE 11—A supported multiple of Max VHT NSS applies to both transmit and receive.  NOTE 12—Some combinations of Supported Channel Width Set and Extended NSS BW Support might not occur in practice.  NOTE 13—2× Max VHT NSS support might be used for HT PPDUs (at 20 or 40 MHz PPDU bandwidth). | | | | | | | | | | |

**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 the channel center frequency for a 160 or 80+80 MHz BSS bandwidth with NSS support less than VHT Max NSS.  See 21.3.14 (Channelization) and 9.4.2.158.3 (Supported VHT-MCS and NSS Set field). | 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.  NOTE—This subfield is not used in a non-VHT HT STA. |

**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 (for non-TVHT STAs). 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 STA with dot11VHTExtendedNSSBWCapable equal to false or not present, 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** | | **NSS support of STA transmitting the VHT Capabilities Information field as a function of the PPDU bandwidth (**×**Max VHT NSS)** | | | | | **Location of 160 MHz channel center frequency if BSS bandwidth is 160 MHz** | **Location of 80+80 MHz center frequency if BSS bandwidth is 80+80 MHz** |
| **Supported Channel Width Set** | **Extended NSS BW Support** | **20 MHz** | **40 MHz** | **80 MHz** | **160 MHz** | **80+80 MHz** |  |  |
| 0 | 0 | 1 | 1 | 1 |  |  |  |  |
| 0 | 1 | 1 | 1 | 1 | 1/2 |  | CCFS2 |  |
| 0 | 2 | 1 | 1 | 1 | 1/2 | 1/2 | CCFS2 | CCFS2 |
| 0 | 3 | 1 | 1 | 1 | 3/4 | 3/4 | CCFS2 | CCFS2 |
| 1 | 0 | 1 | 1 | 1 | 1 |  | CCFS1 |  |
| 1 | 1 | 1 | 1 | 1 | 1 | 1/2 | CCFS1 | CCFS2 |
| 1 | 2 | 1 | 1 | 1 | 1 | 3/4 | CCFS1 | CCFS2 |
| 1 | 3 | 2 | 2 | 2 | 2 | 1 | CCFS1 | CCFS1 |
| 2 | 0 | 1 | 1 | 1 | 1 | 1 | CCFS1 | CCFS1 |
| 2 | 3 | 2 | 2 | 2 | 1 | 1 | CCFS1 | CCFS1 |
| NOTE 1—Max VHT NSS is defined per MCS in 9.4.2.158.3 (Supported VHT-MCS and NSS Set field).  NOTE 2—NSS support is rounded down to the nearest integer.  NOTE 3—1/2× or 3/4× Max VHT NSS support might end up being 0, indicating no support.  NOTE 4—The maximum NSS support is 8.  NOTE 5—Any other combination than the ones listed in this table is reserved.  NOTE 6—CCFS1 refers to the value of the Channel Center Frequency Segment 1 field of the most recently transmitted VHT Operation element.  NOTE 7—CCFS2 refers to the value of the Channel Center Frequency Segment 2 field of the most recently transmitted HT Operation element.  NOTE 8—CCFS1 is non-zero when the current BSS bandwidth is 160 MHz or 80+80 MHz and the NSS support is at least Max VHT NSS. CCFS2 is zero in this case.  NOTE 9—CCFS2 is non-zero when the current BSS bandwidth is 160 MHz or 80+80 MHz and the NSS support is less than Max VHT NSS. CCFS1 is zero in this case.  NOTE 10—At most one of CCFS0 and CCFS1 is non-zero.  NOTE 11—A supported multiple of Max VHT NSS applies to both transmit and receive.  NOTE 12—2× Max VHT NSS support might be used for HT PPDUs (at 20 or 40 MHz PPDU bandwidth).  NOTE 13—A receiving STA in which dot11VHTExtendedNSSCapable is false will ignore the Extended NSS BW Support subfield and effectively evaluate this table only at the entries where Extended NSS BW Support is 0. | | | | | | | | |

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

***Modify three 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 | If transmitted by a STA in which dot11VHTExtendedNSSBWCapable is not true, 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.  If transmitted by a STA in which dot11VHTExtendedNSSBWCapable is true, this field combined with the Extended NSS BW Support subfield and the 160/80+80 BW subfield of an Operating Mode field determines the maximum value of the RXVECTOR 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. |
| 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 160/80+80 BW subfield of an 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. |
| VHT Extended NSS BW Capable | Indicates whether the STA is capable of interpreting the Extended NSS BW Support subfield of the VHT Capabilities Information field. | If dot11VHTExtendedNSSBWCapable is true, then this field is set to 1 to indicate that the STA is capable of interpreting the Extended NSS BW Support subfield of the VHT Capabilities Information field.  Set to 0 otherwise. |

***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 160/80+80 BW subfield of the Operating Mode field in 9.4.1.53 (Operating Mode field).

**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 160/80+80 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.

***Delete Table 10-8 and Table 10-9.***



**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 160/80+80 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 and dot11ExtendedNSSSupported is equal to true, the 160/80+80 BW subfield 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 160/80+80 BW subfield 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, Channel Center Frequency Segment 1 and Channel Center Frequency Segment 2 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  (At least Max VHT NSS support) | 1 | if dot11CurrentPrimaryChannel > dot11CurrentChannelCenterFrequencyIndex0 then dot11CurrentChannelCenterFrequencyIndex0 + 8, else dot11CurrentChannelCenterFrequencyIndex0 - 8 | dot11CurrentChannelCenterFrequencyIndex0 | 0 |
| 160 MHz  (Less than Max VHT NSS support) | 1 | if dot11CurrentPrimaryChannel > dot11CurrentChannelCenterFrequencyIndex0 then dot11CurrentChannelCenterFrequencyIndex0 + 8, else dot11CurrentChannelCenterFrequencyIndex0 - 8 | 0 | dot11CurrentChannelCenterFrequencyIndex0 |
| 80+80 MHz  (At least Max VHT NSS support) | 1 | dot11CurrentChannelCenterFrequencyIndex0 | dot11CurrentChannelCenterFrequencyIndex1 | 0 |
| 80+80 MHz  (Less than Max VHT NSS support) | 1 | dot11CurrentChannelCenterFrequencyIndex0 | 0 | dot11CurrentChannelCenterFrequencyIndex1 |
| 160 MHz  (deprecated) | 2 | dot11CurrentChannelCenterFrequencyIndex0 | 0 | 0 |
| 80+80 MHz  (deprecated) | 3 | dot11CurrentChannelCenterFrequencyIndex0 | dot11CurrentChannelCenterFrequencyIndex1 | dot11CurrentChannelCenterFrequencyIndex1 |

NOTE 1— At least Max VHT NSS support means that the NSS support at 160 or 80+80 MHz is at least Max VHT NSS, and therefore the secondary 80 or 160 MHz channel center frequency is signaled through CCFS1.

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

NOTE 3—For NSS support, see Table 9-74 (Setting of the Channel Width subfield and 160/80+80 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 less than Max VHT NSS support is enabled as defined in Table 11-25a (Extended NSS channel width), and disabled otherwise, in which case the Channel Center Frequency Segment 2 subfield of the HT Operation element 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  (40 MHz apart) | 160 MHz |
| 1 | 1 | 0 | CCFS2 > 0 and  | CCFS2 - CCFS0 | > 16  (> 80 MHz apart) | 80+80 MHz |
| 1 | 1 | 0 | CCFS2 > 0 and  | CCFS2 – CCFS0 | < 8  (< 40 MHz apart) | Reserved |
| 1 | 1 | 0 | CCFS2 > 0 and  8 < | CCFS2 – CCFS0 | ≤ 16  (> 40 MHz and ≤ 80 MHz apart) | Reserved |
| NOTE 1—CCFS0 represents the value of the Channel Center Frequency Segment 0 subfield of the VHT Operation element.  NOTE 2—CCFS2 represents the value of the Channel Center Frequency Segment 2 subfield of the HT Operation element. | | | | |

When VHT BSS operation with with less than Max VHT NSS support 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) and Table 9-74 (Setting of the Channel Width subfield and 160/80+80 BW subfield at a VHT STA transmitting the Operating Mode 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.