IEEE P802.11
Wireless LANs

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| LB225 CR Sub-clause 27.16.1 |
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Abstract

This submission proposes resolutions of comments received from TGax LB225.

(The proposed change is based on TGax Draft 1.3.)

* CIDs: 5229, 5522, 5523, 5524, 7576, 7577, 7578, 7579, 7580, 8618, 8619, 8620, 9967 (13 CIDs)

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.***

| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- |
| 8620 | 205.52 | 27.16.1 | Change "preamble puncture" to "preamble puncturing" | See comment | Revised- Agree in principle.TGax editor makes changes as shown in the as specified in 11-17/0533r3. |
| 5229 | 204.56 | 27.16.1 | Regarding, "A STA for which dot11HEOptionImplemented is true shall setdot11VeryHighThroughputOptionImplemented or dot11HighThroughputOptionImplemented to true." is it possible for HE STA to support VHT, but not HT? Please clarify. | as in comment | Revised- Agree in principle.As suggested by the commenter, it is reasonable to make separate sentences for each bands (e.g., 2.4GHz band and 5 GHz band)The following is not directly related with the proposed reolution of this CID but the TG found that current TGax Draft 1.3 is missing the important requirement about the multiple BSSID support. Based on the TGax SFD, the support of the multiple BSSID is a mandatory of an HE non-AP STA. So, the following additional text is proposed: “A non-AP STA for which dot11HEOptionImplemented is true shall set dot11MultiBSSIDImplemented to true.”TGax editor makes changes as shown in the as specified in 11-17/0533r3. |
| 7576 | 204.56 | 27.16 | It seems a 20MHz HE STA doesn't need to implement VHT features. For sure HE devices in 2.4GHz band don't need to implement VHT features. | Change the text per the comment. | Revised- Agree in principle.As suggested by the commenter, it is reasonable to make separate sentences for each bands (e.g., 2.4GHz band and 5 GHz band)The following is not directly related with the proposed reolution of this CID but the TG found that current TGax Draft 1.3 is missing the important requirement about the multiple BSSID support. Based on the TGax SFD, the support of the multiple BSSID is a mandatory of an HE non-AP STA. So, the following additional text is proposed: “A non-AP STA for which dot11HEOptionImplemented is true shall set dot11MultiBSSIDImplemented to true.”TGax editor makes changes as shown in the as specified in 11-17/0533r3. |
| 9967 | 204.56 | 27.16.1 | How about 20MHz-only STA? Need further clarification. | As in the comment. | Revised- Agree in principle.As suggested by the commenter, it is reasonable to make separate sentences for each bands (e.g., 2.4GHz band and 5 GHz band)The following is not directly related with the proposed reolution of this CID but the TG found that current TGax Draft 1.3 is missing the important requirement about the multiple BSSID support. Based on the TGax SFD, the support of the multiple BSSID is a mandatory of an HE non-AP STA. So, the following additional text is proposed: “A non-AP STA for which dot11HEOptionImplemented is true shall set dot11MultiBSSIDImplemented to true.”TGax editor makes changes as shown in the as specified in 11-17/0533r3. |
| 5522 | 204.34 | 27.16.1 | "A STA that is starting an 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 field of the HE Operation parameter of the MLMESTART. 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 MLMESTART. request primitive." This seems backwards to me. Surely the point is that the STA must set these tuples to agree with what it supports, not "shall be able to receive and transmit". | Replace cited text with "A STA that is starting an HE BSS shall set each of the <HE-MCS, NSS> tuple values in the Basic HE-MCS And NSS Set field of the HE Operation parameter and the HE Capabilities parameter of the MLMESTART. request primitive." | Rejected- There is no technical issue on the current wording. Also, in 11n and 11ac, the exactly same wordings have been used. About the proposed change, it is missing how to set each of the <HE-MCS, NSS> tuple. So it is better to keep current wording.  |
| 5523 | 204.39 | 27.16.1 | "The basic HE-MCS and NSS set is the set of <HE-MCS, NSS> tuples that are supported by all HE STAs that are members of an HE BSS." But according to the previous sentence the STA starting the HE BSS can set these as it wants. Surely a basic set is fixed and agreed to be common for all HE BSSs. If not, then don't use "basic". I don't know what "Basic" is meant to convey here but it does need to be spelled out. | Please define what exactly "basic set " is. Is it fixed or set by the originating STA? Also what criteria does it use to set these? Is it really up to the originating STA? Whatever it is, let's please spell it out. | Rejected- Currently D1.3 is clearly defining the basic HE-MCS and NSS set as the following: “The basic HE-MCS and NSS set is the set of <HE-MCS, NSS> tuples that are supported by all HE STAs that are members of an HE BSS.” |
| 5524 | 204.39 | 27.16.1 | P204 lines 39 - 49. It is very unclear as to what, why or how the originalting STA is supposed to set up the basic set. Is there an Annex explaining how the STA decides? Is the idea to limit HE STAs from joining? But what about legacy VHT or HT STAs? I have to admit I don't get it. Why can't the AP STA simply advertize what it can do, I don't see what defining a basic set adds. | Look again at this Basic set feature. It needs to be explained why it is a godd idea and what it adds. If it is a good idea it needs to be explained somewhere how a STA may use it for whatever purpose it is intended for. My recommendation, delete it. | Rejected- All legacy BSSs (e.g, 11n and 11ac) are definding the basic MCS and NSS set. And, how to set up the Basic HE-MCS And NSS Set is an implementation issue of an AP. |
| 8618 | 204.60 | 27.16.1 | What is an "HE mesh STA"? HE STA with dot11MeshActivated equal to True? | Clarify. The same term also appears in other places in this section. | Rejected-Similar to HT mesh STA and VHT mesh STA, HE mesh STA can be obviously identified as the mesh STA with dot11HEOptionImplemented is true.  |
| 7577 | 205.01 | 27.16 | The whole paragraph can't be true in 5GHz and 2.4GHz bands. | change the text. | Revised- Agree in principle.TGax editor makes changes as shown in the as specified in 11-17/0533r3. |
| 8619 | 205.04 | 27.16.1 | "A STA shall set all the subfields of the VHT Capabilities and HT Capabilities element it transmits to respective values that indicate the same capabilitiesprovided in the HE Capabilities element it transmits.". This requirement is not sufficiently specific. A mapping between relevant HE fields and HT/VHT fields should be provided. | See comment | Revised- Agree in principle.TGax editor makes changes as shown in the as specified in 11-17/0533r3. |
| 7578 | 205.18 | 27.16 | 2.4GHz band is missing. | Change the text per the comment. | Revised- Agree in principle.When a VHT Operation Information Present field is set to 1, the HE Operation element VHT Operation Information field is present. TGax editor makes changes as shown in the as specified in 11-17/0533r3. |
| 7579 | 205.24 | 27.16 | "Channel Center Frequency Segment 2" is missing. Add it. | As in comment | Revised- Agree in principle.The Channel Center Frequency Segment 2 subfield is also set to a value based on Table 11-25.TGax editor makes changes as shown in the as specified in 11-17/0533r3. |
| 7580 | 205.37 | 27.16 | "Channel Center Frequency Segment 2" is missing. Add it. | As in comment | Rejected- When an HE STA determines the channelization, it uses the same information with a VHT STA. And, a VHT STA does not use the Channel Center Frequency Segment 2 subfield. See the below. “A VHT STA shall determine the channelization using the combination of the information in the HTOperation element Primary Channel field and the VHT Operation element VHT Operation Information fieldChannel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields (see 21.3.14(Channelization)).” |

***TGax editor: replace “with preamble puncture”with “with preamble puncturing” throughout Draft 1.3. (CID 8620)***

***TGax editor: change the sub-clause 27.16.1 as the following:***

* 1. HE BSS operation
		1. Basic HE BSS functionality

An HE STA has dot11HEOptionImplemented equal to true.

A STA that is starting an 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 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 is the set of <HE-MCS, NSS> tuples that are supported by all HE STAs that are members of an HE BSS. It is established by the STA that starts the HE BSS, indicated by the Basic HE-MCS And NSS Set field of the HE Operation parameter in the MLME-START.request primitive. Other HE STAs determine the basic HE-MCS and NSS set from the Basic HE-MCS And NSS Set field of the HE Operation element in the BSSDescription derived through the scan mechanism (see 11.1.4.1 (General)).

An HE STA shall not attempt to join (MLME-JOIN.request primitive) a BSS unless it 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.

NOTE—An HE STA does not attempt to (re)associate with an 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.

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

A STA for which dot11HEOptionImplemented is true shall set dot11HighThroughputOptionImplemented to true when operating in 2.4 GHz band. A STA for which dot11HEOptionImplemented is true shall set dot11VeryHighThroughputOptionImplemented and dot11HighThroughputOptionImplemented to true when operating in 5 GHz band. A non-AP STA for which dot11HEOptionImplemented is true shall set dot11MultiBSSIDImplemented to true. (#5229, 7576, 9967)

A STA that is an HE AP or an HE mesh STA declares its channel width capability in the HE Capabilities element 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 transmitting an HT Capabilities element and HE Capabilities element shall set the Supported Channel Width Set subfield of the HT Capabilities element to 1 when either B0 or B1 of the Channel Width Set subfield of the HE Capabilities element is set to 1. A STA transmitting a VHT Capabilities element and HE Capabilities element shall set the Supported Channel Width Set subfield of the VHT Capabilities element to a value that indicates the same channel width capability as the channel width capability indicated in the HE Capabilities element, except when the STA is a 20 MHz-only non-AP HE STA in which case the Supported Channel Width Set subfield of the VHT Capabilities element is reserved. (#7577) ~~A STA shall set all the subfields of the VHT Capabilities and HT Capabilities element it transmits to respective values that indicate the same capabilities provided in the HE Capabilities element it transmits.~~(#8619)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 27.15.4.3 (Additional rate selection constraints for HE PPDUs).

An HE AP or an HE mesh STA shall set the VHT Operation Information Present field in the HE Operation element to 0 if dot11VeryHighThroughputOptionImplemented is false or a VHT Operation element is present in the frame that carries the HE Operation element. Otherwise, the HE AP or the HE mesh STA shall set the VHT Operation Information Present field in the HE Operation element to 1. (#7578)

A ~~STA that is a~~n HE AP or an HE mesh STA that transmits an HE Operation element whose VHT Operation Information Present field is set to 1 (#7578) 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 in the HE Operation element VHT Operation Information field to indicate the BSS bandwidth as defined in Table 11-24 (VHT BSS bandwidth).

The setting of the Channel Center Frequency Segment 0, Channel Center Frequency Segment 1 and Channel Center Frequency Segment ~~1~~2 (#7579) 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 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.

An 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)).

An HE AP or an 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 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 MHz, 40 MHz, 80 MHz, 160 MHz 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 27.5.2.3 (STA behavior).
* An 80 MHz, 160 MHz or 80+80 MHz DL HE MU PPDU(#6253) with preamble punctur~~e~~ing (#8620) may be transmitted if either the primary 20 MHz or the primary 40 MHz, or both are occupied by the transmission (see Table 28-17 (HE-SIG-A field of an HE MU PPDU)).

An 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 an 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.

A STA shall not transmit an A-MPDU in an 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. 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.

An 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 27.

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 27.

***TGax editor: change the sub-clause 27.16.2.2.2 as the following:***

* + - * 1. Autonomous reporting of BSS color collision

A non-AP HE STA may autonomously report BSS color collision when it detects frames from OBSS STAs containing the same BSS color as the one advertised by the AP it is associated with. A STA whose dot11Au-tonomousBSSColorCollisionReportingImplemented is true shall support autonomous reporting of BSS color collision. ~~When dot11AutonomousBSSColorCollisionReportingImplemented is true, dot11Mul-tiBSSIDImplemented shall be equal to true.~~

***TGax editor: change the sub-clause 9.4.2.238 as the following:***

9.4.2.238 HE Operation element

The Multiple BSSID AP field is set to 1 to indicate that the AP transmitting this element belongs to a Multiple BSSID set and is set to 0 otherwise. A non-AP STA in an infrastructure BSS, an IBSS STA or a mesh STA transmitting this element sets the field to 0.

***TGax editor: change the sub-clause 28.1.1 as the following:***

28.1.1 Introduction to the HE PHY

Clause 28 (High Efficiency (HE) PHY specification) specifies the PHY entity for a high efficiency (HE) orthogonal frequency division multiplexing (OFDM) system. In addition to the requirements in Clause 28 (High Efficiency (HE) PHY specification), an HE STA shall be capable of transmitting and receiving PPDUs that are compliant with the mandatory requirements of the following PHY specifications:

— Clause 19 (High Throughput (HT) PHY specification) and Clause 21 (Very High Throughput (VHT) PHY specification) when the HE STA with greater than or equal to 80 MHz capability is operating in the 5 GHz band

— Clause 19 (High Throughput (HT) PHY specification) and Clause 21 (Very High Throughput (VHT) PHY specification) VHT transmission and reception on 20 MHz channel width (see 27.16.1 (Basic HE BSS functionality)) when the 20 MHz only non-AP HE STA is operating in the 5 GHz band

— Clause 19 (High Throughput (HT) PHY specification) when the HE STA is operating in the 2.4 GHz band