IEEE P802.11
Wireless LANs

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| LB1000 CID5960 NSS support partitioning |
| Date: 2015-05-12 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Matthew Fischer | Broadcom | 190 Mathilda Place, Sunnyvale, CA 94086 | +1 408 543 3370 | mfischer@broadcom.com |
| Allert Van Zelst | Qualcomm |  |  |  |
| Youhan Kim | Qualcomm |  |  |  |
| Menzo Wentink | Qualcomm |  |  |  |

Abstract

This document proposes a resolution for CID 5960 of LB1000 (first sponsor ballot), a comment on TGm Draft 4.0 suggesting the creation of additional partitioning of support indication for NSS values.

**REVISION NOTES:**

*Revisions to 11-14-0793:*

R0: initial

R1: R2: change table 8-251 references to 8-250, remove the word non-contiguous wherever it appeared

R3: changes to describe interaction between new 80+80 and 160 max nss subfields and basic VHT-MCS fields, modifications to indicate VHT-MCS supported set determination per operational bandwidth

R4: no conceptual changes - fix incorrect value indicated for determinant in the RX section of the determinant=1 case for both 80+80 and 160, and fix the phrase “one less than” to “two less than” in the description of the encoding for the value 2 in the Max NSS for 80+80 Adjustment and Max NSS for 160 Adjustment

R5: correct the value of Max VHT-MCS for n SS that is used to determine the maximum NSS for 80 MHz operation from a value of 0 to a value of 3

R6: Limited NSS reduction to half only. Changed MCS support to same or twice the supported NSS.

R8: added more CIDs

R9: add MIB variable

 Add modifications to subclauses affected by the Extended NSS BW Support indication – e.g. Rx Supported VHT-MCS and NSS Set

 Add VHT capability bit, do not modify existing VHT Cap definitions, but only add new functionality, replacing previously reserved bits

Update baseline text to Draft P802.11REVmc\_D4.0

Remove CID information referring to old WG letter balloting process

*Revisions to 11-15-0654:*

R0: initial – beginning with 11-14-0793r9, including the following changes:

 In Rx Supported VHT-MCS and NSS Set and Tx Supported VHT-MCS and NSS Set, change the language to only require interpretation of the half NSS bit if the recipient of the bit is capable of interpreting the bit and in the new subclause Half Maximum NSS Support Signaling, remove the text that restricted the transmission of the half NSS signalling bits only to STA that have indicated support for interpretation of the bits. This change is needed because an AP for example, can broadcast capability in a beacon to all STA, both supporters and non-supporters and the interpretation of the half NSS bits are then left to the recipients of the bits. Those recipients that have the capability are required to interpret the value of 1 and those that do not have the capability are allowed to ignore the bits.

R1: providing the alternative, recipient determined setting of the capability bits

R2: yet another alternative, that allows both BW and NSS modifications to deal with the broadcast capability information problem that is created by previous alternatives – that is – if an AP sends VHT Capability information in a broadcast Beacon, then it is unclear whether the association response information will override the Beacon information at a non-AP STA that associates with the AP, so a different signalling method is proposed which allows the creation of a “secret” extended NSS and BW operational set which is only understood by STA that have the optional capability to understand these bits.

R3: remove some inserted text that mentioned basic channel width set

 Extended NSS BW Support bit description in the table – changed TVHT case to reserved and removed change marks, as this section is new text for insertion.

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 TGmc Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGmc Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGmc Editor: Editing instructions preceded by “Instruction to Editor” are instructions to the TGmc editor to modify existing material in the TGmc draft. As a result of adopting the changes, the TGmc editor will execute the instructions rather than copy them to the TGmc Draft.***

**CID LIST:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 5960 | Matthew Fischer | 1306.9 | 9.7.12.1 | Some implementations could have a maximum VHT NSS value that is dependent on the bandwidth of operation. Signaling to support this behavior is desired. Specifically, there is likely to be a difference between maximum NSS support for the 80+80 and 160 MHz bandwidths vs the 20, 40 and 80 MHz bandwidths. | Provide the necessary signaling to allow bandwidth dependent maximum VHT NSS values to be indicated. A presentation will be provided with specific details as to how to accomplish this. Propagate the changes to TVHT. | Revise - generally agree with commenter, TGmc editor to execute proposed changes from 11-15-0654r3 found under all headings which include CID5960 |

**Discussion:**

Implementations can benefit from subsets of functionality that have a finer resolution than the current capabilities fields allow.

**Proposed changes**

The proposed changes add a few new subfields to describe the partitioning of NSS support over a broader range of BW and MU/SU values than is currently describable.

**CID 5960**

**4.3.13 Television very high throughput (TVHT) STA**

***TGmc editor: add a new item to the list of TVHT replacments within subclause 4.3.13 Television very high throughput (TVHT) STA:***

* “dot11TVHTExtendedNSSBWSignalingOptionImpelemented” replaces “dot11VHTExtendedNSSBWSignalingOptionImplemented”.

**8.4.2.157.2 VHT Capabilities Info field**

***TGmc editor: modify the VHT Capabilities Info field of the VHT Capabilities element by changing the reserved bits B30 and B31 of Figure 8-554 – VHT Capabilities Info field within subclause 8.4.2.157.2 VHT Capabilities Info field to become “Extended NSS BW Support”***

***TGmc editor: add the following paragraph in an appropriate location within subclause 8.4.2.157.2 VHT Capabilities Info field to describe the new bit “Extended NSS BW Support”of the VHT Capabilities Info field:***

The Extended NSS BW Support field, combined with the Supported Channel Width Set field and the Supported VHT MCS and NSS Set subfields indicates whether 80+80 MHz and 160 MHz operation is supported. In addition, the Extended NSS BW Support field, combined with the Supported VHT-MCS and NSS Set subfields indicates extensions to the maximum NSS supported for each bandwidth of operation. The use of these fields is described in 9.7.12.1 (Rx Supported VHT-MCS and NSS Set) and 9.7.12.2 (Tx Supported VHT-MCS and NSS Set) and 10.40.8 (Extended NSS BW Support Support Signaling).

***TGmc editor: modify the “Supported Channel Width Set” row of Table 8-240 Subfields of the VHT Capabilities Info field within subclause 8.4.2.157.2 VHT Capbilities Info field, as shown:***

**Table 8-240—Subfields of the VHT Capabilities Info field**

|  |  |  |
| --- | --- | --- |
| Supported ChannelWidth Set | Together with the Extended NSS BW Support subfield, and the value of dot11VHTExtendedNSSBWSignalingOptionImplemented, indicates the complete set of channel widths supported by the STA. See 10.40 (VHT BSS operation). | For a non-TVHT STA:See Table 8-240bb - Setting of the Supported Channel Width Set and Extended NSS BW Support bits at a STA transmitting the VHT Capabilities Info field.For a TVHT STA, the field isstructured into subfields as defined in Figure 8-553a.For a TVHT STA, set the TVHT\_MODE\_2C Support subfield to 1 if it supports TVHT\_MODE\_2C; otherwise set the subfield to 0.For a TVHT STA, set the TVHT\_MODE\_2N Support subfield to 1 if it supports TVHT\_MODE\_2N; otherwise set the subfield to 0. |

***TGmc editor: modify Table 8-240 Subfields of the VHT Capabilities Info field within subclause 8.4.2.157.2 VHT Capbilities Info field, by adding a row as shown:***

**Table 8-240—Subfields of the VHT Capabilities Info field**

|  |  |  |
| --- | --- | --- |
| Extended NSS BW Support | Together with the Supported Channel Width Set subfield and VHT Supported MCS Set subfields and the value of dot11VHTExtendedNSSBWSignalingOptionImplemented, indicates the complete set of channel widths and maximum NSS values per width supported by the STA. See 10.40 (VHT BSS operation). | For a non-TVHT STA:See Table 8-240bb - Setting of the Supported Channel Width Set and Extended NSS BW Support bits at a STA transmitting the VHT Capabilities Info field. For a TVHT STA, the field is reserved. |

**Table 8-240bb—Setting of the Supported Channel Width Set and Extended NSS BW Support bits at a STA transmitting the VHT Capabilities Info field**

|  |  |  |  |
| --- | --- | --- | --- |
| **Supported Channel Width Set** | **Extended NSS BW Support** | **Meaning if dot11VHTExtendedNSSBWSignalingOptionImplemented of the STA transmitting the VHT Capability field is False** | **Meaning if dot11VHTExtendedNSSBWSignalingOptionImplemented of the STA transmitting the VHT Capability field is True** |
| 0 | 0 | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 160 MHz PPDUS and Transmitting STA does not support 80+80 MHz PPDUs. | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 160 MHz PPDUS and Transmitting STA does not support 80+80 MHz PPDUs. |
| 0 | 1 | Reserved | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA supports 160 MHz and 80+80 MHz PPDUs at **half** Max VHT NSS\*\*. |
| 0 | 2 | Reserved | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA supports 160 MHz PPDUs at **half** Max VHT NSS\*\*. Transmitting STA does not support 80+80 MHz PPDUs. |
| 0 | 3 | Reserved | Reserved |
| 1 | 0 | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 80+80 MHz PPDUs. | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 80+80 MHz PPDUs. |
| 1 | 1 | Reserved | Reserved |
| 1 | 2 | Reserved | Reserved |
| 1 | 3 | Reserved | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA supports 80+80 MHz PPDUs at **half** Max VHT NSS\*\*. |
| 2 | 0 | Transmitting STA supports 20/40/80/160/80+80 MHz PPDUs at Max VHT NSS\*. | Transmitting STA supports 20/40/80/160/80+80 MHz PPDUs at Max VHT NSS\*. |
| 2 | 1 | Reserved | Reserved |
| 2 | 2 | Reserved | Reserved |
| 2 | 3 | Reserved | Transmitting STA supports 20/40/80 PPDUs at 2\*Max VHT NSS\*. Transmitting STA supports 160 MHz and 80+80 MHz PPDUs at Max VHT NSS\*. |
| 3 | 0 | Reserved | Reserved |
| 3 | 1 | Reserved | Reserved |
| 3 | 2 | Reserved | Reserved |
| 3 | 3 | Reserved | Reserved |
| \*NOTE – Max VHT NSS is defined in 8.4.2.157.3 (Supported VHT-MCS and NSS Set field)\*\*NOTE – Half Max VHT NSS is equal to one half of Max VHT NSS rounded down to the nearest integer. |

***TGmc editor: modify Figure 8-556 Supported VHT-MCS and NSS Set field within subclause 8.4.2.157.3 Supported VHT-MCS and NSS Set field and some of the text in the subclause, as shown:***

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 B15 | B16 B28 | B29 B31 | B32 B47 | B48 B60 | B61 B63 |
|  | Rx VHT-MCS Map | Rx Highest Supported Long GI Data Rate | Reserved | Tx VHT-MCS Map | Tx Highest Supported Long GI Data Rate | Reserved |
| Bits: | 16 | 13 | 3 | 16 | 13 | 3 |

The Supported VHT-MCS and NSS Set field’s subfields are defined in Table 8-241 (Supported VHT-MCS and NSS Set subfields).

**Table 8-241—Supported VHT-MCS and NSS Set subfields**

|  |  |  |
| --- | --- | --- |
| **Subfield** | **Definition** | **Encoding** |
| Rx VHT-MCSMap | 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. The maximum value of the RXVECTOR parameter MCS of a PPDU is further limited per the Extended NSS BW Support subfield as described in 8.4.2.157.2 (VHT Capabilities Info field). | The format and encoding of this subfield are defined in Figure 8-556 (Rx VHT-MCS Map and Tx VHT-MCS Map subfields and Basic VHT-MCS and NSS Set field(11ac)) and the associated description. |
| Tx VHT-MCSMap | 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. The maximum value of the TXVECTOR parameter MCS of a PPDU is further limited per the Extended NSS BW Support subfield, as described in 8.4.2.157.2 (VHT Capabilities Info field). | The format and encoding of this subfield are defined in Figure 8-556 (Rx VHT-MCS Map and Tx VHT-MCS Map subfields and Basic VHT-MCS and NSS Set field(11ac)) and the associated description. |

The Rx VHT-MCS Map subfield and the Tx VHT-MCS Map subfield have the structure shown in Figure 8-557 (Rx VHT-MCS Map and Tx VHT-MCS Map subfields and Basic VHT-MCS and NSS Set field).



The Max VHT-MCS For *n* SS subfield (where *n* = 1, ..., 8) is encoded as follows:

— 0 indicates support for VHT-MCS 0-7 for *n* spatial streams

— 1 indicates support for VHT-MCS 0-8 for *n* spatial streams

— 2 indicates support for VHT-MCS 0-9 for *n* spatial streams

— 3 indicates that *n* spatial streams is not supported

A STA with a value of true for dot11VHTExtendedNSSBWSignalingOptionImplemented sets the values of the Rx VHT-MCS Map and Tx VHT-MCS Map subfields and Basic VHT-MCS and NSS Set field based on the MCS, NSS and PPDU bandwidth capabilities of the STA assuming that the value of dot11VHTExtendedNSSBWSignalingOptionImplemented is false.

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 22.5 (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 9.7.12.3 (Additional rate selection constraints for VHT PPDUs).

***TGmc editor: modify subclause 9.7.12.1 Rx Supported VHT-MCS and NSS Set and 9.7.12.2 Tx Supported VHT-MCS and NSS Set as shown:***

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

The Rx Supported VHT-MCS and NSS Set of a VHT STA is determined by a receiving 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 received Supported VHT-MCS and NSS Set field as follows:

— If support for the VHT-MCS for NSS spatial streams for a bandwidth is mandatory (see 22.5 (Parameters for VHT-MCSs)), then the <VHT-MCS, NSS> tuple at that bandwidth is supported by the 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 STA on receive, except that if the value of dot11VHTExtendedNSSBWSignalingOptionImplemented of the receving STA is true, the supported bandwidth values and NSS values of each <VHT-MCS, NSS> tuple are updated according to Table 9- abcd (Interpretation of the Supported Channel Width Set and Extended NSS BW Support bits of the VHT Capabilities Info field at a receiving 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 STA on receive, except that if the value of dot11VHTExtendedNSSBWSignalingOptionImplemented of the receving STA is true, the supported bandwidth values and NSS values of each <VHT-MCS, NSS> tuple are updated according to Table 9-abcd (Interpretation of the Supported Channel Width Set and Extended NSS BW Support bits of the VHT Capabilities Info field at a receiving STA).

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

The <VHT-MCS, NSS> tuples excluded by 9.7.12.3 (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.

**Table 9-abcd—Interpretation of the Supported Channel Width Set and Extended NSS BW Support bits of the VHT Capabilities Info field at a receiving STA**

|  |  |  |  |
| --- | --- | --- | --- |
| **Supported Channel Width Set** | **Extended NSS BW Support** | **Meaning if dot11VHTExtendedNSSBWSignalingOptionImplemented of the STA receiving the VHT Capability field is False** | **Meaning if dot11VHTExtendedNSSBWSignalingOptionImplemented of the STA receiving the VHT Capability field is True** |
| 0 | 0 | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 160 MHz PPDUS and Transmitting STA does not support 80+80 MHz PPDUs. | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 160 MHz PPDUS and Transmitting STA does not support 80+80 MHz PPDUs. |
| 0 | 1 | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 160 MHz PPDUS and Transmitting STA does not support 80+80 MHz PPDUs. | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA supports 160 MHz and 80+80 MHz PPDUs at **half** Max VHT NSS\*\*. |
| 0 | 2 | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 160 MHz PPDUS and Transmitting STA does not support 80+80 MHz PPDUs. | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA supports 160 MHz PPDUs at **half** Max VHT NSS\*\*. Transmitting STA does not support 80+80 MHz PPDUs. |
| 0 | 3 | Transmitting STA supports 20/40/80 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 160 MHz PPDUS and Transmitting STA does not support 80+80 MHz PPDUs. | Reserved |
| 1 | 0 | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 80+80 MHz PPDUs. | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 80+80 MHz PPDUs. |
| 1 | 1 | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 80+80 MHz PPDUs. | Reserved |
| 1 | 2 | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 80+80 MHz PPDUs. | Reserved |
| 1 | 3 | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA does not support 80+80 MHz PPDUs. | Transmitting STA supports 20/40/80/160 MHz PPDUs at Max VHT NSS\*. Transmitting STA supports 80+80 MHz PPDUs at **half** Max VHT NSS\*\*. |
| 2 | 0 | Transmitting STA supports 20/40/80/160/80+80 MHz PPDUs at Max VHT NSS\*. | Transmitting STA supports 20/40/80/160/80+80 MHz PPDUs at Max VHT NSS\*. |
| 2 | 1 | Transmitting STA supports 20/40/80/160/80+80 MHz PPDUs at Max VHT NSS\*. | Reserved |
| 2 | 2 | Transmitting STA supports 20/40/80/160/80+80 MHz PPDUs at Max VHT NSS\*. | Reserved |
| 2 | 3 | Transmitting STA supports 20/40/80/160/80+80 MHz PPDUs at Max VHT NSS\*. | Transmitting STA supports 20/40/80 PPDUs at 2\*Max VHT NSS\*. Transmitting STA supports 160 MHz and 80+80 MHz PPDUs at Max VHT NSS\*. |
| 3 | 0 | Reserved | Reserved |
| 3 | 1 | Reserved | Reserved |
| 3 | 2 | Reserved | Reserved |
| 3 | 3 | Reserved | Reserved |
| \*NOTE – Max VHT NSS is defined in 8.4.2.157.3 (Supported VHT-MCS and NSS Set field)\*\*NOTE – Half Max VHT NSS is equal to one half of Max VHT NSS rounded down to the nearest integer. |

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

The Tx Supported VHT-MCS and NSS Set of a VHT STA is determined by a receiving 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 received Supported VHT-MCS and NSS Set field as follows:

— If support for the <VHT-MCS, NSS> tuple at for a bandwidth is mandatory (see 22.5 (Parameters for VHT-MCSs)), then the <VHT-MCS, NSS> tuple at that bandwidth is supported by the 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 STA on transmit, except that if the value of dot11VHTExtendedNSSBWSignalingOptionImplemented of the receving STA is true, the supported bandwidth values and NSS values of each <VHT-MCS, NSS> tuple are updated according to Table 9- abcd (Interpretation of the Supported Channel Width Set and Extended NSS BW Support bits of the VHT Capabilities Info field at a receiving 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 STA on transmit, except that if the value of dot11VHTExtendedNSSBWSignalingOptionImplemented of the receving STA is true, the supported bandwidth values and NSS values of each <VHT-MCS, NSS> tuple are updated according to Table 9- abcd (Interpretation of the Supported Channel Width Set and Extended NSS BW Support bits of the VHT Capabilities Info field at a receiving STA).

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

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

***TGmc editor: add a new subclause 10.40.8 Extended NSS BW Support Support Signaling, to appear immediately following subclause 10.40.7 BSS basic VHT-MCS and NSS set operation as shown:***

**10.40.8 Extended NSS BW Support Support Signaling**

If the value of dot11VHTExtendedNSSBWSignalingOptionImplemented is false, a STA shall set the Extended NSS BW Support Signaling Support subfield of the VHT Capabilities Info field to 0 in VHT Capability elements that it transmits, otherwise, the subfield may be set to 1, 2 or 3 as indicated in 8.4.2.157.2 (VHT Capabilities Info field).

***TGmc editor: modify the text from 10.23.6.4.1 General as shown:***

**10.23.6.4.1 General**

A wideband off-channel TDLS direct link may be started if both TDLS peer STAs indicated wideband support in the VHT Capabilities element VHT Capabilities Info field included in the TDLS Setup Request frame or the TDLS Setup Response frame.

***TGmc editor: modify the text from 10.40.1 Basic VHT BSS functionality as shown:***

**10.40.1 Basic VHT BSS functionality**

A STA that is a VHT AP or a VHT mesh STA declares its channel width capability in the the VHT Capabilities element VHT Capabilities Info field as described in Table 8-240 (Subfields of the VHT Capabilities Info field).

A VHT STA shall not transmit to a second VHT STA using a bandwidth that is not indicated as supported in the Supported Channel Width Set subfield in the HT Capabilities element or in the VHT Capabilities Info field of the VHT Capabilities element received from that VHT STA.

***TGmc editor: modify the text from 10.42 Notification of operating mode changes as shown:***

**10.42 Notification of operating mode changes**

A STA shall not transmit an Operating Mode field with the value of the Channel Width subfield indicating a bandwidth not supported by the STA, as reported in the Supported Channel Width Set subfield in the HT Capability Information field or in the VHT Capabilities Info field in Management frames transmitted by the STA.

***TGmc editor: modify the text from 10.43 Basic TVHT BSS functionality as shown:***

**10.43 Basic TVHT BSS functionality**

The STA that is creating a TVHT BSS shall be able to receive and transmit at each of the <VHT-MCS, NSS> tuple values indicated by the Basic VHT-MCS and NSS Set field of the VHT Operation parameter of the MLME-START.request primitive and shall be able to receive at each of the <VHT-MCS, NSS> tuple values indicated by the Supported VHT-MCS and NSS Set field of the VHT Capabilities parameter of the MLME-START.request primitive. A STA for which dot11TVHTOptionImplemented is true shall set dot11VHTOptionImplemented to true.

A TVHT AP declares its channel width capability in the VHT Capabilities element VHT Capabilities Info field, as defined in 8.4.2.157 (VHT Capabilities element).

A TVHT STA shall not transmit to a TVHT STA using a bandwidth that is not indicated as supported in the VHT Capabilities element or Operating Mode Notification frame recently received from that TVHT STA.

***TGmc editor: add the following new MIB variable to the dot11StationConfig group and add a corresponding value in the group’s SEQUENCE definition and add an appropriate entry to the dot11VHTMACAdditions Object-group:***

**C.3 MIB Detail**

dot11VHTExtendedNSSBWSignalingOptionImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the IEEE 802.11 VHT Extended NSS BW Support Signaling option is implemented."

DEFVAL { false }

::= { dot11StationConfigEntry <ANA> }

**References:**