IEEE P802.11  
Wireless LANs

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| Comment resolutions for subclause 26.17 | | | | |
| Date: 2019-11-01 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Alfred Asterjadhi | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92109 | +1-858-658-5302 | aasterja@qti.qualcomm.com |
| Abhishek Patil | Qualcomm Inc. |  |  |  |
| George Cherian | Qualcomm Inc. |  |  |  |

Abstract

This submission proposes resolutions for multiple comments related to TGax D5.0 with the following CIDs (20 CIDs):

* 22139, 22192, 22381, 22419, 22420, 22421, 22511, 22512, 22513, 22514,
* 22515, 22516, 22517, 22520, 22521, 22522, 22523, 22524, 22525, 22526

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** |
| 22139 | Mark RISON | 450.49 | "A 6 GHz non-AP HE STA that receives a (Re)Association Response frame with the Status Code field indi- cating DENIED\_POOR\_CHANNEL\_CONDITIONS or a Disassociation frame with the Reason Code field indicating POOR\_RSSI\_CONDITIONS from a 6 GHz HE AP should not transmit a (Re)Association Request frame or a Probe Request frame to the AP until one of the following condition is met: -- Sufficient time has passed since it received the (Re)Association Response frame or Disassociation frame from the AP -- The STA has determined that a (Re)Association Request frame or Probe Request frame that it trans- mits will be received by the AP at a sufficiently high RSSI level than its previous transmission to the AP. " -- DENIED\_POOR\_CHANNEL\_CONDITIONS might be due to something other than low RSSI (e.g. it might be due to interference -- that status code is for "excessive frame loss rates and/ or poor conditions on current operating channel") | Change the last sentence in the cited text to "The STA has determined that a (Re)Association Request frame or Probe Request frame that it transmits will be received by the AP at a sufficiently high RSSI level and in sufficiently good channel conditions compared with its previous transmission to the AP. " | Accepted |
| 22192 | Mark RISON | 446.40 | " and may set B2 and B3 in the Supported Channel Width Set field to indicate support for either 160 MHz channel width or 160/80+80 MHz channel width or both" adds nothing of value | Delete the cited text | Accepted |
| 22381 | Mark RISON | 445.53 | CID 20697. There needs to be a requirement on a 20 MHz-only non-AP HE STA to send an OMN on (re)association and channel switch to narrow its operating width to 20 MHz | In 26.17.1 Basic HE BSS operation after the para "A STA transmitting a VHT Capabilities element and HE Capabilities element shall set the Supported Chan- nel Width Set subfield of the VHT Capabilities element to indicate the same channel width as indicated in the HE Capabilities element unless the STA is a 20 MHz-only non-AP HE STA, in which case the Sup- ported Channel Width Set subfield of the VHT Capabilities element is reserved." add a para "A 20 MHz-only non-AP HE STA shall include an Operating Mode Notification element in its (Re)Association Request frame that indicates a 20 MHz channel width." | Rejected –  The STA indicates support for 20 MHz only operation by setting the Supported Channel Width Set subfield of the HT Capabilities element to 0. Please refer to the preceding paragraph.  Hence, the STA does not need to send any OMN element to the AP for this purpose. |
| 22419 | Matthew Fischer | 451.60 | Do we need a requirement that the non-AP STA operating in 6 GHz shall set some MIB variable indicating that it is capable of understanding FILS frames? If an AP can send either FILS or unsolicited Presp, then before discovery, how does a non-AP STA know what the APs on a channel will use? In order to ensure that it receives everything from all APs within 20 TUs, a smart non-AP STA will have to be able to interpret/understand a FILS DF, so should this be a requirement? | Consider making FILS capability, or some subset of FILS capability a requirement or recommendation for non-AP HE STA in 6 GHz | Rejected –  The comment fails to identify a technical issue and is asking several questions, the answers to which are as follows:   1. There is already a MIB variable for the STA to be set, namely dot11FILSProbeDelay. All HE STAs operating in 6G are required to understand FILS Discovery frames since their behavior depends on the correct interpretation of received FD frames. 2. STA understands both, probe resp and FD frames, hence it does not matter which one the AP choses to transmit. 3. Yes, and the STA is already required to interpret/understand FILS DF. |
| 22420 | Matthew Fischer | 451.60 | There is no antecedent for "target time" that is mentioned here - what target time is being referred to? | Clarify | Revised –  Agree in principle with the comment. Proposed resolution clarifies this aspect by re-writing portions of the sentence and generalizing the item to “a target transmit time”.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22420. |
| 22421 | Matthew Fischer | 453.39 | The non-AP STA is required to set some MIB variable here that is part of the FILS set of MIBs, but there is no requirement indicating that a non-AP STA operating in 6 GHz shall have any FILS capability, so how can this requirement be made on its own without discussing the complete requirements for non-AP HE STA in 6 GHz with respect to FILS? | Clarify whether a non-AP HE STA in 6 GHz is required or recommended to perform some or all or none of the FILS procedures, and which ones specifically. |  |
| 22511 | Yongho Seok | 451.38 | "In the 6 GHz band, a STA shall not transmit a Probe Request frame to the broadcast destination address that includes a Short SSID List element with more than Short SSID field." Does it mean "more than one Short SSID field"? Please clarify this. | As in the comment. | Revised –  Agree with the comment. The addition to the spec text has lost the “one”. Proposed resolution is to add the “one”.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22511. |
| 22512 | Yongho Seok | 451.59 | "The transmission of FILS Discovery frames may be omitted if a broadcast Probe Response frame or a Beacon frame is scheduled for transmission at that target transmit time instead of the FILS Discovery frame, or if the AP does not intend to be discovered by STAs." What is the definition of the trarget transmit time? I can't fine such definition in 11.46.2.1 (FILS Discovery frame transmission). A FILS AP just schedules the FILS Discovery frames with dot11FILSFDFrameBeaconMinimumInterval. There is no target transmit time concept. "A FILS AP should transmit FILS Discovery frame(s) in every beacon interval. The interval between the transmission of a Beacon frame and a subsequent FILS Discovery frame shall be no less than the interval indicated in dot11FILSFDFrameBeaconMinimumInterval. The transmission interval between subsequent FILS Discovery frames by an AP in a beacon interval shall be no less than the interval indicated in dot11FILSFDFrameBeaconMinimumInterval." | Please clarify the target transmit time of the FILS Discovery frame. | Revised –  Agree in principle with the comment. Proposed resolution clarifies this aspect by re-writing portions of the sentence and generalizing the item to “a target transmit time”.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22512. |
| 22513 | Yongho Seok | 451.59 | Since a broadcast Probe Response frame or a Beacon frame is scheduled for transmission at that target transmit time, the transmission of FILS Discovery frame is not transmitted. But, if the scheduled broadcast Probe Response frame or Beacon frame is not transmitted, what is the next step? I guess that the following baseline rule should be applied. "If dot11FILSFDFrameBeaconMaximumInteval is not equal to 0, and if a Beacon frame or FD frame has not been transmitted by an AP for a period that is equal to dot11FILSFDFrameBeaconMaximumInterval, that AP shall queue for transmission a FD frame or a Beacon frame unless the next TBTT is within a duration indicated by the value of dot11FILSFDFrameBeaconMinimumInterval.(#32)" But, this baseline rule does not include the broadcast Probe Response frame. The above rule shall be changed as the following: "If dot11FILSFDFrameBeaconMaximumInteval is not equal to 0, and if a Beacon frame, a broadcast Probe Response frame or FD frame has not been transmitted by an AP for a period that is equal to dot11FILSFDFrameBeaconMaximumInterval, that AP shall queue for transmission a FD frame, a broadcast Probe Response frame or a Beacon frame ..." | Please clarify the FILS Discovery omission rule. | Revised –  Agree in principle with the comment. Proposed resolution amends the baseline rule to add the broadcast Probe Response frame case.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22513. |
| 22514 | Yongho Seok | 451.64 | "The AP shall ... follow the rules in 11.1.3.8 (Multiple BSSID procedure) if dot11MultiBSSIDImplemented is true." Because 11.46.2.1 (FILS Discovery frame transmission) does not follows the rules in 11.1.3.8 (Multiple BSSID procedure), do we need to mention this exception? If there is no special treatment for the Multiple BSSID procedure in the FILS frame generation, remove the cited wording. | As in the comment. | Revised –  The exception here is related to the fact that the AP is required to use the transmitted BSSID for FD frames and other requirements when the AP supports MBSSID. But the reference is incorrect and is indeed 11.46.2.1. Proposed resolution fixes the reference.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22514. |
| 22515 | Yongho Seok | 452.01 | An AP operating in the 6 GHz band that is co-located with an AP that does not transmits a Reduced Neighbor Report and/or a Neighbor Report element reporting that 6 GHz AP can not schedule for transmission a FILS Discovery frame every dot11FILSFDFrameBeaconMaximumInterval? If it can schdule a FILS Discovery frame as well, it is not necessary to specify "that does not transmits a Reduced Neighbor Report and/or a Neighbor Report element reporting that 6 GHz AP". Otherwise, please add the following "shall not" statement. "An AP operating in the 6 GHz band that is co-located with an AP that does not transmits a Reduced Neighbor Report and/or a Neighbor Report element reporting that 6 GHz AP shall not schedule for transmission a FILS Discovery frame." | As in the comment. | Rejected –  Could not find a sentence in the cited paragraph that specifies “that does not transmit …”. This rule is essentially saying that the 6G AP may schedule FD frames if the co-located AP is advertising its presence as well. And there is no requirement for the other case (that does not include RNR IE and NR IE) because it is up to the AP to decide what to do in this case (i.e., the AP may not want to be discovered in 2G4 or 5G but may want to do so in 6G. Not stating this allows both cases. |
| 22516 | Yongho Seok | 452.01 | "An AP operating in the 6 GHz band that is co-located with an AP that transmits a Reduced Neighbor Report and/or a Neighbor Report element reporting that 6 GHz AP may schedule for transmission a FILS Discovery frame every dot11FILSFDFrameBeaconMaximumInterval." Regarding the FILS Discovery frame transmission, the following is the baseline rule. "The transmission interval between subsequent FILS Discovery frames by an AP in a beacon interval shall be no less than the interval indicated in dot11FILSFDFrameBeaconMinimumInterval." In the baseline, the FILS Discovery frame is not scheduled every dot11FILSFDFrameBeaconMaximumInterval. If a new rule is defined for the FILS Discovery frame transmission, please add this to the exceptation list (the second paragraph of 26.17.2.3.2). Otherwise, please change the citied wording according to the baseline rule. | As in the comment. | Revised –  Agree in principle with the commenter that the sentence is ambiguous. Proposed resolution replaces the MIB variable with a reference to the baseline subclause which indicates how the FILS Discovery frames are generated.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22516. |
| 22517 | Yongho Seok | 452.07 | "...the 20 TU Probe Responses Active subfield..." The unsolicited broadcast Probe Response frames are sent every dot11FILSFDFrameBeaconMaximumInterval. And, as said in the second paragraph, dot11FILSFDFrameBeaconMaximumInterval is set to 20 TU only if the AP is the 6 GHz-only AP that does not share the same co-located AP set as an AP operating in the 2.4 GHz band or 5 GHz band. It means that the unsolicited broadcast Probe Response transmssion in the 6 GHz AP having the co-located AP in the 2.4 GHz band or 5 GHz band is not strictly related with 20 TU. Change the subfield name to the Unsolicited Probe Responses Active subfield. | As in the comment. | Revised –  Agree with the comment.  TGax editor: Please replace “20 TU Probe Response Active” with “Unsolicited Probe Response Active” and “dot1120TUProbeResponseOptionImplemented” with “dot11UnsolicitedProbeResponseOptionImplemented” throught the draft. |
| 22520 | Yongho Seok | 452.24 | "An AP that corresponds to a nontransmitted BSSID shall not schedule for transmission FILS Discovery frames (see 11.46.2.1 (FILS Discovery frame transmission))" Is this rule applied only for 6 GHz operating AP? Otherwise, please move to 11.46.2.1 (FILS Discovery frame transmission). | As in the comment. | Revised –  Agree in principle with the comment. This applies to baseline (or say is inherited from baseline). Proposed resolution is to convert this statement to a declarative one and add any missing normative behavior to baseline subclauses (11.1.4.3.4 already has it).  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22520. |
| 22521 | Yongho Seok | 452.09 | "An AP ... shall schedule for transmission an unsolicited broadcast Probe Response frame every dot11FILSFDFrameBeaconMaximumInterval." If the unsolicited broadcast Probe Response frame is scheduled every dot11FILSFDFrameBeaconMaximumInterval and the scheduled time is aligned with TBTT, why does AP schedule the unsolicited broadcast Probe Response frame even though the Beacon is scheduled at almost same time. | Remove the unsolicited broadcast Probe Response frame transmission. | Revised –  Agree in principle with the comment. Proposed resolution is to specify that the transmission of the probe response may be omitted if it is scheduled for transmission at a target transmit time of a Beacon.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22521. |
| 22522 | Yongho Seok | 452.56 | "A 6 GHz AP that receives a Probe Request frame with the Address 1 field equal to the broadcast address, shall respond with a Probe Response frame with the Address 1 field set to the broadcast address." A 6 GHz AP responds with a Probe Response frame if the conditions specified in 11.1.4.3.4 (Criteria for sending a response) are satisfied. Change the cited wording as the following: "A 6 GHz AP that receives a Probe Request frame with the Address 1 field equal to the broadcast address, shall respond with a Probe Response frame with the Address 1 field set to the broadcast address, if the conditions specified in 11.1.4.3.4 (Criteria for sending a response) are satisfied." | As in the comment. | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested changes but additionally merges two adjacent sentences to avoid ambiguity and conflicting requirements.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22522. |
| 22523 | Yongho Seok | 452.57 | If the AP consist of the hidden SSID, always sending the broadcast Probe Response is not desirable. | Please add an exception for allowing the unicast Probe Response for the hidden SSID. | Revised –  An AP that operates with a hidden SSID is technically an SSID that does not want to be discovered by STAs. Proposed resolution is to specify that this requirement applies to those APs that intend to be discovered by STAs.  TGax editor to make the changes shown in 11-19/1834r0 under all headings that include CID 22523. |
| 22524 | Yongho Seok | 453.64 | "...after invoking the backoff procedure, described in 10.23.2.2 (EDCA backoff procedure)..." What does it mean? Does the STA shall perform the back-off procedure even though the STA has not been back-logged and the channel is idle? In such case, if we follows the legacy channel access rule, the STA immediately send frame without invoke the backoff procedure. Please remove the citied wording. | As in the comment. | Rejected –  The comment is asking several questions the answers to which are as follows:   1. It means that the STA may transmit the PR frame after invoking the backoff procedure 2. Yes, it is during the time that the STA has invoked the backoff procedure that the STA understands whether the channel is idle or not. 3. Not certain what legacy channel access rule is referred to but the legacy channel access rule is DCF/EDCA, which requires invoking the backoff procedure prior to the transmission of a frame, unless that frame is a response to another frame. |
| 22525 | Yongho Seok | 454.01 | "Otherwise, if the STA has discovered the presence of an AP in that channel through means that are out of scope of the standard and the AP might be detected by the STA,..." What is a difference between the discovery of the presence of the AP and the detection of the AP? Please clarify the discovery and detection. Otherwise, remove this sentence. | As in the comment. | Rejected –  The comment is asking a question. Discovery means the STA has discovered that the AP exists, while the discovery of the presence means that the STA has also detected that the AP is within its receive range. |
| 22526 | Yongho Seok | 454.22 | Fix typo from "PHY Support Criteria" to "PHY Support Criterion". | As in the comment. | Accepted |

**Discussion: *None.***

* HE BSS operation
* Basic HE BSS operation

(#21268)The Beacon frames generated within an HE BSS contain an HE Operation element.

An HE STA has dot11HEOptionImplemented equal to true.

A STA that is operating in(#21270) 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 operating in the 2.4 GHz band that sets dot11HEOptionImplemented to true shall set dot11HighThroughputOptionImplemented to true. A STA operating in the 5 GHz or 6 GHz(#20456) band that sets dot11HEOptionImplemented to true shall set both dot11VHTOptionImplemented(#20457) and dot11HighThroughputOptionImplemented to true. A non-AP STA that sets dot11HEOptionImplemented to true shall set dot11MultiBSSIDImplemented to true.(#21271)(M128)

An HE STA operating in the 6 GHz band shall inherit the functionalities of a VHT STA except that it is exempt from following VHT and HT functionalities and/or requirements that are unavailable or superseded by equivalent HE functionalities and/or requirements (see Clauses 26 (High Efficiency (HE) MAC specification)and 27 (High Efficiency (HE) PHY specification)), and that it shall use the HE format instead of the VHT, HT\_GF, or HT\_MF format for PPDUs transmitted in the 6 GHz band. Additional HE functionalities and/or requirements for the 6 GHz band are defined in 26.17.2 (HE BSS operation in the 6 GHz band).(#20456)

A STA that is an HE AP or an HE mesh STA declares the channel widths at which it is capable of operating in the PHY Capabilities Information field of the HE Capabilities element that it transmits (see Table 9-321b (Subfields of the HE PHY Capabilities Information field)).(#21272)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22192):***

An HE AP operating in the 5 GHz or 6 GHz bands shall set B1 in the Supported Channel Width Set field in the PHY Capabilities Information field in the HE Capabilities element to indicate support for 40 MHz and 80 MHz channel width.*(#22192)* (#20239)

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 if either B0 or B1 of the Supported Channel Width Set subfield of the HE Capabilities element is 1(#mdr) unless the STA is a 20 MHz-only non-AP HE STA, in which case the Supported Channel Width Set subfield of the HT Capabilities element is set to 0.

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 indicate the same channel width as indicated in the HE Capabilities element unless 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.

At a minimum, an HE STA sets the Rx MCS Bitmask subfield of the Supported MCS Set field of its HT Capabilities element according to the setting of each Rx HE-MCS Map *b* subfield(#20563), *b*  {≤ 80 MHz, 160 MHz, 80+80 MHz}, of the Supported HE-MCS And NSS Set field of its HE Capabilities element as follows: for each Max HE-MCS For *n* SS subfield, 1 ≤ *n* ≤ 4, of each Rx HE-MCS Map *b* subfield(#20563), *b*  {≤ 80 MHz, 160 MHz, 80+80 MHz}, with a value other than 3 (no support for that number of spatial streams), the STA shall indicate support for HT MCSs 8× (*n*– 1) to 8× (*n*– 1) + 7 in the Rx MCS Bitmask subfield, where *n* is the number of spatial streams, except for those HT-MCSs(#20991) marked as unsupported as described in 26.15.4.3 (Additional rate selection constraints for HE PPDUs).(#21270)

An HE AP or an HE mesh STA shall set the VHT Operation Information Present field in the HE Operation element to 0 if a VHT Operation element is present in the frame that carries the HE Operation element or if the frame that carries the HE Operation element is sent in the 2.4 GHz band. An HE AP or HE mesh STA shall set the VHT Operation Information Present field in the HE Operation element to 1 if a VHT Operation element is not present in the frame that carries the HE Operation element and the frame is sent in the 5 GHz band.

An HE AP or an HE mesh STA(#21273) that transmits an HE Operation element that has the VHT Operation Information Present field set to 1 shall do one of the following to set the BSS operating channel:

* Set the STA Channel Width subfield and Channel Center Frequency Segment 2 subfield in the HT Operation Information field in the HT Operation element, the Channel Width subfield in the VHT Operation Information field in the HE Operation element, the Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields in the VHT Operation Information field in the HE Operation element to indicate the BSS bandwidth as defined in Table 11-24 (VHT BSS bandwidth) and Table 11-26 (Extended NSS channel width) respectively based on the Extended NSS BW Support and Supported Channel Width Set fields.
* Set the STA Channel Width subfield and Channel Center Frequency Segment 2 subfield in the HT Operation Information field in the HT Operation element, the Channel Width subfield in the VHT Operation Information field in the HE Operation element, the Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields in the VHT Operation Information field in the HE Operation element to indicate the BSS bandwidth as defined in Table 11-24 (VHT BSS bandwidth) and Table 11-26 (Extended NSS channel width) respectively based on the Rx HE-MCS Map ≤ 80 MHz, Rx HE-MCS Map 160 MHz, and Rx HE-MCS Map 80+80 MHz fields.

NOTE 1—The Channel Center Frequency Segment 2 is 0 if Table 11-24 (VHT BSS bandwidth) is applied.

NOTE 2—These two methods give the same result.

The setting of the Channel Center Frequency Segment 0, Channel Center Frequency Segment 1 and Channel Center Frequency Segment 2 subfields is defined 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 9.4.2.247 (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)), where(#20497) in the table the maximum NSS support refers to the HE maximum NSS support instead of the VHT maximum NSS support for an HE STA.(#20891)

An HE STA shall determine the channelization using the information in the Primary Channel field of the HT Operation element when operating in 2.4 GHz and the combination of the information in the Primary Channel field in the HT Operation element and the Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields in the VHT Operation Information field in the VHT Operation element if operating in the 5 GHz band (see 21.3.14 (Channelization)). An HE STA determines the channelization as defined in 26.17.2 (HE BSS operation in the 6 GHz band) if operating in the 6 GHz band.

An HE AP or an HE mesh STA shall set the Secondary Channel Offset subfield in the HT Operation Information field in the HT Operation element 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 rules 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 TB PPDU sent in response to a triggering frame(#21348) follows the rules defined in 26.5.2.3 (Non-AP STA behavior for UL MU operation).
* An 80 MHz, 160 MHz or 80+80 MHz DL HE MU PPDU with preamble puncturing may be transmitted if the primary 20 MHz or the primary 40 MHz are occupied by the transmission and certain 20 MHz subchannels of the secondary channel are idle (see Table 27-20 (HE-SIG-A field of an HE MU PPDU) and 10.22.2.5 (EDCA channel access in VHT, HE, or TVHT BSS)).

An HE STA shall not transmit to a recipient HE STA using a channel width(#21275) that is not indicated as supported in the Supported Channel Width Set subfield in the HE Capabilities element received from that HE STA.

An HE STA shall not transmit to a recipient HE STA using a channel width that exceeds the BSS channel width in the Channel Width field that is contained in:

* The HE Operation element most recently exchanged with the recipient STA, if any, and if the Channel Width field is present
* Otherwise, the VHT Operation element most recently exchanged with the recipient STA, if any
* Otherwise, the HT Operation element most recently exchanged with the recipient STA, if any.(#21275)

A STA shall not transmit an HE PPDU to a recipient STA that carries a frame that is not an HE Compressed Beamforming/CQI frame (see 26.7.3 (Rules for HE sounding protocol sequences)) and that exceeds the maximum MPDU length capability indicated in the VHT Capabilities element last received from the recipient STA in the 2.4 GHz or 5 GHz band(#20116) or, if a VHT Capabilities element has not been received from the recipient STA, that exceeds the maximum A-MSDU length indicated in the HT Capabilities element last received from the recipient STA in the 2.4 GHz or 5 GHz band(#20116).(#20905)

A STA shall not transmit an HE PPDU to a recipient STA that carries a frame that is not an HE Compressed Beamforming/CQI frame (see 26.7.3 (Rules for HE sounding protocol sequences)) and that exceeds the maximum MPDU length capability indicated in the HE 6 GHz Band Capabilities(#21158) element last received from the recipient STA in the 6 GHz band.(#20116)

(#21276)An HE AP shall set the RIFS Mode field in the HT Operation element to 0.

An HE STA follows the rules (#Ed)in 11.40 (VHT BSS operation) for channel selection, determining scanning requirements, channel switching, NAV assertion and antenna indication when operating in the 5 GHz or 6 GHz band(#21277) unless explicitly stated otherwise in Clause 26. An HE STA shall additionally follow the rules (#Ed)in 26.17.2 (HE BSS operation in the 6 GHz band) for scanning and operation in the 6 GHz band.(#20126, #21493)

An HE STA shall follow the rules (#Ed)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 26.

The AP of an ER BSS(#21278) shall not respond with a Probe Response or (Re)Association Response frame to a Probe Request or (Re)Association Request frames, respectively,(#21279) sent from a non-HT STA, or an HE STA that does not support Partial Band Extended Range capability if the HE AP transmits ER beacon in an HE ER SU PPDU with a 106-tone RU(#mdr). An HE AP that is not operating an ER BSS may set the ER SU Disable subfield in the HE Operation element it transmits to 1.

A STA shall have the same value of maximum VHT NSS defined by its Rx HE-MCS Map ≤ 80 MHz subfield(#20563) in the HE Capabilities element as the maximum NSS value indicated by its Rx VHT-MCS Map field in the VHT Capabilities element. If a STA supports 160 MHz, the Maximum NSS defined by its Rx VHT-MCS Map field and Extended NSS BW Support field in the VHT Capabilities element at 160 MHz shall not be more than the maximum NSS defined by its Rx HE-MCS Map 160 MHz subfield(#20563) in the HE Capabilities element at 160 MHz. If a STA supports 80+80 MHz, the maximum NSS defined by its Rx VHT-MCS Map field and Extended NSS BW Support field in the VHT Capabilities element at 80+80 MHz shall not be more than the maximum NSS defined by its Rx HE-MCS Map 80+80 MHz subfield(#20563) in the HE Capabilities element at 80+80 MHz. For every NSS in VHT Capabilities elements and HE Capabilities elements transmitted by a STA, if the maximum HE-MCS is 9 or more, the maximal VHT-MCS shall be 9. Otherwise the maximal VHT-MCS shall be the same as the HE-MCS. An HE STA shall not transmit a VHT Capabilities element with the Supported Channel Width Set field equal to 1 and the Extended NSS BW Support field equal to 3 or with the Supported Channel Width Set field equal to 2 and the Extended NSS BW Support field equal to 3.

If an HE STA supports 160 MHz, the maximum NSS defined by its Rx HE-MCS Map 160 MHz subfield(#20563) for an HE-MCS in the HE Capabilities element at 160 MHz shall not be more than the maximum NSS defined by its Rx HE-MCS Map ≤ 80 MHz subfield(#20563) for the HE-MCS in the HE Capabilities element at 80 MHz.

If an HE STA supports 80+80 MHz, the maximum NSS defined by its Rx HE-MCS Map 80+80 MHz subfield(#20563) for an HE-MCS in the HE Capabilities element at 80+80 MHz shall not be more than the maximum NSS defined by its Rx HE-MCS Map ≤ 80 MHz subfield(#20563) for the HE-MCS in the HE Capabilities element at 80 MHz.

* HE BSS operation in the 6 GHz band
* General

An HE STA(#21509) that supports operation in the 6 GHz band sets dot11HE6GOptionImplemented to true.(#21280)

An HE STA with dot11HE6GOptionImplemented equal to true and operating in the 6 GHz band is a 6 GHz HE STA.

A STA with dot11HE6GOptionImplemented equal to true shall have dot11ExtendedChannelSwitchActivated, dot11MultiDomainCapabilityActivated and dot11OperatingClassesRequired equal to true and shall set to 1 the value of the Extended Channel Switching field in the Extended Capabilities elements it transmits.(#20801, #20802)

A 6 GHz HE STA shall meet the Class A requirements in 27.3.14 (Transmit requirements for PPDUs sent in response to a triggering frame).(#21038, #21060)

An HE AP operating in the 6 GHz band shall indicate support for at least 80 MHz channel width.

An HE AP operating in the 6 GHz band shall set the Co-Hosted BSS subfield in HE Operation element to 0.

A 6 GHz HE STA shall not transmit an HT Capabilities element, VHT Capabilities element, HT Operation element, VHT Operation element or an HE Operation element that contains a VHT Operation Information field.(#20348)

A 6 GHz HE STA shall not transmit in an HE PPDU a frame(#mdr) other than an HE Compressed Beamforming/CQI frame (see 26.7.3 (Rules for HE sounding protocol sequences)) that exceeds the maximum MPDU length capability indicated in the Extended HE Capabilities element received from the recipient HE STA 6G.(#20980)

An AP or mesh STA operating in the 6 GHz band shall include the 6 GHz Operation Information field in the HE Operation elements it transmits. The AP or mesh STA shall set the Channel Width subfield, the Channel Center Frequency Segment 0, and the Channel Center Frequency Segment 1 subfields of the 6 GHz Operation Information field as defined in Table 26-14 (6 GHz BSS channel width), based on the Rx HE-MCS Map ≤ 80 MHz(#20563), Rx HE-MCS Map 160 MHz, and Rx HE-MCS Map 80+80 MHz subfields of the Supported HE MCS And NSS Set field of the HE Capabilities element transmitted by the AP(#21282, #21350).

|  |  |  |
| --- | --- | --- |
| * 6 GHz BSS channel width | | |
| Channel Width field | Center Frequency Segment 1 field | BSS channel width |
| 0 | 0 | 20 MHz |
| 1 | 0 | 40 MHz |
| 2 | 0 | 80 MHz |
| 3 | CCFS1 > 0 and  |CCFS1 – CCFS0| = 8 | 160 MHz |
| 3 | CCFS1 > 0 and  |CCFS1 – CCFS0| > 16 | 80+80 MHz |
| NOTE 1—CCFS0 represents the value of the Channel Center Frequency Segment 0 field and CCFS1 represents the value of the Channel Center Frequency Segment 1 field. | | |

A 6 GHz HE STA shall determine the BSS channelization(#21525) using the Primary Channel, Channel Center Frequency Segment 0 and Channel Center Frequency Segment 1 subfields in the 6 GHz Operation Information field in the HE Operation element when operating in 6 GHz band (see 21.3.14 (Channelization) for the channelization and 27.3.22.2 (Channel allocation in the 6 GHz band) for the equation defining the channel center frequencies in the 6 GHz band).(#21351)

A STA shall not transmit an HT PPDU in the 6 GHz band. A STA shall not transmit a VHT PPDU in the 6 GHz band. A STA shall not transmit a DSSS, HR/DSSS, or ERP-OFDM PPDU in the 6 GHz band.

A 6 GHz HE STA shall set dot11SpectrumManagementRequired to true and operate as defined in 11.7 (TPC procedures).

(#20411, #21283, #21352, #21511, #20411)A 6 GHz AP shall set dot11FILSOmitReplicateProbeResponses(#20501) to true.(#20080)

(#20073)A 6 GHz HE AP may respond with a (Re)Association Response frame with the Status Code field indicating DENIED\_POOR\_CHANNEL\_CONDITIONS if it receives a (Re)Association Request frame from a non-AP STA below a minimum RSSI threshold value. A 6 GHz HE AP may send a Disassociation frame with the Reason Code field indicating POOR\_RSSI\_CONDITIONS to an associated non-AP STA if it receives frames from the STA below a minimum RSSI threshold value for a sufficiently long period of time. How an AP selects a minimum RSSI threshold value or sufficient interval of time is out of scope of this specification.

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22139):***

A 6 GHz non-AP HE STA that receives a (Re)Association Response frame with the Status Code field indicating DENIED\_POOR\_CHANNEL\_CONDITIONS or a Disassociation frame with the Reason Code field indicating POOR\_RSSI\_CONDITIONS from a 6 GHz HE AP should not transmit a (Re)Association Request frame or a Probe Request frame to the AP until one of the following condition is met:

* Sufficient time has passed since it received the (Re)Association Response frame or Disassociation frame from the AP
* The STA has determined that a (Re)Association Request frame or Probe Request frame that it transmits will be received by the AP at a sufficiently high RSSI level and in sufficiently good conditions compared with its previous transmission to the AP.*(#22139)*

How a non-AP STA determines sufficient time has passed or a suitable RSSI threshold is out of scope of the standard.

* Beacons in the 6 GHz band

An HE AP 6G transmits Beacon frames as defined in 11.1 (Synchronization), which may be contained in a(#mdr) non-HT PPDU, non-HT duplicate PPDU, or HE SU PPDU.

An HE AP 6G that transmits a Beacon frame in a(#mdr) non-HT PPDU follows the rules in 10.6.5.1 (Rate selection for non-STBC Beacon and non-STBC PSMP frames).

An HE AP 6G that transmits a Beacon frame in a(#mdr) non-HT duplicate PPDU shall follow the rules in 10.6.5.1 (Rate selection for non-STBC beacon and non-STBC PSMP frames) and shall set the TXVECTOR parameter CH\_BANDWIDTH of the PPDU to a value that is up to the operating channel width of the BSS.

If an HE AP 6G schedules a Beacon frame for transmission in a(#mdr) non-HT duplicate PPDU then it shall set the Duplicate Beacon subfield to 1 in the 6 GHz Operation Information field of the HE Operation element it transmits; otherwise the AP shall set the Duplicate Beacon subfield to 0.

An HE AP 6G that transmits a Beacon frame in an(#mdr) HE SU PPDU shall follow the rules defined in 26.15.6 (Additional rules for HE SU beacons and group addressed frames).

An AP shall not transmit a Beacon frame in an HE SU PPDU or non-HT duplicate PPDU in the 2.4 GHz or 5 GHz bands.(#20076, #21159, #21570)(#20411, #21283, #21352, #21511, #20411)

* Scanning in the 6 GHz band
* General

A 6 GHz AP may set dot11ColocatedRNRImplemented to true and shall set dot11ShortSSIDListImplemented to true. An AP that is in the same co-located AP set as a 6 GHz AP shall set dot11ColocatedRNRImplemented to true and dot11ShortSSIDListImplemented to true(#21288).(#20253)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22511):***

In the 6 GHz band, a STA shall not transmit a Probe Request frame to the broadcast destination address that includes a Short SSID List element with more than one Short SSID field.*(#22511)* (#20493, #21160, #21496)

NOTE—In bands other than the 6 GHz band, there might be more than one Short SSID field in a Short SSID List element in a Probe Request frame to the broadcast destination address. A Probe Request frame does not contain more than one Short SSID List element (see Table 9-40 (Probe Request frame body)).(#20493, #21160, #21496)

* AP behavior for fast passive scanning(#20077)

A 6 GHz AP that does not share the same co-located AP set as an AP operating in the 2.4 GHz band or 5 GHz band is referred to as a 6 GHz-only AP.

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22420, 22512, 22514):***

(#21522, #20072)A 6 GHz-only AP (#20079)shall schedule for transmission FILS Discovery frames as described in 11.46.2.1 (FILS Discovery frame transmission)(#20057), except that the following apply:

* If the FILS Discovery frame is contained in a DL HE MU PPDU then it shall be included in the broadcast RU of the DL HE MU PPDU as defined in 26.15.7 (Additional rules for group addressed frames in an HE MU PPDU).
* The transmission of a FILS Discovery frame may be omitted if a broadcast Probe Response frame or a Beacon frame is scheduled for transmission instead of the FILS Discovery frame at about the same target transmit time(#20350), or if the AP does not intend to be discovered by STAs.*(#22420, 22512)*
* The AP shall set dot11FILSFDFrameBeaconMaximumInterval to a nonzero value that is less than or equal to 20 TUs, and shall follow the rules in 11.46.2.1 (FILS Discovery frame transmission) if dot11MultiBSSIDImplemented is true.(#20351, #20079)*(#22514)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22516):***

An AP operating in the 6 GHz band that is co-located with an AP that transmits a Reduced Neighbor Report and/or a Neighbor Report element reporting that 6 GHz AP may schedule for transmission a FILS Discovery frame as defined in 11.46.2.1 (FILS Discovery frame transmission).*(#22516)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22517, 22521):***

An AP operating in the 6 GHz band that is co-located with an AP that transmits a Reduced Neighbor Report and/or a Neighbor Report element with the Unsolicited Probe Responses Active subfield reporting that 6 GHz AP shall schedule for transmission an unsolicited broadcast Probe Response frame every dot11FILSFDFrameBeaconMaximumInterval except that the transmission of the Probe Response frame may be omitted if a Beacon frame is scheduled for transmission at about the same target transmit time. *(#22517, 22521)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22514):***

An AP operating in the 6 GHz band may send an unsolicited broadcast Probe Response frame, and shall follow the rules in 11.1.4.3.4 (Criteria for sending a response) *(#22514)* if dot11MultiBSSIDImplemented is true(#20079). The Probe Response frame may be included in the broadcast RU of a DL HE MU PPDU as defined in 26.15.7 (Additional rules for group addressed frames in an HE MU PPDU). The Probe Response may be carried in a non-HT duplicate PPDU in which case the PPDU shall have the TXVECTOR parameter CH\_BANDWIDTH set to a value that is up to the operating channel width of the BSS.(M128)

(#20078, #21528, #21577, #25129, #20079, #21578)An HE AP operating in the 6 GHz band that transmits a FILS Discovery frame carrying an FD Capability field shall set the PHY Index subfield to 4.(#20025)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22520):***

An AP that corresponds to a nontransmitted BSSID does not schedule for transmission FILS Discovery frames (see 11.46.2.1 (FILS Discovery frame transmission)) or unsolicited broadcast Probe Response frames (see 11.1.4.3.4 (Criteria for sending a response)).*(#22520)* (#20351, #20079)(#20021)

(#20021)If a 6 GHz-only EMA AP transmits a FILS Discovery frame, it shall include a Reduced Neighbor Report element in the FILS Discovery frame carrying information of all nontransmitted BSSIDs in the multiple BSSID set that are discoverable.

NOTE—A FILS Discovery frame transmitted by a 6 GHz AP with the Multiple BSSIDs Presence Indicator subfield set to 1 and not carrying a Reduced Neighbor Report element indicates the presence of a Multiple BSSID element carrying a complete list of nontransmitted BSSID profiles in the Beacon frame at the advertised TBTT.

If a 6 GHz-only EMA AP transmits a Beacon or broadcast Probe Response frame, it shall include a Reduced Neighbor Report element in that frame carrying information of all nontransmitted BSSIDs in the multiple BSSID set that are discoverable and not carried in the Nontransmitted BSSID Profile subelement(s) of the Multiple BSSID element carried in that frame.

A 6 GHz-only AP should set up the BSS with a primary 20 MHz channel that coincides with a preferred scanning channel (PSC) (see 26.17.2.3.3 (Non-AP STA scanning behavior)).

NOTE—An AP might initiate(#21043) a BSS with a primary channel that coincides with a PSC in order to assist STAs that are scanning the 6 GHz band to discover the BSS. The AP might subsequently switch its operating channel to a non-PSC (e.g., using a CSA mechanism) if it does not expect additional (not yet associated) STAs will need to discover the BSS.

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22522, 22523):***

A 6 GHz AP shall not respond to a Probe Request frame if the frame carries a FILS Request Parameters element and the AP is unable to satisfy the response time constraint specified in the Max Channel Time field in the element (see 11.1.4.3.4 (Criteria for sending a response)). (#20080) A 6 GHz AP that receives a Probe Request frame with the Address 1 field equal to the broadcast address and that intends to be discovered by all STAs, shall respond with a Probe Response frame with the Address 1 field set to the broadcast address or with the next Beacon frame if the conditions specified in 11.1.4.3.4 (Criteria for sending a response) are satisfied.*(#22522, 22523)* (#21530)

* Non-AP STA scanning behavior

The set of 20 MHz channels in the 6 GHz band, with channel center frequency, ch\_a = Channel starting frequency – 55 + 80 × n (MHz) are referred to as preferred scanning channels (PSCs). Channel starting frequency is defined in 27.3.22.2 (Channel allocation in the 6 GHz band), and n = 1,..., 15. (#20452, #20453, #20518, #20519)

NOTE—PSCs might not all be available in a specific location due to regulatory restrictions. A STA scanning the 6 GHz band knows where these PSCs are located since their position is fixed.(#21581)

A non-AP STA that is actively scanning a channel in the 6 GHz band shall operate as defined in 11.1.4.3.2 (Active scanning procedure for a non-DMG STA), unless a given rule is superseded by the rules defined in 26.17.2.3 (Scanning in the 6 GHz band).

The non-AP STA shall not transmit a Probe Request frame to the broadcast destination address with the Address 3 field set to the wildcard BSSID, and the SSID set to the wildcard SSID. (#20127)

The non-AP STA shall not send a Probe Request frame to the broadcast destination address with the Address 3 field (BSSID) set to the BSSID of an AP from which it has already received a Probe Response or a Beacon frame since the start of its scanning on that channel. (#21531, #20127)

The non-AP STA shall not send a Probe Request frame to the broadcast destination address with the Address 3 field (BSSID) set to the BSSID of a nontransmitted BSSID if it has already received the nontransmitted BSSID profile for that BSSID via a Beacon frame or Probe Response frame sent by the transmitted BSSID since the start of its scanning on that channel.(#21532, #20127, #20242)

The non-AP STA shall not send a Probe Request frame to the broadcast destination address(#20127) with the SSID field and/or the Address 3 field set to the SSID and/or BSSID, respectively, of an AP for which it has received a Reduced Neighbor Report or Neighbor Report element(#Ed) with the Unsolicited Probe Responses Active subfield corresponding to that AP set to 1 and that indicates that the AP is operating in that channel until the FILS Probe Timer reaches dot11FILSProbeDelay.

The non-AP STA shall not transmit more than one Probe Request frame to the broadcast destination address(#20127) with the Address 3 field set to the wildcard BSSID and the SSID field not set to the wildcard SSID during each 20 TU period scanning the channel(#20210). The non-AP STA(#21139) shall not transmit more than three Probe Request frames to the broadcast destination address with Address 3 field set to a non-wildcard BSSID during each 20 TU(#20488) period scanning the channel.

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22421):***

The non-AP STA shall set dot11FILSProbeDelay(#20501) to a value equal to or greater than 20 TU(#20488).

NOTE—A non-AP STA waits for at least 20 TU so that it maximizes the probability of receiving FILS Discovery or broadcast Probe Response frames, if any, sent by an AP in that channel (see 26.17.2.3.2 (AP behavior for fast passive scanning)).*(#22421)* (#21353, #21354)

If the non-AP STA is scanning a channel, then the following apply:

* If the STA has received a FILS Discovery frame indicating that an AP is operating in that channel, or if the STA has received a Reduced Neighbor Report or(#21579) Neighbor Report element indicating that an AP is operating in that channel then the STA may, subject to the other rules in this clause, send a Probe Request frame to the broadcast destination address in that channel, with the SSID field set to the SSID that corresponds to that AP or with the Short SSID field of the Short SSID List element set to the short SSID(#20374) that corresponds to that AP and/or with the Address 3 field set to the BSSID of that AP, starting from step c) of 11.1.4.3.2 (Active scanning procedure for a non-DMG STA)(#20210)
* Otherwise, if the channel is a PSC and the STA has determined the medium to be idle for a continuous period of at least dot11MinPSCProbeDelay from the start of the scan on the channel then the STA may, subject to other rules in this subclause, send a Probe Request frame to the broadcast destination address in that channel, with the SSID field set to the SSID that corresponds to an AP or with the Short SSID field of the Short SSID List element set to the short SSID that corresponds to an AP, and/or with the Address 3 field set to the BSSID of an AP, after invoking the backoff procedure, described in 10.23.2.2 (EDCA backoff procedure) and starting from step c) of 11.1.4.3.2 (Active scanning procedure for a non-DMG STA)(#20210)
* Otherwise, if the STA has discovered the presence of an AP in that channel through means that are out of scope of the standard and the AP might be detected by the STA,(#21580) then the STA may send a Probe Request frame to the broadcast destination address(#20127) in that channel,(#20210) with the Address 3 field set to the BSSID of that AP starting from step c) of 11.1.4.3.2 (Active scanning procedure for a non-DMG STA)
* Otherwise, if the FILS-Probe-Timer reaches dot11FILSProbeDelay and the channel is a PSC, then the STA may, subject to the other rules in this subclause, send a Probe Request to the broadcast destination address(#20127) in that channel,(#20210) starting from step c) of 11.1.4.3.2 (Active scanning procedure for a non-DMG STA),
* Otherwise, the STA shall not send a Probe Request frame to the broadcast destination address in that channel(#20210).

NOTE 1—The STA might send an individually addressed Probe Request frame to an AP for reasons other than active scan (e.g. to obtain an updated EDCA parameter set)(#21582) even if it has already received a FILS Discovery, Probe Response or Beacon frame from that AP.(#Ed)

NOTE 2—An AP might be detected by a STA if the STA and the AP are on the same channel and in range.(#21580)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22526):***

If a non-AP STA sends a Probe Request frame in the 6 GHz band that includes a FILS Request Parameters element, then the non-AP STA shall set the value of PHY Support Criterion subfield in the element to either 0 or 3.*(#22526)* (#20025)

* Out of band discovery of a 6 GHz BSS

An AP that operates in the 2.4 GHz or 5 GHz band and that is in the same co-located AP set as one or more 6 GHz APs shall include in Beacon and Probe Response frames that it transmits a Reduced Neighbor Report element with the Co-Located AP subfield in the BSS Parameters subfield in the TBTT Information field(M131) set to 1 to provide at least the operating channels and operating classes of those 6 GHz APs.(#21288)

NOTE—The Reduced Neighbor Report element might contain information on 6 GHz APs that are not in the same co-located AP set as the transmitting AP. In this case the Co-Located AP subfield is set to 0.(#21288)

An AP responds to a probe request by following the rules defined in 11.1.4.3.4 (Criteria for sending a response).(#20081)

(#20083)If neither of the following conditions is met:(#20083)

* the AP transmits an individually addressed Probe Response frame to a STA that has signaled that it does not support operating in the 6 GHz band (see 9.4.2.53 (Supported Operating Classes element)) (#20083)
* the AP operating in the 6 GHz band does not intend to be discovered by STAs (#20083)

then the following applies:(#20083)

* If an AP operating in the 2.4 GHz or 5 GHz band is in the same co-located AP set as one or more 6 GHz APs and has the same SSID as those 6 GHz APs, then the Beacon and Probe Response frames transmitted by the AP or by the transmitted BSSID of the same Multiple BSSID set as the AP shall include, for each of these 6 GHz APs, a TBTT Information field in a Reduced Neighbor Report element with the BSSID field set to the BSSID of the 6 GHz AP, and with either the Short SSID field set to the short SSID of the 6 GHz AP or the Same SSID subfield in the BSS Parameters subfield set to 1 (#20083)
* If an AP operating in the 2.4 GHz or 5 GHz band is in the same co-located AP set as a 6 GHz AP and has a different SSID, and(#20083) no other AP in the same co-located AP set and operating in the 2.4 GHz or 5 GHz band(#20085) is indicating the 6 GHz AP in a Reduced Neighbor Report element(#20085) of the Beacon and Probe Response frames they transmit, then Beacon and Probe Response frames transmitted by the AP (or by the transmitted BSSID of the same Multiple BSSID set as the AP) shall include a TBTT Information field in a Reduced Neighbor Report element with the BSSID field and the Short SSID field set to the BSSID and short SSID of(#20492) the 6 GHz AP, respectively.(#20083)(#21288)

If the AP reported in the TBTT Information field in the Reduced Neighbor Report element(#mdr) is a 6 GHz AP, the reporting AP shall include the BSS Parameters subfield in the TBTT Information field and shall follow the rules (#Ed)in 11.50 (Reduced neighbor report) to set the Multiple BSSID subfield, the Transmitted BSSID subfield, the Co-Located.AP subfield and the OCT Recommended subfield.(#20082)

A STA receiving a frame containing a Reduced Neighbor Report element describing a reported AP operating at 6 GHz with the OCT Recommended subfield set to 1 in the BSS Parameters subfield shall follow the rules in 11.50 (Reduced neighbor report)(#Ed) to perform active scanning, authentication and/or association with the reported AP.(#20082)

(#20082)An AP that operates in the 2.4 GHz or 5 GHz band and that is in the same co-located AP set as one or more 6 GHz APs(#20943) shall include the Advertisement Protocol element in Beacon and Probe Response frames that it transmits and shall support responding with a Neighbor Report ANQP element (9.4.5.19 Neighbor Report ANQP element) carrying one or more Neighbor Report elements (see 9.4.2.36 (Neighbor Report element)) that include at least the SSID information of all the 6 GHz APs in the same co-located AP set, except the 6 GHz APs that don't intend to be discovered.(#21534)(#21288)

NOTE 1—The Neighbor Report ANQP-element can also carry Neighbor Report elements containing information on 6 GHz APs that are not in the same co-located AP set.(#21288)

NOTE 2—It is recommended that the AP responds with a GAS comeback delay of zero.

NOTE 3—If the Same SSID subfield is set to 0 in the BSS Parameters of a reported 6 GHz AP(#21288), a non-AP STA might:

* Use the OCT procedure described in 11.32.5 (On-channel Tunneling (OCT) operation) to send a Probe Request frame to the reported AP through over-the-air transmissions with the reporting AP, if the OCT Recommended subfield is 1(#mdr) in the Neighbor AP Information field describing the reported AP.
* Use the ANQP procedure described in 11.23.3.3 (ANQP Procedure) to send an ANQP request with a Query ID corresponding to Neighbor Report to the reporting AP to retrieve the SSID of the 6 GHz APs, including the reported AP.(#21288)
* Send a Probe Request frame to the reported AP including the BSSID of the reported AP.
* Send a Probe Request frame to the reported AP including the short SSID of the reported AP.
* Perform passive scanning in the operating channel of the reported AP.(#20083)

An AP may set the Unsolicited Probe Response Active subfield to 1 in a Reduced Neighbor Report element or Neighbor Report element it transmits if all 6 GHz APs of the same ESS that operate in the corresponding channel and that might be detected by a STA receiving this frame have dot11 Unsolicited ProbeResponseOptionImplemented equal to true and so(#20805, #21535) are transmitting unsolicited Probe Response frames every 20 TUs (see 26.17.2.3.2 (AP behavior for fast passive scanning)).

NOTE—An AP might be detected by a STA if the STA and the AP are on the same channel and in range.

An AP may set the Member Of ESS With 2.4/5 GHz Co-Located AP(#20024) subfield(#mdr) to 1 in a Reduced Neighbor Report element, if the reported AP operates in the 6 GHz band and is part of an ESS where each AP in the ESS that is operating in the same band as the reported AP and that might be detected by a STA receiving this frame (irrespective of the operating channel), has dot11MemberOfColocated6GHzESSOptionImplemented(#21288) equal to true and also has(#21358, #21536) a corresponding AP operating in the 2.4 GHz or 5 GHz band that is in the same co-located AP set as that AP.(#21288)

NOTE—This subfield indicates that the reported AP is part of an ESS that has no 6 GHz-only APs that might be detected by a STA receiving this frame. This means that all APs operating in the 6 GHz band that are part of that ESS that might be detected by a STA receiving this frame can be discovered in the 2.4 GHz and/or 5 GHz bands(M128).(#20244, #21505)

* HE STA antenna indication

(#20116)A 6 GHz HE STA that does not change its receive(#20526) antenna pattern after association shall set the Rx Antenna Pattern Consistency subfield in the HE 6 GHz Band Capabilities element to 1; otherwise, the STA shall set the Rx Antenna Pattern Consistency subfield in the HE 6 GHz Band Capabilities element to 0.

A 6 GHz HE STA that does not change its transmit(#20526) antenna pattern after association shall set the Tx Antenna Pattern Consistency subfield in the HE 6 GHz Band Capabilities element to 1; otherwise, the STA shall set the Tx Antenna Pattern Consistency subfield in the HE 6 GHz Band Capabilities element to 0.

**11.46.2.1 FILS Discovery frame transmission**

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22520):***

For the APs in a multiple BSSID set, only the AP corresponding to the transmitted BSSID may transmit a FILS Discovery frame; other APs corresponding to nontransmitted BSSIDs shall not transmit a FILS Discovery frame. If dot11MultiBSSIDImplemented is true, then the following applies to the fields in the FILS Discovery frame:*(#22520)*

* The SSID or Short SSID field shall be set to the SSID or short SSID, respectively, of the transmitted BSSID
* The FILS Capability field shall be present and the Multiple BSSIDs Presence Indicator subfield shall be set to 1

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 22513):***

A FILS AP should transmit FILS Discovery frame(s) in every beacon interval. The interval between the transmission of a Beacon frame and a subsequent FILS Discovery frame shall be no less than the interval indicated in dot11FILSFDFrameBeaconMinimumInterval. The transmission interval between subsequent FILS Discovery frames by an AP in a beacon interval shall be no less than the interval indicated in dot11FILSFDFrameBeaconMinimumInterval. If dot11FILSFDFrameBeaconMaximumInteval is not equal to 0, and if a Beacon frame or a broadcast Probe Response frame, or FD frame has not been transmitted by an AP for a period that is equal to dot11FILSFDFrameBeaconMaximumInterval, that AP shall queue for transmission a FD frame, a broadcast Probe Response frame, or a Beacon frame unless the next TBTT is within a duration indicated by the value of dot11FILSFDFrameBeaconMinimumInterval. *(#22513)*