IEEE P802.11
Wireless LANs

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| HE BSS Operation |
| Date: 2016-11-05 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D0.1 with the following CIDs:

* 154

Revisions:

* Rev 0: Initial version of the document.

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.***

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 154 | Alfred Asterjadhi | 1873.53 | Need to define the details for HE BSS operation. | As in comment. | Revised –Agree in principle with the comment. Proposed resolution is to provide spec text for the HE BSS operation subclause, relying as much as possible on the normative text that is present in the baseline in VHT BSS operation and 20/40Mhz BSS operation.TGax editor to make the changes as showin in 11-16-1417r0 under all headings that include CID 154. |

**Discussion:** *Proposed resolution includes expansion of the Basic HE MCS and NSS Set field from 2 to 3 bits to include the new MCSs added in 11ax (1024 QAM) and the addition of the VHT Operation Information field to the HE Operation element to remove dependency from the VHT Operation element.*

***TGax editor: within subclause 9.4.2.219 HE Operation element make the following changes (#CID 154):***

***Within Figure 9-589cq—HE Operation element format change the number of octets for the Basic HE MCS and NSS Set from 2 to 3.***

***At the end of the subclause in the paragraph that describes the Basic HE-MCS and NSS Set field, change “a bitmap of size 16 bits” to “a bitmap of size 24 bits”.***

***Change “Each 2 bit pair in the bitmap” to “Each 3 bit value in the bitmap”.***

***Within Figure 9-589cs—Basic HE-MCS And NSS Set field format change the number of bits per Max HE MCS for NSS n subfield from 2 to 3 and change the bit numbering above the diagram to correspond with the bit count change.***

***TGax editor: Insert the following new text at the end of 9.4.2.219 HE Operation element in draft TGax D0.5:***

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

* 0 indicates support for HE-MCS 0-7 for *n* spatial streams
* 1 indicates support for HE-MCS 0-8 for *n* spatial streams
* 2 indicates support for HE-MCS 0-9 for *n* spatial streams
* 3 indicates support for HE-MCS 0-10 for *n* spatial streams
* 4 indicates support for HE-MCS 0-11 for *n* spatial streams
* 5-7 reserved

***TGax editor: Insert a new field “VHT Operation information field” to the HE Operation element and the following new text at the end of 9.4.2.219 HE Operation element in draft TGax D0.5 (#CID 154):***

The structure of the VHT Operation Information field is defined in Figure 9-564 (VHT Operation Information field) and its subfields are defined in Table 9-252 (VHT Operation Information subfields).

**TGax Editor: *Insert a new subclause as follows (#CID 154):***

**Note to TGax Editor: *Please rely only on the clean version. The trackchanges are for reviewing purposes only.***

25.1 HE BSS operation(11ac)

25.1.1 Basic HE BSS functionality(11ac)

A HE STA has dot11HEOptionImplemented equal to true.

A STA that is starting a HE BSS shall be able to receive and transmit at each of the <HE-MCS, NSS> tuple values indicated by the Basic HE-MCS And NSS Set(#5392) field of the HE Operation parameter of the MLME-START.request primitive and shall be able to receive at each of the <HE-MCS, NSS> tuple values indicated by the Supported HE-MCS and NSS Set field of the HE Capabilities parameter of the MLME-START.request primitive. The basic HE-MCS and NSS set(#6235) is the set of <HE-MCS, NSS> tuples that are supported by all HE STAs that are members of a HE BSS. It is established by the STA that starts the HE BSS, indicated by the Basic HE-MCS And NSS Set(#5392) field of the HE Operation parameter(#3359) in the MLME-START.request primitive. Other HE STAs determine the basic HE-MCS and NSS set(#6235) from the Basic HE-MCS And NSS Set(#5392) field of the HE Operation element in the BSSDescription derived through the scan mechanism (see 11.1.4.1 (General)).

A HE STA shall not attempt to join (MLME-JOIN.request (MDR)primitive) a BSS unless it supports (i.e., is able to both transmit and receive using) all of(#3530) the <HE-MCS, NSS> tuples in the (#6235)basic HE-MCS and NSS set.

NOTE—An HE STA does not attempt to (re)associate with a HE AP unless the STA supports (i.e., is able to both transmit and receive using) all of the <HE-MCS, NSS> tuples in the Basic HE-MCS And NSS Set field in the HE Operation element transmitted by the AP because the MLME-JOIN.request primitive is a necessary precursor to (re)association.(#7445)

A STA for which dot11HEOptionImplemented is true shall set dot11VeryHighThroughputOptionImplemented or dot11HighThroughputOptionImplemented to true.

A STA that is a HE AP or a HE mesh STA declares its channel width capability in(#5960) the HE Capabilities element (#6472) as described in Table 9-262aa (Subfields of the HE PHY Capabilities Information field). If the STA is an HE AP then it shall indicate support for at least 80 MHz channel width if it operates in 5 GHz; otherwise it may indicate any channel width support.

A STA shall set the Supported Channel Width Set subfield of VHT Capabilities and HT Capabilities element it transmits to a value that indicates the same channel width capability as the channel width capability provided in the HE Capabilities element it transmits. A STA shall set all the subfields of the VHT Capabilities and HT Capabilites element it transmits to respective values that indicate the same capabilities provided in the HE Capabilities element it transmits.

At a minimum, an HE STA sets the Rx MCS Bitmask of the Supported MCS Set field of its HT Capabilities element according to the setting of the Rx HE-MCS Map subfield of the Supported HE-MCS and NSS Set field of its HE Capabilities element as follows: for each subfield Max HE-MCS For *n* SS, 1 < n < 4, of the Rx HE-MCS Map field with a value other than 3 (no support for that number of spatial streams), the STA shall indicate support for MCSs 8(*n–*1) to 8(*n–*1)+7 in the Rx MCS Bitmask, where *n* is the number of spatial streams, except for those MCSs marked as unsupported as described in 25.X.2.4 (Additional rate selection constraints for HE PPDUs).

A STA that is a HE AP or a HE mesh STA shall set the STA Channel Width subfield in the HT Operation element HT Operation Information field, the Channel Width, Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields(M188) in the HE Operation element VHT Operation Information field to indicate the (#6508)BSS bandwidth as defined in Table 11-24 (VHT BSS bandwidth).

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The setting of the Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields is shown in Table 11-25 (Setting of Channel Center Frequency Segment 0, Channel Center Frequency Segment 1 and Channel Center Frequency Segment 2 subfields), except that the Max NSS support is provided by the HE STA in frames that contain an HE Capabilities element (see see 9.4.2.218 (HE Capabilities element)) and an Operating Mode field (see 9.2.4.6.4.3 Operating Mode and 9.4.1.53 (Operating Mode field)), wherein in the table the Max NSS support refers to the HE Max NSS support instead of the VHT Max NSS support for an HE STA.

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A HE STA shall determine the channelization using the information in the HT Operation element Primary Channel field when operating in 2.4 GHz and the combination of the information in the HT Operation element Primary Channel field and the HE Operation element VHT Operation Information field Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields when operating in 5 GHz (see 21.3.14 (Channelization)).

A HE AP or a HE mesh STA shall set the HT Operation element HT Operation Information field Secondary Channel Offset subfield to indicate the secondary 20 MHz channel as defined in Table 9-168 (HT Operation element fields and subfields), if the (#6508)BSS bandwidth is more than 20 MHz.

An HE STA that is a member of an HE BSS shall follow the same rules that are defined in 11.40.1 (Basic VHT BSS functionality) when transmitting a 20, 40, 80, 160, or 80+80 MHz HE PPDUs with the following exceptions:

* An HE Trigger-based PPDU sent in response to a Trigger frame or an UL MU Response Scheduling A-Control field follows the rules defined in 25.5.2.3 (STA behavior).
* An 80, 160 or 80+80 MHz HE DL MU PPDU with preamble puncture may be transmitted if either the primary 20 MHz or the primary 40 MHz, or both are occupied by the transmission (see Table 26-17 (HE-SIG-A field of an HE MU PPDU)).

A HE STA shall not transmit to a second HE STA using a bandwidth that is not indicated as supported in the Supported Channel Width Set subfield in the HE Capabilities element received from that HE STA.

A STA shall not transmit an MPDU in a HE PPDU to a STA that exceeds the maximum MPDU length capability indicated in the VHT Capabilities element received from the recipient STA or that exceeds the Maximum A-MSDU Length in the HT Capabilities element received from the recipient STA.(11ac)(#5130)(#7803)

A STA shall not transmit an A-MPDU in a HE PPDU to a STA that exceeds the maximum A-MPDU length capability indicated in the HE Capabilities, VHT Capabilities, and HT Capabilities element received from the recipient STA.(11ac)(#5130)(#7803) The maximum A-MPDU length capability is obtained as a combination of the Maximum A-MPDU Length Exponent subfields in the HE Capabilities and VHT Capabilities element if the recipient STA has transmitted the VHT Capabilities; otherwise it is obtained from a combination of the Maximum A-MPDU Length Exponent subfields in the HE Capabilities and the HT Capabilities element.

A HE AP shall set the RIFS Mode field in the HT Operation element to 0.

An HE STA shall follow the rules defined in 11.40 (VHT BSS operation) for channel selection, determining scanning requirements, channel switching, NAV assertion and antenna indication when operating in 5 GHz unless explicitly stated otherwise in Clause 25.

An HE STA shall follow the rules defined in 11.16 (20/40 MHz BSS operation) for channel selection, determining scanning requirements, channel switching, NAV assertion when operating in 2.4 GHz unless explicitly stated otherwise in Clause 25.

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