IEEE P802.11
Wireless LANs

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| CR for NDP feedback report – part 1 |
| Date: 2017-01-18 |
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Abstract

This document provides CR for CIDs related to NDP feedback report.

11894, 12388, 13863, 12380, 13540, 11542, 13415, 14197, 13646, 11886, 11471, 14268, 12300, 13199, 14130, 12301, 12298, 13412, 13547, 14198, 12297, 13768, 12296, 11552, 12063, 11553, 14270, 11554, 11555, 14132

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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| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number(C)** | **Page** | **Comment** | **Proposed Change** | **Resolution** |
| 11894 | 9.3.1.23.8 | 96.62 | For NDP Feedback Report Poll, how to set the Spatial Reuse field in Common Info field, should it be reserved like STBC, Doppler, etc? | Add description on how to set Spatial Reuse field |  Revised – agree with the commenter. Make the SR field reserved in trigger frame, and set the TXVECTOR value to SRP\_DISALLOW for every NDP feedback response. Apply the changes as in doc 149r1. |
| 12388 | 9.3.1.23.8 | 97.11 | "may" can't be in subcaluse 9. Change "may" to can. | Change the text per the comment. |  Revised – make the change as proposed in doc 149r1. |
| 13863 | 9.3.1.23.8 | 97.11 | "The CS Required subfield of the NDP Feedback Report Poll Trigger frame may be set to 0."Clause 9 can't have "may" sentence. | Remove "may". |  Revised – make the change as proposed in doc 149r1. |
| 12380 | 9.3.1.23.8 | 97.16 | First of all there is Number of HE LTF subfield. Secondly the Number of HE LTF andSymbols And MidamblePeriodicity subfield of the Common Info field indicates the number of HE-LTF symbols minus 1. | Change the text according to the comment. |  Revised – make the change as proposed in doc 149r1. |
| 13540 | 9.3.1.23.8 | 97.17 | The number of HE-LTF symbols for NDP Feedback Report is 2, so the indicated value in Common Info field of the Trigger frame should be 1 (minus 1 principle). In addition, it is clear do describe the terminology of HE-LTF as 4x | Change 'is set to 2 for 2 HE-LTF symbols' to 'is set to 1 for two 4x HE-LTF symbols' |  Revised – make the change as proposed in doc 149r1. |
| 11542 | 9.3.1.23.8 | 97.25 | Is "User Info field" for the NDP Feedback Report Poll Trigger frame meant to replace the "User Info" field in the Trigger frame? Or is this really the Trigger Dependent User Info? Please clarify. | as in comment |  Revised – make this clarification. Apply the changes in doc 149r1. |
| ~~13415~~ | ~~9.3.1.23.8~~ | ~~97.34~~ | ~~NDP feedback currently doesn't provide an opportunity for non-associated STAs to request a probe response, which means a large amount of probe requests and probe response messages.~~ | ~~Add 1 bit from 'reserved' for 'Request for Probe Response'.Change Eq. 9-ax1 to N\_STA=18\*2^BW\*(Multiplexing\_Flag)-2^BW\*'Request\_for\_Probe\_Response'~~ | ~~Revised – agree with the commenter. Define a procedure to allow unassociated STAs to make resource request and to make requests for asking for a probe response. Apply the changes as defined in doc 149r1~~ |
| 14197 | 9.3.1.23.8 | 98.02 | Given the "encoded value" and "its definition" of Multiplexing Flag as shown in "The Multiplexing Flag subfield indicates the number of STAs that are multiplexed with P-matrix codes on the same set of tones in the same RU, and is encoded as the number of STAs minus 1","Multiplexing Flag" needs to be replaced with "Multiplexing Flag+1" in Equation 9-ax1 | as in comment |  Revised – Clarify the sentence. Apply the changes as proposed in doc 149r1 |
| 13646 | 9.3.1.23.8 | 98.11 | Is the Multiplexing Flag subfield really the number of STAs that are multiplexed with P-matrix codes on the same set of tones in the same RU minus 1? Then it seems that the Multiplexing Flag subfield may become 0 resulting in no STAs. | Delete "minus 1". |  Revised – Clarify the sentence. Apply the changes as proposed in doc 149r1 |
| 11886 | 9.4.2.244 | 158.45 | Incorrect section reference | Fix section reference to 27.5.6 |  Revised – make the changes as proposed as doc 149r1. |
| 11471 | 9.4.2.244 | 158.47 | misspelling "Ressource" | "Ressource" in exponent should be "Resource" |  Revised – agree with the comment. Apply the changes proposed in doc 149r1. |
| 14268 | 27.5.6 | 260.29 | The short feedbacks mechanism is suitable for collecting information from the STAs like BSS color information the STAs detect in PPDUs from OBSS. This comment was submitted during D1.0 comment collection but not resolved doe to lack of time. | Define specification of short feedback to collect BSS color information the STAs detect in OBSS PPDUs. By allocating keys (indexes) on each RU and the AP announces the allocations to STAs, the collecting mechanism can be realized. |  Rejected – This seems to require to be able to have multiple RU\_TONE\_SET per users, which is currently not supported by the PHY. Propose to reject unless a presentation is made by the commenter. |
| ~~12300~~ | ~~27.5.6~~ | ~~260.30~~ | ~~NDP feedback report triggers are meant to be sent regularly with predefined intervals and at predetermined transmission times. This way, the STA can know when to be in the awake state when it wants to make a resource request. The specification needs to describe a way for the AP to indicate to the STAs at what target transmission times these NDP feedback reports trigger frames will be transmitted and with which periodicity.~~ | ~~Add a mechanism for the AP to indicate to the STAs the target transmission times and periodicity of the NDP feedback reports trigger frames. This should account for the possible different types of feedbacks. We can include such information in the NDP Feedback Report Parameter Set element, or in a broadcast TWT element.~~ | ~~Revised – agree with the comment. Apply the changes as in doc 149r1~~ |
| 13199 | 27.5.6.1 | 260.34 | There is a lot of repetition between the 1st and 2nd paragraph in this section. | Suggest consolidating the two paragraphs and removing redundent sentences |  Revised – agree with the comment. Apply the changes as proposed in doc 149r1. |
| 14130 | 27.5.6.1 | 260.42 | add the reference with "28.3.17 HE TB NDP feedback PPDU" at the end of the sentence.For example, "... is an HE TB PPDU without data payloads as defined in 28.3.17 (HE TB NDP feedback PPDU)" | as in comment |  Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| ~~12301~~ | ~~27.5.6.2~~ | ~~260.49~~ | ~~NDP feedback reports can currently be sent only by associated STA. In order to reduce the use of EDCA for transmissions of unassociated STAs to the AP or to simply reduce the latency to access the medium for unassociated STAs, NDP feedback report procedure should be extended to allow unassociated STAs to send a resource request with the NDP feedback report.~~ | ~~Modify the NDP feedback report poll trigger frame and the NDP feedback procedure to allow unassociated STAs to send an NDP feedback report. The procedure should also allow the STA to be triggered by the AP, following an NDP feedback report poll resource request.~~ | ~~Revised – agree with the commenter. Define a new mode for unassociated STAs. Apply the changes as in doc 149r1.~~ |
| 12298 | 27.5.6.2 | 261.01 | It is not clear in the spec that if a STA does not havea resource request to make or any buffer status to report, it does not respond to the NDP report poll trigger frame. | Add a note that clarify this point |  Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 13412 | 27.5.6 | 261.05 | "If a STA does not satisfy all of the above conditions, it is not required to respond to the NDP FeedbackReport Poll Trigger frame." seems to indicate that although it is "not required" to respond it maye do so if it wanted to. That seems incorrect to me. | Change to "If a STA does not satisfy all of the above conditions, it shall not respond to the NDP FeedbackReport Poll Trigger frame" | Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 13547 | 27.5.6.2 | 261.15 | The intended values of Multiplexing Flag in Eq (9-ax1) is 1 or 2, but actual encoded 'value' is 0 or 1 to INDICATE 1 or 2, respectively. BW part value is directly used from the encoded value, therefore better to be consistent | Change (Multiplexing Flag) to (Multiplexing Flag+1). The equation (9-ax1) in P98L2 should be updated together | Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 14198 | 27.5.6.2 | 261.15 | Given the "encoded value" and "its definition" of Multiplexing Flag as shown in "The Multiplexing Flag subfield indicates the number of STAs that are multiplexed with P-matrix codes on the same set of tones in the same RU, and is encoded as the number of STAs minus 1","Multiplexing Flag" needs to be replaced with "Multiplexing Flag+1" | as in comment |  Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 12297 | 27.5.6.2.1 | 261.23 | Clarify spatial reuse TxVector for NDP feedback report | No spatial reuse should be possible on top of NDP feedback report, spatial reuse should probably be set to SR\_delay. |  Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 13768 | 27.5.6.2.1 | 261.29 | "PSDU\_LENGTH shall be set to 0". PSDU\_LENGTH should be APEP\_LENGTH because it's in Tx side | change PSDU\_LENGTH to APEP\_LENGTH |   Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 12296 | 27.5.6.2.2 | 261.57 | this subsection is describing PHY processing for the modulation of assigned tones. This should be moved to section 28. | Remove the modulation of the assigned tones paragraph in section 27 and make sure that this behavior is clearly described in section 28 |  Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 11552 | 27.5.6.2.2 | 261.64 | what is the definition for "RU\_TONE\_SET"? | as in comment |  Revised – RU\_TONE\_SET is replaced by RU\_TONE\_SET\_INDEX. Apply the changes as proposed in doc 149r1. |
| 12063 | 27.5.6.4.1 | 262.00 | What if a STA has zero buffer bytes (no data)? Does that means that the STA does not send back HE TB NDP feedback response? Please clarify this case. | Add some setences to clarify the case when a STA has no data. |   Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 11553 | 27.5.6.2.2 | 262.02 | what is the definition for "RU\_TONE\_SET"? | as in comment |   Revised - agree with the comment. Apply the changes as proposed in doc 149r1. |
| 14270 | 27.5.6.3.1 | 262.12 | NDP Feedback Report Poll Trigger can be aggregated with other frame? | Clarify if needed. | Revised – no reasons to aggregate with other frames. Apply the changes as proposed in doc 149r1.  |
| 11554 | 27.5.6.4.1 | 262.38 | what is the definition for "RU\_TONE\_SET"? | as in comment |  Revised – RU\_TONE\_SET is replaced by RU\_TONE\_SET\_INDEX. Apply the changes as proposed in doc 149r1. |
| 11555 | 27.5.6.4.1 | 262.38 | why is RU\_TONE\_SET listed twice? | as in comment |  Revised – remove one iteration. Apply the changes as proposed in doc 149r1. |
| 14132 | 27.5.6.4.1 | 262.47 | Table 27-1 shows resource request with buffered bytes for transission from 1 to beyond the resource request butter threshold. To make a STA's behavior clear, leave the note what is the STA's behavior when there is no buffered bytes. | as in comment |  Revised – agree with the comment. Clarify the behavior in such case. Apply the changes as proposed in doc 149r1. |

1. **Proposed changes**

***11ax Editor: Modify 9.3.1.23.8 NDP feedback Report Poll variant as follows:***

* NDP Feedback Report Poll variant

(#6144)The NDP Feedback Report Poll Trigger frame(#8485) format is defined in Figure 9-52c (Trigger frame).

The RA field is set to the broadcast address.

The Common Info field of the NDP Feedback Report Poll Trigger frame is defined in Figure 9-52d (Common Info field).

The BW subfield indicates the bandwidth of the NDP feedback report response and is defined in Table 9-25c (BW subfield encoding).

The CS Required subfield of the NDP Feedback Report Poll Trigger frame(#Ed) can be set to 0. (#13863, #12388)

The STBC, LDPC Extra Symbol Segment, Packet Extension, Spatial Reuse, and Doppler subfields are reserved. (#11894)

The Number Of HE-LTF Symbols And Midamble Periodicity subfield of the Common Info field indicates the number of HE-LTF symbols present in the NDP feedback report response minus 1 and is set to 1 for two 4x HE-LTF symbols. (#13540, 12380)

The GI and LTF Type subfield of the Common Info field is set to 2.

The Trigger Dependent Common Info subfield(#7323) is not present.

The User Info field for NDP Feedback Report Poll Trigger frame is defined in Figure 9-52n (User Info field for the NDP Feedback Report Poll variant) by renaming the fields of the User Info field defined in Figure 9-52g (User Info field). (#11542)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | Starting AID | Reserved | Feedback Type | Reserved | Target RSSI | Multiplexing Flag |
| Bits: | 12 | 9 | 4 | 7 | 7 | 1 |
|  |  |

The Feedback Type subfield encoding is defined in Table 9-25k (Feedback Type subfield encoding).

|  |
| --- |
| * Feedback Type subfield encoding
 |
| Value | Description |
| 0 | Resource request |
| 1-15 | Reserved |

The scheduled HE non-AP STAs are identified by a range of AIDs. The Starting AID field defines the first AID of the range of AIDs that are scheduled to respond to the NDP Feedback Report Poll Trigger frame.

The Target RSSI subfield indicates the target received signal power of the NDP feedback report response for all scheduled STAs. The resolution for the Target RSSI subfield is 1 dB. The Target RSSI subfield encoding is defined in Table 9-25i (Target RSSI subfield encoding).

The total number of STAs, *NSTA*, that are scheduled to respond to the NDP Feedback Report Poll Trigger frame is calculated using Equation (9-ax1).

* *NSTA* = 18  2*BW*  (*Multiplexing Flag +1*)(#7108)

where *BW* is the value indicated in the BW subfield of the NDP Feedback Report Poll Trigger frame, *Multiplexing Flag* is the value indicated in the Multiplexing Flag subfield of the NDP Feedback Report Poll Trigger frame.

The Multiplexing Flag subfield indicates the number of STAs, which are multiplexed with P-matrix codes on the same set of tones in the same RU, minus 1. (#14197, 13646)(#7108)

***11ax Editor: Modify 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 the HE TB PPDU. The feedbacks are not for channel sounding. (#13199)

(#6144)An HE AP sends an NDP Feedback Report Poll Trigger frame 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 an HE non-AP STA is an HE TB PPDU without data payloads, as defined in 28.3.17 (HE TB NDP feedback PPDU). (#14130) An HE non-AP STA uses the information carried in the NDP Feedback Report Poll Trigger frame(#8485) 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 NDP Feedback Report Poll Trigger frame(#8485) 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 NDP Feedback Report Poll Trigger frame(#8485).
* The STA is scheduled by the NDP Feedback Report Poll Trigger frame(#8485).
* 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 NDP Feedback Report Poll Trigger frame, as described in 27.5.6.4 (NDP feedback report types).

If a STA does not satisfy all of the above conditions, it shall not respond to the NDP Feedback Report Poll Trigger frame.(#7108)

A STA is scheduled to respond to the NDP Feedback Report Poll Trigger frame if its 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 NDP Feedback Report Poll Trigger frame. *NSTA* is calculated by the following equation, with BW subfield and Multiplexing Flag subfield from the eliciting Trigger frame:

*NSTA* = 18  2*BW*  (*Multiplexing Flag+1*) (#13547, #14198)(#7108)

1. 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 response 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:

* FORMAT shall be set to HE\_TRIG.
* APEP\_LENGTH 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 Target RSSI subfield 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 27.5.6.2.2 (Modulation of the assigned tones).

 (#12296)

* AP behavior

NDP Feedback Report Poll Trigger frame shall be transmitted either in a non-HT PPDU or in a VHT or HE PPDU in a Single MPDU. (#14270)

* Reception of NDP feedback report responses

Following the transmission from an AP of an NDP Feedback Report Poll Trigger frame, 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.(17/1307r1)

The AP shall not send any acknowledgement 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 NDP Feedback Report Poll Trigger frame with the type subfield set to "0" for "resource request".

If the Feedback Type subfield in the User Info field of the NDP Feedback Report Poll Trigger frame 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 non-zero buffer status to report, if shall not respond to the NDP Feedback Report Poll trigger frame. (#12063, #14132)

Each STA that is scheduled is assigned a STARTING\_STS\_NUM and an RU\_TONE\_SET\_INDEX to transmit a FEEDBACK\_STATUS bit.(#7108)

The meaning of the FEEDBACK\_STATUS bit is defined in Table 27-1 (FEEDBACK\_STATUS description):

|  |
| --- |
| * FEEDBACK\_STATUS description(#7108)
 |
| 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.

***11ax Editor: Add the following sentence at the end of the 2nd parapgraph of 27.5.3.2.2 Padding for trigger frame or frame containing UMRS Control field as follows:***

An AP transmitting an NDP Feedback Report Poll Trigger frame shall ensure that a *MinTrigProcTime* of at least 16 µs passes from the last User Info field not equal to 4095.