IEEE P802.11
Wireless LANs

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| Comment Resolution on Retansmission of OFDMA Random Access |
| Date: 2016-09-11 |
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Abstract

This submission proposes resolutions of comments received from TGax comment collection (TGax Draft 0.1).

* CIDs: 49,51,181,440,442,601,602,1198,2291,2385,2684 (11 CID)

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Editorial modifications from Rev 0 based on suggestions from others
* Rev 2: Editorial modifications from Rev 1 to align with doc 11-16/1158 and 1222
	+ First two paragraphs of subclause 25.5.2.6.1 are changed to exactly the same as in 11-16/1222
	+ The 6th paragraph of subclause 25.5.2.6.1 keeps unchanged, the corresponding modification (CID 181) merged in 11-16/1158.
* Rev 3: A clear version of Rev 2, no change for the text.
* Rev 4: Change “1-16/1162r1” into “1-16/1162r4” in the 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 | Page Number | Line Number | Comment | Proposed Change | Resolution |
| 49 | 60 | 34 | If an UL MU transmission via UL MU random access was not succeeesful (due to collision, or other error cases), with what value the STA should initialize its OCW; OCWmin, or twice the prior OCW value initialization? | As in the comment | Revised.Paragraphs are added to specify how to update the OCW after a successful transmission and a failure transmission respectively.TGax editor makes changes as shown in 11-16/1162r4. |
| 601 | 60 | 48 | The standard shall define, how the STA changes its backoff when it receives new contention parameters from the AP | As mentioned in comments | Revised.Paragraphs are added to specify how to update the OCW after a successful transmission and a failure transmission respectively.TGax editor makes changes as shown in 11-16/1162r4 . |
| 442 | 60 | 36 | The procedure is silent if/when the STA increases its OCW after it hits zero | Add language that OCW is re-chosen randomly after transmission (or some other condition) | Revised.Paragraphs are added to specify how to update the OCW after a successful transmission and a failure transmission respectively.TGax editor makes changes as shown in 11-16/1162r4. |
| 2385 | 47 | 6 | The RA procedure only defines the initial random access. However, when the RA fails (i.e. collision occurs), the spec does not say how to handle this case, whether perform re-transmission of RA or start a new RA with double OCW. |  | Revised.Paragraphs are added to specify how to update the OCW after a successful transmission and a failure transmission respectively.TGax editor makes changes as shown in 11-16/1162r4. |
| 51 | 60 | 1 | Would there be OCWmax for random access? There should be such value to upper limit the increase of OCW in cases or collision or error. | As in the comment | Revised.Agree in principle.An OCWmax parameter is added in Beacon frame or Probe response frame.TGax editor makes changes as shown in 11-16/1162r4. |
| 602 | 60 | 29 | It is not clear why the parameter is called OCWmin, if there is no OCWmax | Rename OCWmin or introduce OCWmax | Revised.An OCWmax parameter is added in Beacon frame or Probe response frame. |
| 1198 | 60 | 7 | For random access UL-OFDMA, OCWmin is defined but not OCWmax. This isimportant to make sure that OCW will be upperbounded the same way for all 11ax devices. | Define an OCWmax parameter | RevisedAn OCWmax parameter is added in Beacon frame or Probe response frame. |
| 2684 | 60 | 8 | Other parameters for random access are TBD.We should define it | OCWmax or Retry Limits are necessaryfor a retransmission procedure of the UL OFDMA-based random access. | Revised.An OCWmax parameter is added in Beacon frame or Probe response frame. |
| 181 | 78 | 47 | If the OBO counter is 0 or it decrements to 0 are the same condition in terms of this procedure (pick one and remove the other). Also Trigger frame for random access is better referred to as a Trigger frame that contains at least a random RU? | As in comment | Revised.They are two different ways for OBO counter to get 0. It is better to keep both of them. The sentence is modified to make it clearer.“Trigger frame for random access” is replaced with “trigger frame contains RU(s) assigned for AID value 0”. (IEEE motion passed, slide105 in 11-16/0512r4) |
| 440 | 60 | 32 | initiates | begins when the ... receives. Although, really it begins when the AP sends the trigger frame frro random access! .. Or when a value of OCW is chosen ... delete this sentence? | Revised.Agree in principle.The sentence is deleted. |
| 2291 | 60 | 7 | "OCWmin" has not yet been discussed, neither passed any motion. Further, even when the optimal OCW is used, 2/3 of contentions will fail. Any non-AP STA's changing of OCW away from this optimal OCW is problematic | The draft shall follow the passed motion which use OCW. Avoid to use the term OCWmin, use OCW instead | Revised.It already passed motion that OCWmin is carried in Beacon frame. Both OCW and OCWmin are needed. OCW will be set to OCWmin for the initial transmission. |

Discussion:

* OCWmax is introduced as the upper limit of OCW;
* The OCW update mechanisms in OFDMA based random access are similar as in EDCA
	+ OCW reset to OCWmin after a successful transmission;
	+ OCW shall be update with 2\*OCW + 1 till OCWmax is reached after a failure transmission,;

**25.5.2.6.1 Random access procedure**

***TGax editor: change the 25.5.2.6.1 as the following:***

In this subclause(#1304), the random access procedure is described with respect to UL OFDMA contention parameters. The procedure is also illustrated in Figure 25-1 (Illustration of the UL OFDMA-based random access procedure). ~~An HE STA that uses the random access procedure maintains an internal OFDMA backoff (OBO) counter(#2712).~~ The OFDMA contention window (OCW) is an integer with an initial value of OCWmin. ~~Other parameters for random access are TBD.~~

An HE AP indicates the value of OCWmin and OCWmax in the RAPS element within a Beacon or Probe Response frame for the random access operation. ~~The method of indication of the OCWmin value is TBD.~~  The OCWmax is the upper limit of OCW.

~~The random access procedure initiates with an HE STA receiving a Trigger frame for random access~~.

For an initial UL PPDU transmission, when an HE STA obtains the value of OCWmin from the HE AP, it shall set the value of OCW to the OCWmin and shall initialize its OBO counter to a random value in the range of 0 and OCWmin.

If the OBO counter for an HE STA is smaller than the number of RUs assigned to AID value TBD in a Trigger frame, then the HE STA shall decrement its OBO counter to zero. Otherwise, the HE STA decrements its OBO counter by a value equal to the number of RUs assigned to AID value TBD in a Trigger frame. For instance, as shown in Figure 25-1 (Illustration of the UL OFDMA-based random access procedure), HE STA 1 and HE STA 2 decrement their non-zero OBO counters by 1 in every RU assigned to AID value TBD for random access within the Trigger frame.

If the OBO counter for an HE STA is zero or if the OBO counter decrements to 0, the STA(#1551) randomly selects any one of the assigned RUs for random access and transmits its UL PPDU in the selected RU. Otherwise, the STA resumes with its OBO counter in the next Trigger frame for random access.

If the HE Trigger-based PPDU is successfully transmitted in the randomly selected RU, the STA shall reset its OCW to the value indicated in the OCWmin field of the most recently received RAPS element (9.4.2.215 UL OFDMA-based Random Access Parameter Set element).

*Note: If the transmitted HE Trigger-based PPDU does not solicit an immediate response, then the STA follows the OCW reset rule that applies to successful transmission.*

25.5.2.6.2 Retransmission procedure for random access

If an HE Trigger-based PPDU soliciting an immediate response that is sent by a STA in its randomly selected RU (see 25.5.2.6.1 Random access procedure) fails, then the STA may attempt to retransmit the HE trigger-based PPDU using random access. This subclause defines the retransmission procedure that a STA may follow using random access.

If the HE Trigger-based PPDU is not successfully transmitted in the randomly selected RU, the STA shall update its OCW to 2\*OCW +1 for every retransmission, until the OCW reaches the value of OCWmax indicated in the RAPS element. Once the OCW reaches OCWmax for successive retransmission attempts, the OCW shall remain at the value of OCWmax until the OCW is reset.