IEEE P802.11
Wireless LANs

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| Comment resolutions for non-AP STA scanning (26.17.2.3.3) |
| Date: 2019-06-01 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D4.0 with the following CIDs (21 CIDs):

* 20210, 20242, 20454, 20518, 20519, 21044, 21096, 21139, 21140, 21141,
* 21353, 21354, 21531, 21532, 21579, 21580, 21581, 21582, 20374, 20376,
* 20127

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** |
| 20210 | GEORGE CHERIAN | 431.00 | 6GHz scannning: Consider allowing STAs to send Probe Req in PSC, after detecting Xms of IDLE time on the channel (X < 20ms. The exact value is TBD) | As in the comment. | Revised –Agree in principle. Rules for active scanning in a PSC are like those in OCE/11ai. Proposed resolution is to use the same value of OCE, which is 7 ms. TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 20210. |
| 20242 | Huizhao Wang | 432.21 | Allow STA to send probe req after missed beacons/probe resp for a period of time. | Add Active Scan Timeout IE to advertise a time period that if a STA has missed beacon or probe resp for that period of time, then it is allowed to send out probe request. | Revised –Te sentence relates to Probe Request frames sent for discovery purposes i.e., the probe reques is sent to the broadcast destination address. Proposed resolution clarifies this.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 20242. |
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| 20454 | Mark Hamilton | 432.12 | P432.12 says the non-AP STA shall operate per 11.1.4.3.2, but 11.1.4.3.2 has a lot of "may"s. Are those supposed to be "shalls" now? | Clarify which "may"s in 11.4.3.2 are expected to be performed, and which are not. | Revised –All the rules in 11.1.4.3.2 are to be followed except when those rules are superseced by the rules are defined below. Proposed resolution clarifies this aspect.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 20454. |
| 20518 | Mark RISON | 432.07 | "The set of 20 MHz channels in the 6 GHz band, with channel center frequency, ch\_a = channel starting frequency + 5 x 16 x (n - 1), where n = 1, ..., 15, are referred to as preferred scanning channels (PSCs)." -- normally channel 0 refers to the channel at the channel starting frequency | Change "(n - 1)" to "n" and change "1, ..., 15" to "0, ..., 14" | Rejected –Either indexization brings to the same result for the equation. The reason for using an index that starts from one rather than zero is beneficial because this way one can determine which PSC is being referred to. It is more intuitive to refer to the first PSC, second PSC and so on, rather than the 0th PSC etc.  |
| 20519 | Mark RISON | 432.07 | "The set of 20 MHz channels in the 6 GHz band, with channel center frequency, ch\_a = channel starting frequency + 5 x 16 x (n - 1), where n = 1, ..., 15, are referred to as preferred scanning channels (PSCs)." -- normally channel 0 refers to the channel at the channel starting frequency. See 27.3.22.2 | Change the cited text at the referenced location to "The set of 20 MHz channels in the 6 GHz band with channel numbers 12 + 16 <mult> n, where n = 0, ..., 14, are referred to as preferred scanning channels (PSCs)." | Rejected –This comment is like that of CID 20518. Either indexization brings to the same result for the equation. The reason for using an index that starts from one rather than zero is beneficial because this way one can determine which PSC is being referred to. It is more intuitive to refer to the first PSC, second PSC and so on, rather than the 0th PSC etc. |
| 21044 | Massinissa Lalam | 432.07 | It seems to me that the current description of the PSCs is not really useful since an AP can set its primary channel in any of the 20 MHz available in the 6 GHz (within regulation constraint). Either make real use of it (like mandating an AP to set its primary channel in one of those) or remove this concept completely. | As in comment | Rejected –The PSCs have two benefits 1) Reduce scanning time for non-AP STAs, since the STAs need not scan all the channels in the 6 GHz band to find an AP of interest, and 2) keep a certain portion of the channels (non-PSC) free from frames that the STA would send during active scanning (probe requests). An AP that is interested to be discovered quickly by a STA has the following options: 1) set the primary in the PSC (as recommended), set the primary in any channel but transmit the FD frame or the Beacon frame in non-HT duplicate PPDU format (as allowed), 3) delegate other APs to include its information (co-located APs or other neighboring APs in this band or in other bands.  |
| 21096 | Naotaka Sato | 432.63 | It's NOT technically clear why a non-AP STA can discover an AP by sending Probe Request after completing operations described in the above. Typically, the transmission power of AP is higher than that of STA, so it is unlikely the transmission by a STA helps discovering an AP. | Delete this bullet. | Revised –Agree in principle with the comment that in general it is more beneficial for the STA to listen to APs transmissions for discovering the AP, however in certain cases it might be desirable for the STA to attempt to transmit a Probe Request frame (i.e., enable active scanning). For example, because the AP might not be able to send a FILS Discovery frame in time due to medium conditions. There are pros and cons for this exemption, which were discussed during the specification drafting, and the conclusion is to allow this exemption for the PSC case only. Also please note that the STA always knows where the PSCs are located since their position is predeterministically mapped (refer to the beginning of this subclause).Proposed resolution adds further clarification in this case by specifying the PSC that is available in that location.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 21096. |
| 21139 | Pascal VIGER | 432.17 | The two texts line 17 and line 40 seem confusing :- "The non-AP STA shall not transmit a Probe Request frame with a broadcast address, the Address 3 field set to the wildcard BSSID, and the SSID set to the wildcard SSID."- "The non-AP STA shall not transmit more than one Probe Request frame with the broadcast address and with the Address 3 field set to the wildcard BSSID..." | Please confirm the correctness of the two sentences. An explanation NOTE can also be useful. | Rejected –The CRC confirms the correctness of the two sentences. The first sentence forbids the STA to send a broadcast Probe Request that has a wildcard BSSID and a wildcast SSID (i.e, a blind Probe Request that triggers all APs in the surrounding to response with a Probe Response). The second sentence prohibits the STA to send more than one broadcast Probe Request frame with a wildcard BSSID (i.e., the STA can probe up to one time any AP from a certain (non-wildcard SSID). These terminologies are commonly used in active scanning behavior and no additional note seems to be necessary. |
| 21140 | Pascal VIGER | 432.42 | Replace value '20 480 ╡s' by '20 TUs' | as per comment | AcceptedNote to TGax Editor: Already accounted for. Hence, no further changes are necessary. |
| 21141 | Pascal VIGER | 432.46 | Replace value '20 480 ╡s' by '20 TUs' | as per comment | AcceptedNote to TGax Editor: Already accounted for. Hence, no further changes are necessary. |
| 21353 | Rojan Chitrakar | 432.42 | Why 20480uS? If the value is based on some constant or another value, it is better to write as such. | Add a NOTE why the scan period has to be 20480uS or re-write as a constant/variable. | Revised –The value derives from the fact that the AP generates FD frames with a periodicity that does not exceed 20 TUs. Proposed resolution adds one note to provide some clarificiation about this.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 21353. |
| 21354 | Rojan Chitrakar | 432.46 | Why 20480uS? If the value is based on some constant or another value, it is better to write as such. | Add a NOTE why dot11FILSProbeDelay has to be 20480uS. | Revised –The value derives from the fact that the AP generates FD frames with a periodicity that does not exceed 20 TUs. Proposed resolution adds one note to provide some clarificiation about this.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 21354. |
| 21531 | Yongho Seok | 432.21 | "The non-AP STA shall not send a Probe Request frame 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."Please clarify how long the non-AP STA shall not send a Probe Request frame. Because the non-AP STA can send a Probe Request frame for obtaining the BSS update information, after joining to the BSS. | As in comment. | Revised –BSS update information is polled by the STA via Probe Request frames that are individually addressed. There is already a statement that addresses this. Quoting:“The STA might send an individually addressed Probe Request frame to an AP for reasons other than active scan even if it has already received a FILS Discovery, Probe Response or Beacon frame from that AP.”To clarify that the statement under discussion is applicable to only active scan the proposed resoluition is to clarify that the probe request in question is one that is sent under active scan, i.e., that is sent with a broadcast address.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 21351. |
| 21532 | Yongho Seok | 432.26 | "The non-AP STA shall not send a Probe Request frame 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."Please clarify how long the non-AP STA shall not send a Probe Request frame. Because the non-AP STA can send a Probe Request frame for obtaining the BSS update information, after joining to the BSS. | As in comment. | Revised –BSS update information is polled by the STA via Probe Request frames that are individually addressed. There is already a statement that addresses this. Quoting:“The STA might send an individually addressed Probe Request frame to an AP for reasons other than active scan even if it has already received a FILS Discovery, Probe Response or Beacon frame from that AP.”To clarify that the statement under discussion is applicable to only active scan the proposed resoluition is to clarify that the probe request in question is one that is sent under active scan, i.e., that is sent with a broadcast address.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 21352. |
| 21579 | Yusuke Tanaka | 432.51 | Comma in "Reduced Neighbor Report, or Neighbor Report element" must be removed. | As commented. | Accepted |
| 21580 | Yusuke Tanaka | 432.57 | "Presence of an AP" is not a sufficient. The STA need to know existence of radio transmission by a nearby AP and need to know BSSID of the AP in some way. | Modify "the STA has discovered the presence of an AP in that channel" with "the STA has discovered the existence of radio transmission by a nearby AP and BSSID of the AP in the channel" | Revised –Agree in principle with the comment. However, the STA need not necessarily hear a transmission from the AP but rather know that it is within transmission range from the AP. The proposed resolution is to clarify that the AP has been discovered to be present in that channel and within transmission range.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 21580. |
| 21581 | Yusuke Tanaka | 432.63 | It is not technically clear why a STA can discover an AP by sending Probe Request after completing operations described in the above. Typically, transmission power of an AP is higher than that of a STA, thus it is unlikely that transmission by a STA helps discovering an AP.In addition, PSCs can not always be available as described in P432L10. A STA can never know whether PSCs are not available or an AP is not discovered. Therefore descriptions in this bullet let a STA behave as if in a PSC even when PSCs are not available. | Remove this bullet. | Revised –This CID is like CID 21096.Agree in principle with the comment that in general it is more beneficial for the STA to listen to APs transmissions for discovering the AP, however in certain cases it might be desirable for the STA to attempt to transmit a Probe Request frame (i.e., enable active scanning). For example, because the AP might not be able to send a FILS Discovery frame in time due to medium conditions. There are pros and cons for this exemption, which were discussed during the specification drafting, and the conclusion is to allow this exemption for the PSC case only. Also please note that the STA always knows where the PSCs are located since their position is predeterministically mapped (refer to the beginning of this subclause). Proposed resolution adds further clarification in this case by specifying the PSC that is available in that location.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 21581. |
| 21582 | Yusuke Tanaka | 433.03 | What the NOTE says is beyond the scope of NOTE and should be describe as specification. | Describe what the NOTE says as specification text. | Rejected –The note is providing guidance as to where the equivalent normative behavior is provided. For example, it says tha the STA follows the rules defined in 11.1.4.3.2 for sending probe requests for scanning. And it specifies that in this case the probe request is broadcast, which is already clear as per specification in 11.1.4.3.2. The note here was added for information purpose only and converting it to normative behavior would duplicate existing normative behavior and is not necessary. |
| 20374 | Laurent Cariou | 432.53 | This paragraph says that the STA, under specific conditions, may send a probe request with the "SSID set to the SSID of that AP". Under the same conditions, the probe request should be authorized to be sent to the BSSID or the short SSID of that AP, and not be restricted only to SSID. | Same as comment | Revised –Agree in principle that the STA can send the Probe Request with the Short SSID instead of the SSID. Proposed resolution accounts for this case. Regarding the BSSID this is already covered in the bullet that follows. To make it clearer that this presence is possible via any means the proposed resolution clarifies this as well.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 20374. |
| 20376 | Laurent Cariou | 432.18 | If a STA sends a probe request to a Short SSID, the BSSID is set to Wildcard BSSID and SSID to Wildcard SSID. This should be allowed and the sentece should therefore account for this particular case. | Same as comment | Rejected –When the SSID field is set to the Wildard SSID then all APs that receive that Probe Request frame are required to respond. Having the short SSID present in the Probe Request frame has no purpose. In the 6 GHz band the STA cannot send a Probe Request frame with the SSID set to the Wildcard SSID. If the STA wants to send a Probe Request frame with the Short SSID then the STA has to set the SSID to any other value, other than the Wildard SSID obviously. This is already allowed. Hence, no further changes are necessary.  |
| 20127 | Alfred Asterjadhi | 431.15 | Some terminologies in this subclause are not consistent. Please refer to 11-18/1471r4. E.g., good to use "broadcast destination address" throughout. | As in comment. | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested changes.TGax editor to make the changes shown in 11-19/0962r0 under all headings that include CID 20127. |

**Discussion: *None.***

* 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* + 5 × 16 × (*n* - 1), where *n = 1, ..., 15*, are referred to as preferred scanning channels (PSCs).

NOTE—PSCs might not all be available in a specific location due to regulatory restrictions.

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 20454):***

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 those rules are superseded by the rules defined in that subclause, and as defined below.*(#20454)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 20127):***

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)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 21351, 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)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 21352, 20127, 20242):***

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)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 20127):***

The non-AP STA shall not send a Probe Request frame to the broadcast destination address 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 with the 20 TU 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.*(#20127)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 21353, 21354, 21140, 21141, 20127):***

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 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*(#21140)* period scanning the channel.

The non-AP STA shall set the dot11FILSProbeDelay to a value equal to or greater than 20 TU.*(#21141)*

NOTE—A non AP STA is expected to scan a channel for a time that is not less than 20 TU because this is the maximum interval used by an AP to generate FILS Discovery frames (see 26.17.2.3.2 (Fast passive scanning)).*(#21353, 21354)*

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 21579, 21580, 20374, 20127, 20210, 21581, 21096):***

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*(#21579)* or 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 in that channel with (short) SSID set to the (short) SSID*(#20374)* of that AP as per step d) of 11.1.4.3.2 (Active scanning procedure for a non-DMG STA) without waiting for the FILS Probe Timer to reach dot11FILSProbeDelay,
* Otherwise, if the STA’s CS mechanism has determined the medium to be idle for a continuous period of at least 7 ms since the start of the deferral period and the channel is a PSC that is available in that location*(#21581, 21096)*, then the STA may, subject to other rules in this clause, send a Probe Request frame in that channel with (short) SSID set to the (short) SSID of an AP as per step d) of 11.1.4.3.2 (Active scanning procedure for a non-DMG STA) without waiting for FILS Probe Timer to reach dot11FILSProbeDelay.*(#20210)*
* Otherwise, if the STA has discovered the presence of an AP in that channel that is within its transmission range*(#21580),* eventually through means that are out of scope of the standard*(#20374)*, then the STA may send a Probe Request frame to the broadcast destination address*(#20127)* with the Address 3 field set to the BSSID of that AP without waiting for the FILS Probe Timer to reach dot11FILSProbeDelay,
* Otherwise, if the FILS Probe Timer reaches dot11FILSProbeDelay and the channel is a PSC that is available in that location*(#21581, 21096)*, then the STA may, subject to the other rules in this clause, send a Probe Request to the broadcast destination address*(#20127)* as per step d) 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.

NOTE—A STA that performs an active scan on receipt of the MLME-SCAN.request primitive with ScanType parameter indicating an active scan always sends the Probe Request frame with the Address 1 field set to the broadcast address (i.e., a Probe Request frame to the broadcast destination address (see 11.1.4.3.2 (Active scanning procedure for a non-DMG STA)))*(#20127)*. The Address 3 field (BSSID), set per the MLME-SCAN.request primitive, is set to either a specific BSSID or the wildcard BSSID, and determines the set of responders. The STA might send an individually addressed Probe Request frame to an AP for reasons other than active scan even if it has already received a FILS Discovery, Probe Response or Beacon frame from that AP.

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 Criteria subfield in the element to either 0 or 3.