IEEE P802.11
Wireless LANs

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| CIDs related to 27.5.6 – Misc |
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Abstract

This document provides proposals for CID12994.

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.***

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| 12994 | 96.62 | I don't find the resource allocation information for each scheduled HE non-AP STA in the NDP Feedback Report Poll variant subclause.Apparently, the text seems to infer that the User Info field defined in Figure 9-52g for a Trigger Frame is replaced by the one defined in Figure 9-52n for this variant, but RU / MCS are missing. So how are the scheduled HE STA supposed to send their feedback to the HE AP? Please better explain how the HE TB PPDU in response of this TF variant is constructed. | As in comment | Revised – Doc 149r4 is already partially resolving this comment. Clarify whose STAs can respond to an NFRP trigger. Clarify in which management frames the NDP Feedback Parameter set element can be transmitted. Apply the changes in document 767r2. |

1. **Proposed changes**

***TGax editor: Modify section 27.5.6 NDP Feedback Report Procedure as follows:***

* NDP feedback report procedure
* General

The NDP feedback report is a mechanism for an HE AP to collect feedback from multiple HE STAs in a more efficient manner than with an HE TB PPDU. The feedback is not for channel sounding.(#13199)

An HE AP sends an NFRP Trigger frame(#13318) to solicit NDP feedback report response from many STAs that are identified by a range of scheduled AIDs in the Trigger frame. The NDP feedback report response from a non-AP HE STA(#14217) is an HE TB NDP feedback PPDU (see 28.3.17 (HE TB NDP feedback PPDU))(#14130). A non-AP HE STA(#14217) uses the information carried in the NFRP Trigger frame(#13318) to know if it is scheduled, and in this case, to derive the parameters for the transmission of the response.

In this subclause, the NDP feedback report procedure is described.

* STA behavior

A STA shall set the NDP Feedback Report Support subfield in the HE Capabilities element to 1 if it supports NDP feedback report and set it 0, otherwise.

A STA shall not transmit an NDP feedback report response unless it is explicitly enabled by an AP in one of the operation modes described in this subclause. The inter frame space between a PPDU that contains an NFRP Trigger frame(#13318) and the NDP feedback report poll response is SIFS. A STA shall commence the transmission of an NDP feedback report response at the SIFS time boundary after the end of a received PPDU, when all the following conditions are met:

* The received PPDU contains an NFRP Trigger frame(#13318)
* The STA is scheduled by the NFRP Trigger frame(#13318)
* The NDP feedback report support subfield in HE MAC Capabilities Information field is set to 1
* The STA intends to provide a response to the type of the NDP feedback contained in the NFRP Trigger frame(#13318), as described in 27.5.6.4 (NDP feedback report types).

A STA that does not satisfy all of the above conditions shall not respond to the NFRP Trigger frame(#13318).

A STA is scheduled to respond to the NFRP Trigger frame(#13318) if all the following conditions are met:

* The STA is associated with the BSSID indicated in the TA field of the NFRP Trigger frame or the STA has dot11MultiBSSIDActivated set to true and is associated with a nontransmitted BSSID of a multiple BSSID set and the TA field of the NFRP Trigger frame is set to the transmitted BSSID of that multiple BSSID set.
* The STA’s AID is greater than or equal to the starting AID and less than starting AID + *NSTA*, using the Starting AID subfield in the eliciting Trigger frame, and with *NSTA* the total number of STAs that are scheduled to respond to the NFRP Trigger frame(#13318). *NSTA* is calculated by the following equation, with UL BW subfield(#11372) and Multiplexing Flag subfield from the eliciting Trigger frame:

*NSTA* = 18  2*BW*  (*Multiplexing Flag + 1*)(#13547, #14198)

A non-AP HE STA shall obtain NDP Feedback Report parameter values from the most recently received NDP Feedback Report Parameter Set element carried in the Management frames received from its associated AP. A non-AP HE STA with dot11MultiBSSIDActivated set to true and associated with a nontransmitted BSSID of a multiple BSSID set shall inherit the NDP Feedback Report parameter values from the NDP Feedback Report Parameter Set element when carried in the Management frames that have a TA whose value is equal to the transmitted BSSID of that multiple BSSID set if the NDP Feedback Report Parameter Set element is not carried in the nontransmitted BSSID profile for that BSSID. If the NDP Feedback Report Parameter Set element is not received in a Management frame that has a TA whose value is equal to the BSSID of the associated AP or to the transmitted BSSID of the multiple BSSID set, the non-AP HE STA shall use default values for the NDP Feedback Report parameters.

* Transmission of the HE NDP feedback report response

An NDP feedback report response is an HE TB NDP feedback PPDU, as defined in 28.3.17 (HE TB NDP feedback PPDU).

A STA transmitting an NDP feedback report in response to a Trigger frame, shall set the TXVECTOR parameter as for transmitting an HE TB PPDU in response to a Trigger frame as described in 27.5.3.3 (STA behavior for UL MU operation), except for the following parameters:

* The FORMAT parameter shall be set to HE\_TB(#12602)
* The APEP\_LENGTH parameter shall be set to 0(#13768)
* The RU\_ALLOCATION parameter shall be set to be maximum RU size for the BW
* The RU\_TONE\_SET\_INDEX parameter shall be set with the following equation, with the value of the Starting AID subfield in the User Info field of the eliciting Trigger frame:
* RU\_TONE\_SET\_INDEX = (AID  Starting AID) mod (18  2*BW*)
* The NUM\_STS parameter shall be set to 1
* The SPATIAL\_REUSE parameter shall be set to SRP\_DISALLOW
* The STARTING\_STS\_NUM parameter shall be set with the following equation, with the values of the Starting AID subfield in the User Info field of the eliciting Trigger frame:
* STARTING\_STS\_NUM = (AID  Starting AID) / 18 / 2*BW*
* The MCS parameter shall be set to 0
* The DCM parameter shall be set to 0
* The FEC\_CODING parameter shall be set to 0
* The TXPWR\_LEVEL\_INDEX parameter shall be set to the value based on the Transmit Power Control for HE TB PPDU and based on the value of the AP Tx Power subfield and the UL Target RSSI subfield(#11372) in the User Info field of the eliciting Trigger Frame (see 28.3.14.2 (Power pre-correction))

A STA transmitting an NDP feedback report response to a Trigger frame shall modulate the assigned tones as descried in 27.5.6.3 (AP behavior).(#12296)

* AP behavior
* General

An AP may transmit NDP Feedback Report Parameter Set element in beacons, in probe responses and in (re)association frames.

The NFRP Trigger frame shall be transmitted in a non-HT PPDU or HT PPDU, or as an EOF-MPDU in a VHT, HE ER SU PPDU or HE SU PPDU.(#14270)

An AP that transmits an NFRP Trigger frame shall set the TA field of the frame to the MAC address of the AP, except when dot11MultiBSSIDActivated is true and the Trigger frame is directed to STAs from at least two different BSSs of a multiple BSSID set, in which case, the AP shall set the TA field of the frame to the transmitted BSSID.

* Reception of NDP feedback report responses

Following the transmission from an AP of an NFRP Trigger frame(#13318), multiple STAs may simultaneously send NDP feedback report responses to the AP. Based on the RXVECTOR parameter NDP\_REPORT, which provides the detected status array for the resources of each spatial stream and tone set assigned by the Trigger frame, the AP can derive the list of AIDs from the resources of which an NDP feedback report response was sent, and their response.

The AP shall not send any acknowledgment(#11208) in response to the reception of NDP feedback report responses.

* NDP feedback report types
* NDP feedback report with resource request type

An HE AP may send an NFRP Trigger frame(#13318) with the type subfield set to "0" for "resource request".

If the Feedback Type subfield in the User Info field of the NFRP Trigger frame(#13318) is set to 0 for "resource request", a STA that is scheduled may send an NDP feedback report response in order to signal to the AP that it has packets in its queues and would like to be triggered in UL MU. If the STA does not have a resource request to make or does not have any nonzero buffer status to report, it shall not respond to the NFRP Trigger frame(#14290).(#14132)

Each STA that is scheduled is assigned a STARTING\_STS\_NUM and an RU\_TONE\_SET\_INDEX to transmit a FEEDBACK\_STATUS bit.(18/149r3)

The meaning of the FEEDBACK\_STATUS bit is defined in Table 27-2 (FEEDBACK\_STATUS description):

|  |
| --- |
| * FEEDBACK\_STATUS description
 |
| FEEDBACK\_STATUS | Description |
| 0 | Resource request with buffered bytes for transmission between 1 and the resource request buffer threshold. |
| 1 | Resource request with buffered bytes for transmission above the resource request buffer threshold. |

The resource request buffer threshold is equal to 2(Resource request buffer threshold exponent) octets, using the Resource Request Buffer Threshold Exponent subfield in the most recently received NDP Feedback Report Parameter Set element sent by the AP to which the STA is associated. The resource request buffer threshold is equal to 256 octets if no NDP Feedback Report Parameter Set element has been sent by the AP to which the STA is associated.

***TGax editor: Modify section 27.5.3.2.3 Allowed settings of the Trigger frame fields and TRS Control subfield as follows:***

* Allowed settings of the Trigger frame fields and TRS Control subfield(#14137)

An AP(#14256) shall not send a Trigger frame that is not an NFRP Trigger frame with User Info fields addressed to STAs from two or more BSSs of a multiple BSSID set to a STA unless the STA has set the Rx Control Frame To MultiBSS subfield in the HE MAC Capabilities Information field of the HE Capabilities element it transmits to 1. An AP may send an NFRP Trigger frame addressed to STAs from two or more BSSs of a multiple BSSID set.

An AP that transmits a Trigger frame shall set the TA field of the frame to the MAC address of the AP, except when dot11MultiBSSIDActivated is true and the Trigger frame is directed to STAs from at least two different BSSs of a multiple BSSID set, in which case, the AP shall set the TA field of the frame to the transmitted BSSID.

* Beacon frame format

Add the following row into Table 9-27 (Beacon frame body) maintaining row order:

|  |
| --- |
| * Beacon frame body
 |
| **Order** | **Information** | **Notes** |
| 82 | NDP Feedback Report Parameter Set | The NDP Feedback Report Parameter Set element is optionally present if dot11HighEfficiencyOptionImplemented is true; otherwise, it is not present. |

* Association Response frame format

Add the following row in Table 9-30 (Association Response frame body) as follows maintaining numeric order:

|  |
| --- |
| * Association Response frame body
 |
| **Order** | **Information** | **Notes** |
| 61 | NDP Feedback Report Parameter Set | The NDP Feedback Report Parameter Set element is optionally present if dot11HighEfficiencyOptionImplemented is true; otherwise, it is not present. |

* Reassociation Response frame format

Add the following row in Table 9-32 (Reassociation Response frame body) as follows maintaining numeric order:

|  |
| --- |
| * Reassociation Response frame body
 |
| **Order** | **Information** | **Notes** |
| 64 | NDP Feedback Report Parameter Set | The NDP Feedback Report Parameter Set element is optionally present if dot11HighEfficiencyOptionImplemented is true; otherwise, it is not present. |

* Probe Response frame format

Add the following new rows into Table 9-34 (Probe Response frame body):

|  |
| --- |
| * Probe Response frame body
 |
| **Order** | **Information** | **Notes** |
| 99 | NDP Feedback Report Parameter Set | The NDP Feedback Report Parameter Set element is optionally present if dot11HighEfficiencyOptionImplemented is true; otherwise, it is not present. |