IEEE P802.11  
Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolution of CIDs in clauses 3.1 (LB266) | | | | |
| Date: September 6, 2022 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| John Wullert  Subir Das | PERATON LABS |  |  | <jwullert@peratonlabs.com>  <sdas@peratonlabs.com> |
| An Nguyen  Frank Suraci | DHS/CISA/ECD |  |  | (an.p.nguyen, frank.suraci) @cisa.dhs.gov |

Abstract

This submission proposes resolutions for the following 15 CIDs received for TGbe LB266 in clause 3.1:

~~10510,~~ 11082, 11083, 10511, 10512, 11172, 10184, 10186, 10185, ~~10187, 11473, 11474, 11475~~, 10188, 10189, 10190, 10513, 11476, 11477

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Updates based on off-line discussions with commenters
* Rev 2: Additional updates based on exchange via email reflector. Removal of CIDs 10187, 11473, 11474, 11475.
* Rev 3: Updated references in editor instructions in table to correct revision. Revised resolution to CID 10510 with edits to Clause 9.4.2.36
* Rev 4: Added green tags plus wording change to remove normative language in one definition
* Rev 5: Incorporated off-line editorial feedback.
* Rev 6: Rejected CID 11172 based on input from the editor.
* Rev 7: Online edits and defer 10510

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 TGbe Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGbe editor to modify existing material in the TGbe draft. As a result of adopting the changes, the TGbe editor will execute the instructions rather than copy them to the TGbe Draft.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Section** | **Pg/Ln** | **Comment** | **Proposed Change** | **Resolution** |
| **10510** | 3.1 | 47.04 | The definition of "AP reachability" and reference to this term in the standard (such as that in Neighbor Report element) needs to be updated to cover the case where non-AP MLD is able to exchange preauthentication messages with the target AP MLD. | As in comment | Revised  Agree in principle. Appended MLD-level definition of reachability.  **TGbe editor please implement changes labelled as #10510 in document 802.11-22-1255r7.** |
| **11083** | 3.1 | 47.05 | We need to modify the definiton of association for MLD. | Change the definition of association from "association: The service used to establish a mapping between an access point (AP) or personal basic service set (PBSS) control point (PCP), and a station (STA) and enable STA invocation of the distribution system services (DSSs) " to "association: The service used to establish a mapping between an access point (AP) or personal basic service set (PBSS) control point (PCP), and a station (STA) and enable STA invocation of the distribution system services (DSSs) or to establish a mapping between an access point (AP) multi-link device (MLD) and a non-AP MLD and enable non-AP MLD invocation of the DSSs." | Accepted |
| **11082** | 3.1 | 47.05 | We need to modify the definiton of authentication for MLD. | Change the definition of authentication from "authentication: The service used to establish the identity of one station (STA) as a member of the set of STAs authorized to associate with another STA." to "authentication: The service used to establish the identity of one station (STA) as a member of the set of STAs authorized to associate with another STA or to establish the identify of one multi-link device (MLD) as a member of the set of MLDs authorized to associate with another MLD." | Accepted |
| **10512** | 3.1 | 47.15 | Definition of BSS Transition in baseline spec needs to be updated to be consistent with the description on pg 57 line 43 of TGbe spec.  Same goes for definition of Fast BSS Transition and Reassociation Service.  Please check and update other definitions in baseline spec to include MLD | As in comment | Revised  Agree in principle. Modified definitions of BSS transition and Fast BSS transition to allow for MLD  **TGbe editor please implement changes labelled as #10512 in document 802.11-22-1255r7.** |
| **10511** | 3.1 | 47.14 | Do we need a definition for MLD Max Idle Period to be consistent with BSS Max Idle Period definition in baseline spec? | Provide a definition for MLD Max Idle Period | Revised  Added definition of MLD max idle period based on definition of *basic service set (BSS) max idle period*.  **TGbe editor please implement changes labelled as #10511 in document 802.11-22-1255r7.** |
| 11172 | 3.1 | 47.22 | 802.11me D1.3 consistently uses "non-access-point" to spell out non-AP. 802.11be uses "non-access point", the 802.11be amendment should align with the 802.11me baseline. Change all instances of "non-access point" to be "non-access-point". There are 12 locations in the amendment. | Change: "non-access point" To: "non-access-point" in all 12 locations: 47.22, 47.27, 51.22, 51.28, 51.34, 51.40, 52.1, 52.49, 52.60, 53.11, 54.5, 54.8. | Rejected  Per the most updated discussion and resolution in the TG me, (CID#1295) "non-access point" is used. |
| **10184** | 3.1 | 50.65 | Defintion of reported access point contains extraneous "or". | Revise definition as "An AP that is describedidentified in an element such as a Neighbor Report element, a Reduced Neighbor Report element, or Basic Multi-Link element." | Revised  Agree in principle. Modified definition to address comment  **TGbe editor please implement changes labelled as #10184 in document 802.11-22-1255r7.** |
| **10186** | 3.1 | 51.66 | Defintion of reporting access point contains extraneous "or". | Revise definition as "An AP that is transmitting an element, such as a Neighbor Report element, a Reduced Neighbor Report element, or Basic Multi-Link element, describing a reported AP." | Revised  Agree in principle. Modified definition to address comment  **TGbe editor please implement changes labelled as #10186 in document 802.11-22-1255r7.** |
| **10185** | 3.1 | 51.14 | Defintion mixes singular and plural references to non-AP STAs in a confusing manner. | Revise defintion as "An extended power save mode for non-access-pointnon-access point (non-AP) stations (STAs) and non-AP multi-link devices (MLDs) whereby a non-AP STA or the STAs affiliated with a non-AP MLD need not listen for every delivery traffic indication map (DTIM) Beacon frame and does not perform group temporal key/integrity group temporal key/beacon integrity group temporal key (GTK/IGTK/BIGTK) updates. | Revised  Agree in principle. Modified definition to address comment  **TGbe editor please implement changes labelled as #10185 in document 802.11-22-1255r7.** |
| **10188** | 3.1 | 52.44 | Definition of "multi-link operation" is really only a pointer to another clause, which is not particularly useful. | Revise defintion to be "A mode of operation that allows a non-access point (non-AP) multi-link device (MLD) to discover, authenticate, associate, and exchange traffic over multiple links with an AP MLD." | Revised  Agree in principle. Modified definition to use examples to illustrate “operations”  **TGbe editor please implement changes labelled as #10188 in document 802.11-22-1255r7.** |
| 10189 | 3.1 | 52.50 | Definitions in base spec do not contain references to clauses | Remove the following text "as defined in 35.3.4.2 (Use of Multi-Link probe request and response)" | Rejected  Base spec does not prohibit use of references. |
| 10190 | 3.1 | 52.57 | Definitions in base spec do not contain references to clauses | Remove the following text "as defined in 35.3.4.2 (Use of Multi-Link probe request and response)" | Rejected  Base spec does not prohibit use of references. |
| **10513** | 3.1 | 53.04 | Change 'of the' to 'affiliated with an' | As in comment | Accepted |
| **11476** | 3.1 | 53.07 | "concurrent" should be "concurrently" | change as in comments | Revised  Corrected issue twice in the note.  **TGbe editor please implement changes labelled as #11476 in document 802.11-22-1255r7.** |
| **11477** | 3.1 | 53.16 | a PPDU cannot consist of RUs | change "which consists" to "which is transmitted on" | Revised  Agree in principle. Revised definition to reflect change.  **TGbe editor please implement changes labelled as #11477 in document 802.11-22-1255r7.** |

***TGbe editor: Please note baseline is 11be D2.1.1 or definitions taken from*** ***802.11‐2020***

**3.1 Definitions**

***TGbe editor: Incorporate following definitions from*** ***802.11‐2020 and revise as shown:***

**access point (AP) reachability:** An AP is reachable by a station (STA) if preauthentication messages can be exchanged between the STA and the target AP via the distribution system (DS). [10510] An AP MLD is reachable by a non-AP MLD if preauthentication messages can be exchanged between a STA affiliated with the non-AP MLD and an AP affiliated with the target AP MLD via the DS.

**association:** The service used to establish a mapping between an access point (AP) or personal basic service set (PBSS) control point (PCP), and a station (STA) and enable STA invocation of the distribution system services (DSSs) [11083] or to establish a mapping between an access point (AP) multi-link device (MLD) and a non-AP MLD and enable non-AP MLD invocation of the DSSs.

**authentication:** The service used to establish the identity of one station (STA) as a member of the set of STAs authorized to associate with another STA [11082] or to establish the identify of one multi-link device (MLD) as a member of the set of MLDs authorized to associate with another MLD.

**basic service set (BSS) transition:** [10512] Movement of an association by a station (STA) or non-AP MLD from one BSS or AP MLD to another BSS or AP MLD in the same extended service set (ESS) that might involve changing operating mode from STA to MLD or vice versa. See 4.5.3.2 (Mobility types).

**fast basic service set (BSS) transition:** [10512] A BSS transition that minimizes the amount of time that data connectivity to the distribution system (DS) is lost.

**multicast-group address:** A medium access control (MAC) address associated by higher level convention with a group of logically related stations (STAs) [10512] or non-AP MLDs.

**service set transition:** [10512]A change of association that is either a BSS transition or an extended service set (ESS) transition.

***TGbe editor: Add the following definition:***

**[10511] MLD max idle period:** A time period during which the access point (AP) multi-link device (MLD) does not disassociate a non-AP MLD due to nonreceipt of frames from any of the stations (STAs) affiliated with that non-AP MLD.

**3.2 Definitions specific to IEEE 802.11**

***TGbe editor: Modify the following definitions and note as shown:***

[10184] **reported access point (AP):** An AP that is ~~described~~identified in an element such as a Neighbor Report element, a Reduced Neighbor Report element, or Per-STA Profile subelement of the Basic Multi-Link element.

[10186] **reporting access point (AP):** An AP that is transmitting an element, such as a Neighbor Report element, a Reduced Neighbor Report element or Basic Multi-Link element, describing a reported AP.

[10185] **wireless network management (WNM) sleep mode:** An extended power save mode for ~~non-access-point~~non-access point (non-AP) stations (STAs) and non-AP multi-link devices (MLDs) whereby a non-AP STA or STAs affiliated with a non-AP MLD need not listen for every delivery traffic indication map (DTIM) Beacon frame and do not perform group temporal key/integrity group temporal key/beacon integrity group temporal key (GTK/IGTK/BIGTK) updates.

**multi-link operation (MLO):** [10188] Operations such as, but not limited to, discovery, authentication, multi-link setup, and frame exchanges, between two multi-link devices (MLDs) as described in 35.3 (Multi-link operation).

**nonsimultaneous transmit and receive (NSTR) link pair:** A pair of links within a multi-link device (an MLD) for which the receiver requirements specified in Clause 36 (Extremely high throughput (EHT) PHY specification) are not met on one of the links when a station (STA) [10513] affiliated with an MLD is transmitting on the other link. Each link of such a pair is a member of the NSTR link pair.

[11476] NOTE—If an MLD supports transmission on link 1 concurrently with reception on link 2, but cannot support transmission on link 2 concurrently with reception on link 1, this pair of links is NSTR for that MLD.

**non-orthogonal frequency division multiple access (non-OFDMA) extremely high throughput (EHT) physical layer (PHY) protocol data unit (PPDU):** An EHT PPDU [11477] which is transmitted using a single resource unit (RU) or a single multiple resource unit (MRU) that occupies all the nonpunctured 20 MHz channels within the PPDU bandwidth.

***TGbe editor: Modify the following text as shown:***

**9.4.2.36 Neighbor Report element**

…

[10510] The AP Reachability field indicates whether the AP or AP MLD identified by this BSSID is reachable by the STA or non-AP MLD that requested the neighbor report. For example, the AP identified by this BSSID is reachable for the exchange of preauthentication frames as described in 12.6.10.2. The values are shown in Table 9-172.

**Table 9-172—Reachability field**

|  |  |  |
| --- | --- | --- |
| **Value** | **Reachability** | **Usage** |
| 0 | Reserved | Not used. |
| 1 | Not Reachable | A station or non-AP MLD sending a preauthentication frame to the BSSID will not receive a response even if the AP or AP MLD indicated by the BSSID is capable of preauthentication. |
| 2 | Unknown | The AP or AP MLD is unable to determine if the value Reachable or Not Reachable is to be returned. |
| 3 | Reachable | The station or non-AP MLD sending a preauthentication frame to the BSSID can receive a response from an AP or AP MLD that is capable of preauthentication. |