IEEE P802.11
Wireless LANs

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| CID 11001 |
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Abstract

This submission proposes resolution for CID 11001 received for TGax LB230

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Updated based on offline feedback
	+ Text revised to D2.3
* Rev 2: Updated the resolution (AP is recommended to transmit frequent FD frames to aid unassociated STA’s determine its operating parameters)
* Rev 3: Updated the text in ‘Resolution’ column

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** | **Pg / Ln** | **Section** | **Comment** | **Proposed Change** | **Resolution** |
| 11001 | Abhishek Patil | 85.10 | 9.3.1.23 | Random access for unassociated STAs is broken. In case of random access for unassociated STAs (AID12=2045), the most likely case is that an unassociated STA wishing to use the random access RU has not received any other frames from the AP sending the Trigger frame. As a result, the unassociated STA has no knowledge of the reference channel (primary 20). Since the RU indexing is with respect to the primary20 of the AP, how would an unassociated non-AP STA know the RU mapping of the Trigger frame? | As in comment | **Revised**An unassociated STA may not have received any mgmt. frame from the AP before it hears a TF with AID12=2045. In such case, the STA would need to know operating parameters of the BSS (e.g., operating BW, etc) and the AP’s primary channel to identify the location where expect a response from the AP.AP is recommended to transmit frequent FILS Discovery frames between beacon periods to aid unassociated STAs discover it and determine the operating parameters of the BSS.**TGax editor, please make changes as shown in doc 11-18/0364r3** |

**Discussion**

An unassociated non-AP STA may not have received any frames from an AP before it receives a Trigger frame from that AP containing RA-RUs with AID12=2045. Typically, an unassociated STA scans in 20MHz-only mode to conserve power. An AP can sprinkle RA-RUs for unassociated STAs anywhere within its operating BW. As a result, it is possible for an unassociated STA to access an RU which is not located on the AP’s primary channel. Further, an unassociated may not know the RU mapping in the Trigger frame – for example when the AP is operating in 80+80MHz mode. When a STA sends Probe Request frame to an AP in a TB PPDU, the Probe Response frame is sent on the AP’s primary channel. Since a STA has no clue on where to look for the response, it will miss the response if RU it used was not on the AP’s primary channel. In such a situation, the AP will end up retrying several times leading to inefficient medium usage.

**Disallow UORA for unassociated STAs**

TGax should not propose a broken feature and another option would be to limit random access feature to associated STAs only. If approved, this will have a major impact to the spec. There are several sections in the spec that provide rules for UORA for unassociated STA or discuss/differentiate between associated and unassociated STAs (e.g., 9.3.1.9.7, 9.3.1.23, several portions of clause 27). Such major changes at this stage of the project is very risky and we don’t recommend going this route.

**AP transmits Probe Response in the same RU location as the STA’s UL TB PPDU [special STA\_ID]**

This option would require defining a new ‘special’ RU. Current spec does not allow repeating an RU more than once in a DL MU PPDU (unless the RU is an unassigned RU). An exception rule would need to allow a special RU meant for unassociated STAs who have sent a Probe Request frame to an AP in a TB PPDU. Also, the spec would need additional rules to prohibit an AP from assigning STA\_ID=2045 in the same DL MU PPDU which is carrying the special RU. This will be a new feature with several ‘exception’ rules added to the spec.

**AP sends Probe Response frame in non-HT Duplicate on all channels**

Probe Response frame carries AP configuration information. However, HT Operation element carries Primary channel information. Probe response in a non-HT Duplicate will confuse legacy (11a/b/g) clients who would incorrectly conclude that the AP is operating on the channel it receives the response frame. In such scenarios, the legacy client may make several attempts to associate with the AP on the channel. This leads to unnecessary (association) frames and wastage of medium resources. This is one of the reason why beacon is not transmitted in non-HT Duplicate.

**Non-AP STAs use an RA-RU only after hearing the AP’s beacon**

Beacon frame carries AP’s configuration information. However, waiting to hear AP’s beacon would encourage passive scanning which is not a preferred approach as it will have severe impact on the STA’s power consumption. Besides, a STA that is scanning one of the secondary channels will not hear the AP’s beacon as it is sent on the primary channel. To conserve battery, STAs may end up sending active probes which defeats the motivation behind random access. Also, STAs that are far from the AP may not be able to close the link with AP (i.e., their Probe Request frame sent in SU won’t be heard by the AP). Such STAs can benefit from a narrow band RU allocated by a TF from the AP. Waiting to hear a beacon would also mean lost opportunity since the STA would ignore RA-RUs located in the current (secondary) channel that it is scanning.

**Solution:**

It is recommended that AP transmits FILS Discovery frames at regular intervals within a beacon period to aid unassociated STAs gather information about the AP. Unassociated STAs can use the information to decide whether to use the RA-RUs assigned by a TF from the AP.

**27.5.5.6 Additional considerations for unassociated STAs**

***TGax Editor: Please add the following new paragraphs after the 2nd paragraph in this section as shown below (11ax D2.3 P292L29):***

An AP should transmit FILS Discovery frames as described in 11.47.2.1 (FILS Discovery frame transmission) at regular intervals within a beacon period to aid unassociated STAs discovery it and determine the operating parameters of its BSS.

A non-AP STA may derive the operating parameters of an AP’s BSS upon receiving a FILS Discovery frame from the AP and use the information to send a Management frame in a TB PPDU as a response to a Trigger frame from the AP containing RA-RUs for unassociated STAs.

***TGax Editor: Please add a new bullet as shown below to the following paragraph in this section (11ax D2.3 P292L30):***

A non-AP STA that sends an HE TB PPDU by following the UORA procedure in response to a Trigger frame from an AP it is not associated with allocating RA-RU(s):

* shall set the TXVECTOR parameter BSS\_COLOR to the value of the RXVECTOR parameter BSS\_COLOR of the soliciting Trigger frame (see 27.5.5.2 (UORA Procedure) and 27.5.3.3 (STA behavior for UL MU operation)).
* shall include at most one MMPDU in the HE TB PPDU.
* shall set the RA field of the frame carried in the HE TB PPDU to the TA address of the soliciting Trigger frame or to the address of a nontransmitted BSSID if the soliciting BSS corresponds to transmitted BSSID.

**27.5.3.4 A-MPDU contents in an HE TB PPDU**

***TGax Editor: Please add a new paragraph after the 2nd paragraph in this section as shown below (11ax D2.3 P282L38):***

An unassociated STA shall include at most one Management frame in the HE TB PPDU that is sent in response to a Basic Trigger frame that contains RA-RU(s) with AID12 subfield set to 2045.