IEEE P802.11
Wireless LANs

|  |
| --- |
| CR for 6 GHz out of band |
| Date: 2018-07-09 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Laurent Cariou |  |  |  | laurent.cariou@intel.com |

Abstract

This document provides CR for CIDs:.

1. **Introduction**

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. The introduction and the explanation of the proposed changes are 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** | **Commenter** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 20017 | Abhishek Patil | 9.4.2.36 | 148.20 | It would be beneficial for a 2.4/5 AP to provide TPC information for it's co-located with a 6GHz AP. This way a probe request sent to the 6GHz AP can honor the TCP requirements. | Add TCP element to the list of Optional Sub-elements |  |
| 20019 | Abhishek Patil | 9.4.2.170.2 | 153.20 | An option of Length = 2 (i.e., TBTT Offset and BSS Parameter subfield) can be beneficial in scenarios where an AP is reporting APs that have the same SSID. | Provide an option for Length = 2 in Table 9-282 | Revised – agree with the commenter. Modify the table to add a line for length 2 with TBTT offset and BSS Parameters. Apply the chnges marked as CID 20019 in doc 0417r0. |
| 20022 | Abhishek Patil | 9.4.2.170.2 | 154.24 | RNR should provide an indication that the advertised AP has enabled TPC constraints. | Add a bit to BSS Parameter subfield to indicate if the reported AP has TPC enabled. Further, add TPC element of the reported AP as a sub-element to Neighbor Report element. When the TPC bit in BSS Parameter subfield in RNR is set to 1, a receiving STA may send a Neighbor Report ANQP query to gather TPC info of the reported AP and use appropriate TxPower when probing the reported AP. |  |
| 20040 | Abhishek Patil | 11.32.5 | 284.30 | This is a roundabout way of indicating support for OCT. An AP RNR may report a neighboring AP that has a co-located BSS and supports OCT while the advertising AP doesn't support OCT. Such indirect indication is error prone. A direct indication is always preferred. | The bit in Multi-band element is sufficient to indicate whether or not the AP supports OCT. The other fields in the element can be set to 0 to disable features that are unrelated to 6GHz discovery case. | Revised – modify the paragraph to indicate that there are 2 ways to indicate support for OCT: with the Multiband element, and with RNR. And to clarify that with the RNR option, both the reported and reporting APs support OCT. Apply the changes marked as CID20040 in doc 0417r0. |
| 20041 | Abhishek Patil | 11.32.5 | 284.32 | Does this mean that an AP that doesn't support OCT is not allowed to report another AP that suppports OCT? Also what is the motive for an AP that doesn't have a co-located BSS to support OCT? Allowing an one AP to tunnel message on behalf of another physical AP can have serious security implications. Support for OCT must be limited to the case where an AP has a co-located BSS. Further, the indication must be direct (i.e., carried in mgmt frame of the AP that supports OCT), instead of indirect indication via inclusion or exclusion of other APs that support OCT | The bit in Multi-band element is sufficient to indicate whether or not the AP supports OCT. The other fields in the element can be set to 0 to disable features that are unrelated to 6GHz discovery case. | Revised – the current spec defines that if a reporting AP1 sends an RNR to report a reported AP2, and the OCT recommended bit is set to 1, both AP1 and AP2 support OCT an the OCT procedure can be used between AP1 and AP2.The commenter however points out another possible use case. AP1 is reporting 2 reported APs: AP2 and AP3 (AP2 co-located with AP3 for instance, and not with AP1), and AP2 and AP3 support OCT and the OCT procedure can be used between AP2 and AP3. But AP1 does not support OCT, at least with AP2 and AP3, meaning that the OCT procedure can not be used to reach AP3 from AP1. This can not be signaled today with the RNR as there is way to indicate a specific relationship between 2 reported APs. It would however be beneficial to cover this scenario with the Neighbor Report element. A BSS transition management frame carrying 2 reported APs that are collocated and that support OCT between them. Propose to define a Co-located With Preceeding Reported AP field in the Neighbor report element describing that the reported AP is collocated with the AP reported in the immediately preceeding Neighbor report element in the same frame. And define an OCT With Preceeding Reported AP Recommended field to indicate that OCT is recommended between the 2 reported APs. |
| 20244 | Huizhao Wang | 26.17.2.4 | 434.26 | Cannot understand this paragraph | Please rewrite the paragraph so that a human being can understand | Revised – a note was added in section 9.4.2.170.2 for a human being to understand this. Add a similar note in this subclause. Apply the changes marked as CID20244 in doc 0417r0. |
| 20252 | Jarkko Kneckt | 9.4.2.170.2 | 152.45 | The scanning STA should get information whether all bands that have a co-located AP are listed in the Reduced Neighbor Report. This ensures that STA does not need to further request co-located BSSs and the STA knows all candidate APs easily. | Two alternative resolutions are proposed:1. Either write that all bands in which the reporting AP has a co-located AP are included to the Reduced Neighbor Reports,2. or add a bit to the Reduced Neighbor Report element that indicates whether all bands in which a colocated AP operates are included to the reduced neighbor report. | Jarkko has a submission |
| 20253 | Jarkko Kneckt | 9.4.2.170.2 | 152.45 | Enable in active scanning the scanning non-AP STA to request information that is included to the Reduced Neighbor Report. For example, a non-AP STA should be capable to indicate the bands in which it is interested to operate and request AP information on these bands to be added to the Reduced Neioghbor Report elements. | Please create a new Reduced Neighbor Report Criteria element that may be included to the Probe Request frames. This element can request the bands from which the AP information should be added to the Reduced Neighbor Report element. | Jarkko has a submission |
| 20255 | Jarkko Kneckt | 9.4.2.170.2 | 152.45 | Allow a non-AP STA to request whether only the co-located APs are included in the Reduced Neighbor Report or whether to include neighbor AP information to the Reduced Neighbor Report. | Please create a new Reduced Neighbor Report Criteria element that may be included to the Probe Request frames. This element can request to include only co-located AP information or to include neighbor AP information to the Reduced Neighbor Report included to the Probe Response frames. | Jarkko has a submission |
| 20264 | Jarkko Kneckt | 9.4.2.170.2 | 152.45 | A STA should be capable to request that Reduced Neighbor Report contains AP information only on the SSIDs that are included in the Probe Request frame. The guidance helps to reduce the size of the Neighbor Report element and to provide essential information for the scanning STA. | Please create a new Reduced Neighbor Report Criteria element that may be included to the Probe Request frames. This element can request to include information of APs that match with the SSIDs included to the Probe Request frame to the Reduced Neighbor Report in the Probe Response frames that are transmitted as a response to the Probe Request. | Jarkko has a submission |
| 20265 | Jarkko Kneckt | 9.4.2.170.2 | 152.45 | A STA should be capable to request that Reduced Neighbor Report contains information of All APs in the ESS from which the STA may receive a Beacon. Information of all APs ensures that the STA knows all available APs and can select the best AP. | Please create a new Reduced Neighbor Report Criteria element that may be included to the Probe Request frames. This element can request to include information of all APs in the ESS that are within a coverage that the requesting STA could receive a beacon from them to the Reduced Neighbor Report in the Probe Response frames that are transmitted as a response to the Probe Request. | Jarkko has a submission |
| 20290 | kaiying Lv | 9.4.2.36 | 147.62 | The explaination of "20 TU Probe Response Active subfield" in Neighbor Report element should be consistent with the same subfield in Reduced Neighbor Report element.And "that might be detected by a STA" is more suitable than "in the coverage area of the STA". | As in comment. | Revised – agree with the commenter. Use the same sentence as in the Reduced Neighbor Report element. Make the changes marked as CID20290 in doc 0417r0. |
| 20365 | Laurent Cariou | 26.17.2.4 | 433.26 | The Filtered Neighbor AP subfield set to 1 is also an indication that the reported AP has the same SSID and should therefore added in this sentence as a condition. | Add the Filtered Neighbor AP subfield set to 1 in the list of ways to indicate that the reported AP has the same SSID | Revised – agree with the commenter. Add another way to indicate that the reported AP has the same SSID as the reporing AP, by using the Filtered Neighbor AP subfield set to 1. Make the changes marked as CID20365 in doc 0417r0. |
| 20366 | Laurent Cariou | 9.4.2.36 | 147.01 | OCT recommended field is included in reduced neighbor report to indicate that both the reporting AP and the reported AP support OCT and that OCT can be used to communicate with one AP through the other AP, if the 2 APs are collocated or not collocated in the same device. In a similar manner, OCT support should be indicated when a reported AP is reported in a Neighbor Report, as the functionality is similar. We should therefore define a new field in the Neighbor Report element, in figure 9-334, that indicates that both the reporting AP and reported AP support OCT. There could also be another field indicating that OCT is recommended with the AP collocated with the reported AP. | Define a new field in the Neighbor Report element, in figure 9-334, that indicates that both the reporting AP and reported AP support OCT. | Revised – agree with the commenter. Define new fields in the Neighbor Report element to describe the different possibilities of OCT support: between the reporting AP and the reported AP, and between the reported AP and its co-located APs, and modify section 11.32 to describe this behavior. Apply the changes marked as CID20366 as proposed in doc 0417r0. |
| 20369 | Laurent Cariou | 9.4.2.36 | 147.01 | A new field was defined in the neighbor report element to indicate that the reported AP is colocated with the reporting AP. What is still missing is the way for a reporting AP to indicate that 2 or more of the reported APs that are reported with 2 or more neighbor report elements in the same frame are co-located, and possibly support OCT. | Define a new field in the Neighbor report element, in figure 9-334, that indicates that the reported AP is colocated with the immediately following or preceeding neigbor report element in the same frame. | Revised – agree with the commenter. Define a new field in Neighbor Report to indicate that the reported AP is collocated with the immediately preceeding reported AP, and a new field to indicate that OCT is recommended with the collocated AP. Apply the changes as proposed in doc 0417r0. |
| 20370 | Laurent Cariou | 26.17.2.4 | 433.55 | An HE STA that is capable of operating at 6 GHz should be mandated to support OCT. This is anyway very beneficial for STA for seamless switching, and this will reduce the options, which cause interop issues in testing. | Add a statement in 26.17.2.4 that an HE non-AP STA capable of operating at 6 GHz shall support OCT. | Revised – agree with the comment. Apply the changes marked as CID20370 in doc 0417r0. |
| 20371 | Laurent Cariou | 26.17.2.4 | 444.06 | Using Neighbor Report ANQP protocol to get the SSID of the reported APs received in Reduced Neighbor Reports was defined to cover for the gap that a STA can only know the short SSID when receiving the Reduced Neighbor report (in case this Short SSID does not match the SSID of the reporting AP), and that this was helpful in order to send a probe request at 6 GHz to that particular SSID. As we also defined that a STA can send a probe request with a targetted Short SSID, the need to use the ANQP function to get SSID does not seem useful anymore. Unless there is an important other need for this function, this should be removed from the spec. | Same as comment | Revised – remove the need for an AP to support the Neighbor Report ANQP protocol to provide the SSID. |
| 20800 | Mark RISON | 9.4.2.170.2 | 154.58 | The concept that an "AP might be detected" is used all over the place but only defined in a NOTE buried in Clause 9 | Move the definition of "detect" to Clause 3 | Revised – agree with the comment. Add a new definition for Detected AP in clause 3.2. Apply the changes marked as CID20800 in doc 0417r0. |
| 20801 | Mark RISON | 26.17.2.4 | 433.28 | "a STA that has signaled that it does not support operating in the 6GHz band (see 9.4.2.53 (Supported Operating Classes element))" -- but that element is only present if extended channel switching is supported | Make support for ECS mandatory for HE STAs | Revised – agree with the commenter. Apply the changes as proposed in this document. |
| 20802 | Mark RISON | 26.17.2.4 | 433.28 | "a STA that has signaled that it does not support operating in the 6GHz band (see 9.4.2.53 (Supported Operating Classes element))" -- but that element is only present if extended channel switching is supported | Use b24 of the HE Capabilities field to indicate support for 6G operation | Revised – agree with the commenter in principle. Make EDCA support required for 6 GHz HE STAs. Apply the changes as porposed in this document. |
| 20803 | Mark RISON | 26.17.2.4 | 433.21 | "If an AP operating on a 2.4 or 5 GHz channel has one or more co-located APs operating at 6 GHz with the same SSID, then Beacon frames and Probe Response frames transmitted by the AP or by the transmitted BSSID of the same Multiple BSSID set as the AP shall include, at a minimum, for each of these co-located APs, a TBTT Information field in a Reduced Neighbor Report element with the BSSID field set to the BSSID of the co-located AP, and with either the Short SSID field set to the Short SSID of the co-located AP or the Same SSID subfield in the BSS Parameters subfield is set to 1, except if the AP transmits an individually addressed Probe Response frame to a STA that does not support operating in the 6 GHz band or if the AP operating at 6 GHz does not intend to be discovered by STAs. " -- the precedence of the "except if" part is not clear | Reword as a set of bullets that indicate the precedence |  |
| 20804 | Mark RISON | 26.17.2.4 | 434.15 | "NOTE 2---It is recommended that the AP responds with a GAS comeback delay of zero." -- this is a hidden normative requirement | Replace with "The AP should respond with a GAS comeback delay of zero." | Revised – CID20371 resolves this comment by removing this note. |
| 20805 | Mark RISON | 26.17.2.4 | 434.18 | "Report," -- spurious comma (or needs "element"). And when no comma then needs "element" | Delete the referenced comma. Ditto at 432.33, 432.51, 434.18. At 433.36, 433.45, 433.48, 433.51 add " element" after "Neighbor Report" | Revised – agree with the comment. Apply the changes marked as CID20805 in doc 0417r0. |
| 20806 | Mark RISON | 11.32.5 | 284.28 | "if the STA is an AP and the OCT Recommended subfield in a Neighbor AP Information field of the STA'sReduced Neighbor Report element is 1" seems unnecessary, since such an AP will just set OCT Not Supported to 0, obviously | Delete the cited text at the referenced subclause | Revised – an AP may send the RNR instead of the MBE. However this sentence could be removed as the following sentences already cover this case. Delete th’s part of the sentence and create a bullet list of how an AP can indicate its support for OCT. Apply the changes marked as CID20806 in doc 0417r0. |
| 21161 | Po-Kai Huang | 26.17.2.4 | 433.35 | For the sentence "no co-located AP operating in the 2.4 GHz or 5 GHz bands", do we mean "no co-located AP operating in the 2.4 GHz or 5 GHz bands with the same SSID as the AP operating in the 6 GHz bnad"? Otherwise, this seems to duplicate advertisement based on the rule in paragraph 2. | As in comment. | Revised – the sentence is not clear. The meaning is that if there are no other co-located APs that already include the RNR for the 6 GHz AP, then the AP shall include an RNR in the beacon/probe. Modify the sentence to improve the readability. Apply the changes marked as CID21161 in do c0417r0. |
| 21162 | Po-Kai Huang | 26.17.2.4 | 433.21 | The texts implies that there can be one or more co-located APs operating in the 6 GHz band with the same SSID (probably in different channels). It seems that it is also possible to have one or more APs in 5 GHz band with the same SSID (probably in different channels as well). I guess for each 6 GHz AP with the SSID, only one of the APs with the same SSID in 5 GHz band needs to advertise it. | As in comment. | Reject – it is helpful to have the RNR in each of the co-located APs with the same SSID, so that if a STA sends a probe to any of these APs, it will receive the RNR for the co-located 6 GHz AP as well. |
| 21355 | Rojan Chitrakar | 26.17.2.4 | 434.02 | Should the OCT procedure be performed via over-the air transmission with the AP that sent the Reduced Neighbor Report element even when the Co-Located AP subfield is set to 0? In this case the Reported AP is likely to be a separate device. The OCT should be performed over the air with the Reported AP directly on a supported band (2.4 or 5 GHz). | when the Co-Located AP subfield is set to 0, the OCT procedure should be performed over the air with the Reported AP directly on a supported band (2.4 or 5 GHz). | Revised – Change the recommendation meaning as follows: If the co-located AP subfield is set to 1, the STA should use OCT. If the co-located AP subfield is set to 0, the AP may use OCT. Apply the changes marked as CID21355 in doc 0417r0. |
| 21356 | Rojan Chitrakar | 26.17.2.4 | 434.06 | Why increase an AP's burden by making it mandatory for APs to support both Reduced Neighbor Report element and Neighbor Report elements when either one method is sufficient? | Only make it madatory for APs to support one feature, either Reduced Neighbor Report element or Neighbor Report elements. An AP that support Reduced Neighbor Report element need not support Neighbor Report elements and vice versa; APs can choose which method they prefer. | Revised – Although these 2 features are not doing the same thing, resolution to CID 20731 is removing ANQP concept. |
| 21357 | Rojan Chitrakar | 26.17.2.4 | 434.18 | This paragraph is written in an extremely confusing way; I think the intention is to say that an AP may set the 20 TU Probe Response Active subfields to 1 for APs listed in the neighbor elements that transmit unsolicited Probe Response frames every 20 TUs. The portion "that operate in the corresponding channel andthat might be detected by a STA receiving this frame" seem redundant. | Rewrite the paragraph without redundant texts. Also, remove the Note below, it is completely redundant. | Reject – there are no redundancies in this sentence. The text ”that operate in the corresponding channel andthat might be detected by a STA receiving this frame" is needed to reduce the constaint on the AP side to have all APs in the entire ESS transmit probe responses every 20TUs, but only the ones in the range of the STAs. |
| 21358 | Rojan Chitrakar | 26.17.2.4 | 434.26 | This paragraph is written in a confusing way;The portion "and that might be detected by a STA receiving this frame" seem redundant. Additionaly, the last phrase "have a corresponding co-located AP operating in the 2.4 GHz or 5 GHz bands" seem to be grammatically incorrect. Which AP is it referring to? The Reported AP, or the reporint AP? | Rewrite the paragraph without redundant texts. | Revised – clean the sentence to make sure there are no ambiguities for the last part of the sentence. Apply the changes marked as CID21358 in doc 0417r0. |
| 21442 | Thomas Derham | 26.17.2.4 | 433.00 | This section describes requirements on APs that are not necessarily HE APs, and are not operating on 6 GHz band (rather, they are operating on 2.4/5 and happen to be co-located with a 6 GHz AP).Suggest to move this section into clause 11 instead of the HE MAC clause. | Per comment | Revised – Following the new editing style, keep the section 26.17.2.4 as is, and include a reference to this subclause in subclause 11.50 Reduced Neighbor report. Apply the changes as proposed in this document. |
| 21505 | Yonggang Fang | 9.4.2.170.2 | 154.53 | It is not clear whether the AP operating in 6 GHz should be set "Member of Co-located ESS" to 1 if this AP is co-located with another AP of ESS in the 6 GHz band. | Please clarify that | Revised – the sentence clearly says that the bit is set if there is a co-located AP at 2,4 or 5 GHz bands, not 6 GHz. Add a note also below to provide explanations on the meaning. Apply the changes marked as CID21505 in doc 0417r0. |
| 21506 | Yonggang Fang | 9.4.2.170.2 | 154.58 | It might be a case that co-located ESS HE AP operating in 2.4 GHz and 6 GHz bands cannot be detected by an HE STA due their beacons' coverage difference in those bands when the AP transmits a non-HT beacon in 2.4 GHz and an HE beacon in 6 GHz. Therefore the HE STA may not be able to detect HE AP in 6 GHz band when using the "Member of Co-located ESS". We need to address this issue. |  |  |
| 21533 | Yongho Seok | 26.17.2.4 | 433.55 | "A reporting AP should set the OCT Recommended subfield to 1 in the BSS Parameters subfield of a TBTT Information field in a Reduced Neighbor Report element if both the reporting AP and the reported AP supports..."OCT and the Co-Located AP subfield is 1 in the TBTT Information Header subfield of the same Neighbor AP Information field."Please use the MIB variable for indicating if a reporting AP implements the OCT. | As in comment. | Revised – apply the changes as proposed in this document. |
| 21534 | Yongho Seok | 26.17.2.4 | 434.11 | "... 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 co-located APs operating in the 6 GHz band."What if the AP operating at 6 GHz does not intend to be discovered by STAs? | As in comment. | Revised – resolution to CID20371 removes the ANQP concept. |
| 21535 | Yongho Seok | 26.17.2.4 | 434.18 | "An AP may set the 20 TU Probe Responses Active subfield to 1 in a Reduced Neighbor Report, 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 are transmitting unsolicited Probe Response frames every 20 TUs (see 26.17.2.3.2 (Fast passive scanning))."Define the MIB variable for this optional feature and change the sentence based on the MIB variable. | As in comment. | Revised – agree with the comment. Apply the changes as proposed in this document. |
| 21536 | Yongho Seok | 26.17.2.4 | 434.26 | "An AP may set the Member Of Co-located ESS subfield 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 all the APs 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) have a corresponding co-located AP operating in the 2.4 GHz or 5 GHz bands."Define the MIB variable for this optional feature and change the sentence based on the MIB variable. | As in comment. | Revised – agree with the commenter. Apply the changes as proposed in this document. |
| 21583 | Yusuke Tanaka | 26.17.2.4 | 433.55 | "Reporting AP" is not a defined terminology. | Define this terminology or use descriptive sentences. | Revised – this terminology is used heavily in baseline. Add a definition for Reporting AP and reported AP in section 3.2. Apply the changes marked as CID21583 in doc 0417r0. |
| 21584 | Yusuke Tanaka | 26.17.2.4 | 434.23 | This NOTE is not required. What the NOTE provides is generally known and "be detected" and "range" are ambiguous expression. | Remove the NOTE. | Revised – CID20800 is asking for a definition of the term detection. This resolves this comment. Apply the changes marked as CID20800 in doc 0417r0. |
| 20081 | Abhishek Patil | 26.17.2.3.4 | 433.22 | The 3 paragraphs starting line 22 describe unsolicited advertisement. However, it is not clear what is the expected behavior when a non-AP STA's request a specific SSID. Do all co-hosted APs respond? | For the three paragraphs starting line 22, separate the AP side rules for carrying RNR in Beacon versus a directed Probe Response frame. The beacon rules may also cover other group addressed frames such as broadcast Probe Response or FILS Discovery if the AP choses to send those in 2.4/5G. | Reject – the rules currently say that all probe responses transmitted by this AP shall include the RNR. That therefore applies also for the case the probe response is sent in response to a probe request. |
| 20082 | Abhishek Patil | 26.17.2.3.4 | 433.59 | If the reporting AP and the reported AP have Co-Located bit set to 0 (i.e., do not have a co-located 6GHz AP), why is OCT Support discussed under the 6GHz out-of-band discovery context? | Delete the following sentence: "A reporting AP may set the OCT Recommended subfield to 1 in the BSS Parameters subfield of a TBTT Information field in a Reduced Neighbor Report element if both the reporting AP and the reported AP have the same SSID and support OCT and the Co-Located AP subfield is 0 in the TBTT Information Header subfield of the same Neighbor AP Information field." | Reject – the suggested resolution does not match the comment. The commenter is asking whether the use of OCT with a non-co-located AP to discover a 6 GHz AP is considered as Out-of-band discovery, which is the title of the subclause. The response is yes. |
| 20083 | Abhishek Patil | 26.17.2.3.4 | 434.06 | The current description covers the AP side details however, the non-AP STA side details are missing | The spec needs to describe the details how a non-AP STA uses ANQP mechanism to gather additional information of a 6GHz AP. | Revised – CID20371 removes this ANQP concept. |
| 21285 | Robert Stacey | 26.17.2.3.1 | 431.06 | I understand the need for advertising 6 GHz band operation in the lower frequency bands, but I don't see why \*all\* co-located APs need to do this. Suppose you have a guest BSS but no guest services in the 6 GHz band. Must this BSS advertise the 6 GHz BSS? Surely only the BSSs that have equivalent service in the 6 GHz band would advertise. What about a device that supports two different management entities, for example a Comcast device that leases a BSS to AT&T: must the AT&T BSS advertise Comcast's 6 GHz AP? | Resit the requirement that \*all\* co-located BSSs advertise 6 GHz BSSs and determine if this is really necessary. Being in the same physcial device is not sufficient; I think there needs to be an MBO, FST or some other transmfer relationship between the BSSs. Under the same managment domain makes sense but I'm not sure how you define that: same SME? | Reject – the commenter fails to identify an issue. The current requirement is that an AP at 2.4/5GHz shall send an RNR for the 6 GHz AP with the same SSID, and that if there is a 6 GHz AP that has no co-located AP at 2.4/5GHz with the same SSID, then at least one of the AP as 2.4/5GHz will include an RNR. For each AP operating at 6 GHz, there is an RNR sent by one co-located AP, but not all co-located APs are sending an RNR for all 6 GHz co-located APs.  |
| 21286 | Robert Stacey | 26.17.2.3.1 | 431.07 | The requirement on co-located APs is not testable without a definition of "co-located". Co-located, in lay terms, could mean in the same buidling. | Change to "An AP in the same device as an AP operating in the 6 GHz band shall set..." | Revised – create a new definition for a Co-located AP in section 3.2. Apply the changes marked as CID21286 in doc 0417r0. |
| 21335 | Robert Stacey | 26.17.2.3.1 | 431.08 | This statement and a few others require that every AP that is co-located with a 6 GHz APadvertise the 6 GHz BSS. Surely only one of the low frequency band APs needs to advertise. | Change to "In a deivce that has an AP operating in the 6 GHz band and an AP operating in the 2.4 Ghz or 5 GHz band, at least one of the APs operating in the 2.4 or 5 GHz band shall set both dot11ColocatedRNRImplemented to true and dot11ShortSSIDListImplemented to true" | Reject – the specification is currently defining what the commenter suggests. Section 11.1.4.3.4 defines that the AP responds to a probe request if dot11ColocatedRNRImplemented is true, the SSID in the Probe Request frame matches theSSID of an AP that is co-located with the STA and the AP is reported by the STA in a ReducedNeighbor Report element in Beacons and Probe Responses according to the rules defined in26.17.2.3 (Scanning in the 6 GHz band). And section 26.17.2.3 effectively defines that the minimum requirement is that only one AP at 2.4/5 reports the co-located 6 GHz AP. |
| 21441 | Thomas Derham | 26.17.2.3.1 | 431.07 | "An AP that is co-located with an AP operating in the 6 GHz band"The AP this requirement applies to is not operating in 6 GHz band, nor is it necessarily an HE AP.This requirement should be moved to a generic MAC clause. | Move requirement to a new suitably-named section in clause 11 | Revised – Following the new editing style, keep the section 26.17.2.4 as is, and include a reference to this subclause in subclause 11.50 Reduced Neighbor report. Apply the changes as proposed in this document. |

1. **Proposed changes**

**3.2 Definitions specific to IEEE 802.11**

***TGax editor: Add the following definition to subclause 3.2 Definitions specific to IEEE 802.11 (#20800, #21583, #21286, #20382)***

**Detected access point (AP):** An AP might be detected by a station (STA) if the STA and the AP are on the same channel and in range.

**Reported access point (AP):** An AP that is described in an element such as a Neighbor Report element or a Reduced Neighbor Report element.

**Reporting access point (AP):** An AP that is transmitting an element, such as a Neighbor Report element or a Reduced Neighbor Report element, describing a reported AP.

**Co-located access point (AP):** An AP that is a member of a co-located BSSID set.*(#20382, 21286)*

***TGax editor: Change the following section 9.4.2.36 Neighbor Report element***

* Neighbor Report element

Change Figure 9-334 (BSSID Information field) as follows:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 B1 | B2 | B3 | B4 B9 | B10 | B11 | B12 | B13 |
|  | AP Reachability | Security | Key Scope | Capabilities | Mobility Domain | High Throughput | Very High Throughput | FTM |
| Bits: | 2 | 1 | 1 | 6 | 1 | 1 | 1 | 1 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B14 | B15 | B16 | B17 | B18 | B19 | B20 | B21 | B22        B31 |
|  | High Efficiency | HE ER BSS | Co-located AP | 20 TU Probe Response Active | Member of Co-located ESS | OCT Supported With Reporting AP | Co-located With Preceding Reported AP | OCT Recommended With Co-located AP | Reserved |
| Bits: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | ~~18~~110 |
|  | * BSSID Information field
 |

(18/1227r13)

Change paragraphs 10 and 11 as follows:

~~The High Throughput bit is set to 1 to indicate that the AP represented by this BSSID is an HT AP including the HT Capabilities element in its Beacons, and that the contents of that HT Capabilities element are identical in content to the HT Capabilities element advertised by the AP sending the report.~~

The High Throughput bit is set to 1 to indicate that the AP represented by this BSSID is an HT AP and that the HT Capabilities element (or HT Operation element), if included as a subelement in the report, is identical in content to the HT Capabilities element (or HT Operation element) included in the neighboring AP's Beacon. Otherwise the High Throughput subfield is set to 0.

The Very High Throughput bit is set to 1 to indicate that the AP represented by this BSSID is a VHT AP and that the VHT Capabilities element (or VHT Operation element), if included as a subelement in the report, is identical in content to the VHT Capabilities element (or VHT Operation element) included in the neighboring AP’s Beacon. Otherwise the Very High Throughput subfield is set to 0.

Insert the following after the paragraph beginning “The FTM field...”:

The High Efficiency subfield is set to 1 to indicate that the AP represented by this BSSID is an HE AP and that the HE Capabilities element (or HE Operation element), if included as a subelement in the report, is identical in content to the HE Capabilities element (or HE Operation element) included in the neighboring AP's Beacon frame. Otherwise the High Efficiency subfield is set to 0.

When the High Efficiency subfield is 1 the HE ER BSS subfield is set to 1 if the BSS corresponding to the HE AP representing this BSSID is an extended range BSS beaconing using the HE ER SU PPDU (see 26.17.6 (ER beacon generation in an ER BSS)). Otherwise the HE ER BSS subfield is set to 0.

The Co-located AP subfield is set to 1 to indicate that the AP reported in this Neighbor Report element is co-located with the AP sending the Neighbor Report element.(#15023)

The 20 TU Probe Response Active subfield is set to 1 if the reported AP is part of an ESS where all the APs that operate in the same channel as the reported AP and that might be detected by a STA receiving this frame have dot1120TUProbeResponseOptionImplemented equal to true and have are transmitting unsolicited Probe Response frames every 20 TUs (see 26.17.2.3 (Scanning in the 6 GHz band)). It is set to 0 otherwise or if it does not have that information. (#20290, #21535)

The Member Of Co-located ESS subfield is set to 1 if the reported AP is part of an ESS where all the APs operating in the same band as the reported AP (irrespective of the operating channel within that band) that might be detected by a STA receiving this frame have dot11MemberOfColocatedESSOptionImplemented equal to true and have a corresponding co-located AP operating in the 2.4 GHz or 5 GHz bands. It is set to 0 otherwise or if it does not have that information. It is reserved if the reported AP is operating in the 2.4 GHz or 5 GHz bands. (#21536)

NOTE 1—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 5 GHz bands.

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

The OCT Supported with Reported AP subfield is set to 1 to indicate that OCT is supported to exchange MMPDUs with the AP reported in the Neigbor Report element (see 11.31.5 (On-channel Tunneling (OCT) operation)), through over-the-air transmissions with the AP sending the Neighbor Report element. It is set to 0 otherwise. (#20366)

The Co-located With Preceding Reported AP field is set to 1 to indicate that the AP reported by this Neighbor Report element in a frame is co-located with the AP reported in the immediately preceding Neighbor Report element in the frame. It is set to 0 otherwise. (#20369, #20041)

The OCT Recommended With Co-located AP field is set to 1 to indicate that OCT is supported to exchange MMPDUs with the AP reported in the Neighbor Report element (see 11.31.5 (On-channel Tunneling (OCT) operation)), through over-the-air transmissions with its co-located APs. It is set to 0 otherwise. Its co-located APs may be reported in the same frame. (#20369, #20041)

NOTE – The OCT Recommended With Co-located AP field does not indicate that OCT procedure (see 11.31.5 (On-channel Tunneling (OCT) operation)) can be used to exchange MMPDUs with the AP reported in the Neighbor Report element, through over-the-air transmissions with the reporting AP if the reporting AP is not co-located with the reported AP. (#20369, #20041)

Delete the paragraph “Bits 14-31 are reserved.”

Insert new rows in Table 9-173 (Optional subelement IDs for Neighbor report) as follows and update the reserved row:

|  |
| --- |
| * Optional subelement IDs for Neighbor report
 |
| Subelement ID | Name | Extensible |
| 193 | HE Capabilities | Yes |
| 194 | HE Operation | Yes |
| 195 | BSS Load(#17024) |  |
| 196 | HE BSS Load | Yes |
| 197 | SSID(18/1227r13) |  |

Insert the following after the 2nd last paragraph (beginning “The VHT Operation element...”):

The HE Capabilities subelement is the same as the HE Capabilities element as defined in 9.4.2.242 (HE Capabilities element).

The HE Operation subelement is the same as the HE Operation element as defined in 9.4.2.243 (HE Operation element).

The BSS Load subelement is the same as the BSS Load element as defined in 9.4.2.27 (BSS Load element).

The HE BSS Load subelement is the same as the HE BSS Load element as defined in 9.4.2.252 (HE BSS Load element).(#17024)

The SSID subelement is the same as the SSID element as defined in 9.4.2.2 (SSID element).(18/1227r13)

* Reduced Neighbor Report element
* Neighbor AP Information field

Change Figure 9-624 (TBTT Information Header subfield) as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0             B1 | B2 | B3 | B4                     B7 | B8                            B15 |
|  | TBTT Information Field Type | Filtered Neighbor AP | ~~Reserved~~Co-Located AP | TBTT Information Count | TBTT Information Length |
| Bits:  | 2 | 1 | 1 | 4 | 8 |
| * TBTT Information Header subfield
 |

(18/1227r13)

Insert the following after the 4th paragraph:

The Co-Located AP subfield is set to 1 if every AP in this Neighbor AP Information field is co-located with the transmitting AP. It is set to 0 otherwise, or if the information is unknown.

Change the 6th paragraph as follows:

The TBTT Information Length subfield is 1 octet in length and indicates the length of each TBTT Information field included in the TBTT Information Set field of the Neighbor AP Information field. When the TBTT Information Field Type subfield is set to 0, the TBTT Information Length subfield:

* contains the length in octets of each TBTT Information field that is included in the TBTT Information Set field of the Neighbor AP Information field
* is set to 1, 5, 7, 8, ~~or~~ 11, or 12; other values are reserved.
* indicates the TBTT Information field contents as shown in Table 9-273 (TBTT Information field content).

Change Table 9-282 (TBTT Information field contents) as follows:

|  |
| --- |
| * TBTT Information field contents
 |
| TBTT Information Length subfield value | TBTT Information field contents |
| 1 | The Neighbor AP TBTT Offset subfield |
| 2 | The Neighbor AP TBTT Offset subfield and the BSS Parameters subfield (#20019) |
| 5 | The Neighbor AP TBTT Offset subfield and the Short-SSID subfield |
| 7 | The Neighbor AP TBTT Offset subfield and the BSSID subfield |
| 8 | The Neighbor AP TBTT Offset subfield, the BSSID subfield, and the BSS Parameters subfield |
| 11 | The Neighbor AP TBTT Offset subfield, the BSSID subfield andthe Short-SSID subfield |
| 12 | The Neighbor AP TBTT Offset subfield, the BSSID subfield, the Short-SSID subfield and the BSS Parameters subfield |
| 0, 1–4, 6, ~~8–10, 12–255~~ 9–10 | Reserved |
| 13–255 | The first 12 octets of the field are the same as for TBTT Information Length  |

***Change Figure 9-625 – TBTT Information field format as follows***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Neighbor AP TBTT Offset | BSSID (optional)(#15)(11ai) | Short-SSID (optional)(#15)(11ai) | BSS parameters |
| Octets: | 1 | 0 or 6 | 0 or 4 | 0 or 1 |
| TBTT Information field (11ai)format |

Change the 3rd to last paragraph as follows:

~~The Neighbor AP TBTT Offset subfield is 1 octet in length and indicates the offset in TUs, rounded down to nearest TU, to the next TBTT of an AP from the immediately prior TBTT of the AP that transmits this element. The value 254 indicates an offset of 254 TUs or higher. The value 255 indicates an unknown offset value.~~

The Neighbor AP TBTT Offset subfield indicates the offset in TUs, rounded down to nearest TU, to the following:

* The next TBTT of the reported AP from the immediately prior TBTT of the AP that transmits this element if the reported AP is not part of a multiple BSSID set or is the transmitted BSSID of a multiple BSSID set.
* The next TBTT of the transmitted BSSID of the multiple BSSID set of the reported AP from the immediately prior TBTT of the AP that transmits this element if the reported AP is part of a multiple BSSID set and is a nontransmitted BSSID.

The value 254 indicates an offset of 254 TUs or higher. The value 255 indicates an unknown offset value.

Insert at the end of this subclause:

The format of the BSS Parameters subfield is defined in Figure 9-624 (BSS Parameters subfield).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4 | B5 | B6          B7 |
|  | OCT Recommended | Same SSID | Multiple BSSID | Transmitted BSSID | Member Of Co-located ESS | 20 TU Probe Response Active | Reserved |
| Bits:  | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| * BSS Parameters subfield
 |

The OCT Recommended subfield is set to 1 to indicate that OCT is recommended to exchange MMPDUs with the AP identified in the TBTT Information field (see 11.31.5 (On-channel Tunneling (OCT) operation)), through over-the-air transmissions with the AP sending the Reduced Neighbor Report element. It is set to 0 otherwise.

The Same SSID subfield is set to 1 to indicate that the reported AP has the same SSID as the reporting AP. It is set to 0 otherwise.

The Multiple BSSID subfield is set to 1 to indicate that the reported AP is part of a multiple BSSID set. It is set to 0 otherwise.

The Transmitted BSSID subfield is set to 1 to indicate that the reported AP is a transmitted BSSID. It is set to 0 it the reported AP is a nontransmitted BSSID. It is reserved if the Multiple BSSID subfield is set to 0.

The Member Of Co-located ESS subfield is set to 1 if the reported AP is part of an ESS where all the APs operating in the same band as the reported AP (irrespective of the operating channel within that band) that might be detected by a STA receiving this frame have dot11MemberOfColocatedESSOptionImplemented equal to true and have a corresponding co-located AP operating in the 2.4 GHz or 5 GHz bands. It is set to 0 otherwise or if it does not have that information. It is reserved if the reported AP is operating in the 2.4 GHz or 5 GHz bands.

NOTE 1—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 5 GHz bands.

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

The 20 TU Probe Response Active subfield is set to 1 if the reported AP is part of an ESS where all the APs that operate in the same channel as the reported AP and that might be detected by a STA receiving this frame have dot1120TUProbeResponseOptionImplemented equal to true and are transmitting unsolicited Probe Response frames every 20 TUs (see 26.17.2.3 (Scanning in the 6 GHz band)). It is set to 0 otherwise or if it does not have that information.

* BSS transition management request

[…]

The AP shall include the BSS Transition Candidate List Entries field in the BSS Transition Management Request frame if the AP has information in response to the BSS Transition Management Query frame. The BSS Transition Candidate List Entries field contains zero or more Neighbor Report elements describing the preferences for target BSS candidates. A Preference field value of 0 indicates that the BSS listed is an excluded BSS. The STA should refrain from associating to an AP corresponding to an excluded BSS. The Preference field values are used to establish the relative order of entries within the given list at the given time, and for the given AP. The Neighbor Report elements describing co-located APs shall be transmitted one after the other in a consecutive way. The Co-located With Preceding Reported AP subfield in the BSSID Information field of a Neighbor Report element shall be set to 1 if the AP described by the Neighbor Report element in a frame is co-located with the AP reported in the immediately preceding Neighbor Report element in the frame. (#20369, #20041)

**11.32 Multi-band operation 11.32.5 On-channel Tunneling (OCT) operation**

***Change the 1st paragraph as follows:***

Either of the following conditions indicates that a STA supports OCT and has the dot11OCTOptionImplemented equal to true (#20040, #20806, #21533):

* A STA supports the OCT if the OCT Not Supported subfield within the STA's Multi-band element is 0.
* If a reporting AP sends a frame with a Reduced Neighbor Report element with a TBTT Information field describing a reported AP that has the OCT Recommended subfield equal to 1, then both the reporting AP and the reported AP support the OCT.
* If a reporting AP sends a frame with a Neighbor Report element describing a reported AP that has the OCT Supported With Reporting AP subfield equal to 1, then both the reporting AP and the reported AP support the OCT. (#20369)
* If a reporting AP sends a frame with a Neighbor Report element describing a reported AP that has the OCT Recommended With Co-located AP subfield equal to 1, then the reported AP and its co-located APs support the OCT. (#20369)

A STA should not perform OCT with a peer STA that does not support the OCT. A STA that does not support the OCT shall ignore a received OCT MMPDU.

***Change the 2nd paragraph as follows:***

~~OCT allows a STA of a multi-band capable device to transmit an MMPDU that was constructed by a differ-ent STA of the same device.~~ OCT provides the following:

— allows a STA of a multi-band capable device or a STA that has co-located STAs to transmit or forward an MMPDU that was constructed by, addressed by or addressed to a different STA in the same device,

— allows an AP to transmit or forward an MMPDU that was constructed by, addressed by, or addressed to another AP if either one of the APs sends a Reduced Neighbor Report element with a TBTT Information field describing the other AP or if either one of the APs sends a Neighbor Report element describing the other AP, and where both APs support OCT. (#20369)

An MMPDU transmitted this way is referred to as an *OCT MMPDU*. The MLME of the nontransmitting STA that constructs or is the destination of an OCT MMPDU is referred to as an *NT-MLME*. The MLME of the STA that transmits or receives an OCT MMPDU over the air is referred to as a *TR-MLME*. An NT-MLME that constructs an OCT MMPDU destined to a peer NT-MLME does so according to the capabilities of the STA that contains the peer NT-MLME.

NOTE—OCT can be used in conjunction with or independent from the FST setup protocol.

***TGax editor: Change the following section 26.17.2.4 Out of band discovery of a 6 GHz BSS***

* Out of band discovery of a 6 GHz BSS

(18/1227r13)An AP that operates in the 2.4 GHz or 5 GHz bands and that is co-located with one or more APs that operate in the 6 GHz band shall include in Beacon and Probe Response frames that it transmits a Reduced Neighbor Report element with the Co-Located AP subfield in the TBTT Information Header subfield set to 1 to provide at least the operating channels and operating classes of the co-located APs in the 6 GHz band.

NOTE—The Reduced Neighbor Report element might contain information on APs that are operating in the 6 GHz band that are not co-located with the transmitting AP. In this case the Co-Located AP subfield is set to 0.

If an AP operating in the 2.4 GHz or 5 GHz bands has one or more co-located APs operating in the 6 GHz band with the same SSID, then Beacon frames 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 co-located APs, a TBTT Information field in a Reduced Neighbor Report element with the BSSID field set to the BSSID of the co-located AP, and with either the Short SSID field set to the short SSID of the co-located AP or the Same SSID subfield in the BSS Parameters subfield set to 1 or the Filtered Neighbor AP subfield set to 1 (#20365), except if 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)) or if the AP operating in the 6 GHz band does not intend to be discovered by STAs.

An AP, or the transmitted BSSID of the same Multiple BSSID set, shall include in the Beacon frames and Probe Response frames it transmits, for each of these co-located APs, a TBTT Information field in a Reduced Neighbor Report element with the BSSID field set to the BSSID of the co-located AP, and with either the Short SSID field set to the short SSID of the co-located AP or the Same SSID subfield in the BSS Parameters subfield set to 1 or the Filtered Neighbor AP subfield set to 1 (#20365), if the following conditions are met:

* The AP is operating in the 2.4 or 5 GHz bands
* The AP has one or more co-located APs operating in the 6 GHz band with the same SSID
* The Probe response sent by the AP is not individually addressed 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))
* The AP operating in the 6 GHz band intends to be discovered by STAs.

If an AP operating in the 2.4 GHz or 5 GHz bands has a co-located AP operating in the 6 GHz band with a different SSID, and no co-located AP operating in the 2.4 GHz or 5 GHz bands is indicating the 6 GHz AP in a Reduced Neighbor Report element 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 the co-located AP, except if the AP transmits an individually addressed Probe Response frame to a STA that has signalled that it does not support operating in the 6 GHz band (see 9.4.2.53 (Supported Operating Classes element)) or if the AP operating at 6 GHz does not intend to be discovered by STAs.

If the 6 GHz AP reported in a TBTT Information field in a Reduced Neighbor Report is not part of a multiple BSSID set, then the BSS Parameters subfield shall be included with the Multiple BSSID subfield set to 0. If the 6 GHz AP reported in a TBTT Information field in a Reduced Neighbor Report is a transmitted BSSID, then the BSS Parameters subfield shall be included with the Multiple BSSID subfield set to 1 and the Transmitted BSSID subfield set to 1. If the 6 GHz AP reported in a TBTT Information field in a Reduced Neighbor Report is a nontransmitted BSSID, then the BSS Parameters subfield shall be included with the Multiple BSSID subfield set to 1 and the Transmitted BSSID subfield set to 0.

A reporting AP should set the OCT Recommended subfield to 1 in the BSS Parameters subfield of a TBTT Information field in a Reduced Neighbor Report element if both the reporting AP and the reported AP have the dot11OCTOptionImplemented equal to true (#21533) and the Co-Located AP subfield is 1 in the TBTT Information Header subfield of the same Neighbor AP Information field. A reporting AP may set the OCT Recommended subfield to 1 in the BSS Parameters subfield of a TBTT Information field in a Reduced Neighbor Report element if both the reporting AP and the reported AP have the same SSID and have the dot11OCTOptionImplemented equal to true (#21533) and the Co-Located AP subfield is 0 in the TBTT Information Header subfield of the same Neighbor AP Information field. If the OCT Recommended subfield is set to 1 and the Co-Located AP subfield is set to 1 in the Neighbor AP Information field describing a reported HE AP in the Reduced Neighbor Report element, then a non-AP STA that has the dot11OCTOptionImplemented equal to true (#21533) should use the OCT procedure described in 11.31.5 (On-channel Tunneling (OCT) operation) to perform active scanning, authentication and/or association with the reported AP through over-the-air transmissions with the AP that sent the Reduced Neighbor Report element. If the OCT Recommended subfield is set to 1 and the Co-Located AP subfield is set to 0 in the Neighbor AP Information field describing a reported HE AP in the Reduced Neighbor Report element, then a non-AP STA that has the dot11OCTOptionImplemented equal to true (#21533) may use the OCT procedure described in 11.31.5 (On-channel Tunneling (OCT) operation) to perform active scanning, authentication and/or association with the reported AP through over-the-air transmissions with the AP that sent the Reduced Neighbor Report element. (#21355)

 (#20371)An AP may set the 20 TU Probe Responses 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 dot1120TUProbeResponseOptionImplemented equal to true and are transmitting unsolicited Probe Response frames every 20 TUs (see 26.17.2.3.2 (Fast passive scanning)). (#20805, #21535)

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 Co-located ESS subfield 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 all the APs, that are 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), have dot11MemberOfColocatedESSOptionImplemented equal to true and have a corresponding co-located AP operating in the 2.4 GHz or 5 GHz bands. (#21358)

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 5 GHz bands. (#20244, #21505)

***TGax editor: Change the following section 26.17.2.1 General as follows***

**26.17.2 HE BSS operation in the 6 GHz band**

**26.17.2.1 General**

A HE STA that has a value of true for dot11HE6GOptionImplemented shall be capable of operating in the 6 GHz band.

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

A 6 GHz HE STA shall have dot11ExtendedChannelSwitchActivated equal to true. (#20801, #20802)

A 6 GHz HE non-AP STA shall have dot11OCTOptionImplemented equal to true and support the OCT procedure. (#20370)

***TGax editor: Change the following section 11.50 Reduced neighbour report as follows***

**11.50 Reduced neighbor report(#1533)**

In Beacon and Probe Response frames, a Reduced Neighbor Report element may be transmitted by an AP with dot11TVHTOptionImplemented or dot11FILSActivated(11ai) true. In FILS Discovery frames, a Reduced Neighbor Report element is optionally sent by a FILS AP. An AP that operates in the 2.4 GHz or 5 GHz bands and that is co-located with one or more APs that operate in the 6 GHz band shall include a Reduced Neighbor Report element in Beacon and Probe Response frames following the rules defined in subclause 26.17.2.4 (Out of band discovery of a 6 GHz BSS). (#21442, #21441) A Reduced Neighbor Report element contains information on neighbor APs(#1242)(11ai). A Reduced Neighbor Report element might not be exhaustive either by choice or by the fact that there may be neighbor APs not known to the AP.

***TGax editor: Add a new entry at the end of the list of dot11Station ConfigEntry: “dot11OCTOptionImplemented TruthValue” (#21533)***

***TGax editor: Add the following text in section C-3 MIB detail before the “End of dot11StationConfigTable TABLE”: (21533)***

dot11OCTOptionImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the station implementation is

capable of On-Channel tunnelling operation. The capability is

disabled otherwise."

DEFVAL { false }

::= { dot11StationConfigEntry 2}

***TGax editor: Add a new entry at the end of the list of dot11HEStation ConfigEntry: “dot1120TUProbeResponsesActiveOptionImplemented TruthValue” (#21535)***

***TGax editor: Add the following text in section C-3 MIB detail before the “End of dot11HEStationConfigTable TABLE”: (21535)***

dot1120TUProbeResponseOptionImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the station implementation is an AP and is transmitting unsolicited Probe Response farmes every 20 TUs (see 26.17.2.3.2 (Fast passive scanning)). The capability is disabled otherwise."

DEFVAL { false }

::= { dot11HEStationConfigEntry 2}

***TGax editor: Add a new entry at the end of the list of dot11HEStation ConfigEntry: “dot11MemberOfColocatedESSOptionImplemented TruthValue” (#21535)***

***TGax editor: Add the following text in section C-3 MIB detail before the “End of dot11HEStationConfigTable TABLE”: (21535)***

dot11MemberOfColocatedESSOptionImplemented OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is a capability variable.

Its value is determined by device capabilities.

This attribute, when true, indicates that the station implementation is an AP that operates in the 6 GHz band and is part of an ESS where all the APs have a corresponding co-located AP operating in the 2.4 GHz or 5 GHz bands (see 26.17.2.4 (Out of band discovery of 6 GHz BSS)). The capability is disabled otherwise."

DEFVAL { false }

::= { dot11HEStationConfigEntry 2}