IEEE P802.11
Wireless LANs

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| CR on differentiating non-TB and TB sounding |
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Abstract

Proposed resolutions to 16673, 16674, 16675, 16676, 16678 and 16681

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# Comment

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 16673 | 306.04 | 27.6.3 | TB sounding sequence is adequately distinguished from non-TB sounding sequence using the RA field alone (individually addressed vs broadcast). Additionally using the number of STA Info fields to distinguish the sequences just complicates things. HE TB sounding can involve 1 or more STAs (NOT 2 or more). HE non-TB sounding only a one STA. | Remove "with a single STA Info field". (If necessary, add a separate requirement that an individually addressed HE NDP Announcement shall have a single STA Info field). | REVISEDTGax editor to make changes in <this doc>.Existing implementations use both methods for distinguishing between TB and non-TB sounding. It would be prudent to keep the definition as is. Changes fix the requirement on setting the AID in the STA info field to accommodate a mesh STA, AP or IBSS member recipient (these don’t have AIDs). |
| 16674 | 306.21 | 27.6.3 | TB sounding sequence is adequately distinguished from non-TB sounding sequence using the RA field alone (individually addressed vs broadcast). Additionally using the number of STA Info fields to distinguish the sequences just complicates things. HE TB sounding can involve 1 or more STAs (NOT 2 or more). HE non-TB sounding only a one STA. | Remove "with two or more STA Info fields" | REVISEDTGax editor to make the changes in <this doc>Existing implementations use both methods for distinguishing between TB and non-TB sounding. It would be prudent to keep the definition as is. The changes remove “as the initiat frame of the sequence” later in the paragraph since this is already in the definition. |
| 16675 | 307.01 | 27.6.3 | TB sounding sequence is adequately distinguished from non-TB sounding sequence using the RA field alone (individually addressed vs broadcast). Additionally using the number of STA Info fields to distinguish the sequences just complicates things. HE TB sounding can involve 1 or more STAs (NOT 2 or more). HE non-TB sounding only a one STA. | Change "except when the HE NDP Announcement frame contains only one STA Info field..." to "unless the HE NDP Announcement frame is individually addressed..." | REVISEDTGax editor to make the changes in <this doc>The changes reference “HE TB sounding” sequence and “HE non-TB sounding sequence” instead of number of STA Info fields. Also, the statements are made declarative since they apply meaning to what is being transmitted. There are normative statements elsewhere on recipient behavior. |
| 16676 | 307.10 | 27.6.3 | TB sounding sequence is adequately distinguished from non-TB sounding sequence using the RA field alone (individually addressed vs broadcast). Additionally using the number of STA Info fields to distinguish the sequences just complicates things. HE TB sounding can involve 1 or more STAs (NOT 2 or more). HE non-TB sounding only a one STA. | Change "An HE beamformer that transmits an HE NDP Announcement with more than one STA Info field..." to "An HE beamformer that transmits a broadcast HE NDP Announcement frame..." | REVISEDTGax editor to make the changes in <this doc>The first sentence is deleted; a shall statement for BFRP Trigger frame transmission in the sequence is unnecessary, the frame is present as part of the definition of the sequence.The second sentence is update to refer to the sequence rather than the number of STA Info fields in the NDP Announcement frame. The figure shows the sequence. |
| 16677 | 308.12 | 27.6.3 | TB sounding sequence is adequately distinguished from non-TB sounding sequence using the RA field alone (individually addressed vs broadcast). Additionally using the number of STA Info fields to distinguish the sequences just complicates things. HE TB sounding can involve 1 or more STAs (NOT 2 or more). HE non-TB sounding only a one STA. | Change "when the HE NDP Announcement frame has only on STA Info field" to "if the HE NDP Announcement frame is individually addressed" | REVISEDTGax editor to make the changes in <this doc>The paragraph is updated to reference the sequence rather than the number of STA Info fields in the HE NDP Announcement frame. |
| 16678 | 309.23 | 27.6.3 | TB sounding sequence is adequately distinguished from non-TB sounding sequence using the RA field alone (individually addressed vs broadcast). Additionally using the number of STA Info fields to distinguish the sequences just complicates things. HE TB sounding can involve 1 or more STAs (NOT 2 or more). HE non-TB sounding only a one STA. | Change "an HE NDP Announcement frame that has only one STA Info field" to "an individually addressed HE NDP Announcement frame" | REVISEDTGax editor to make the changes in <this doc>The changes split the paragraph into two (a beamformer requirement and a beamformee requirement). The changes make reference to the sounding sequence instead of the number of STA Info fields. |
| 16681 | 310.26 | 27.6.3 | TB sounding sequence is adequately distinguished from non-TB sounding sequence using the RA field alone (individually addressed vs broadcast). Additionally using the number of STA Info fields to distinguish the sequences just complicates things. HE TB sounding can involve 1 or more STAs (NOT 2 or more). HE non-TB sounding only a one STA. | Remove "that has more than one STA Info field" | REVISEDTGax editor to make the changes in <this doc>Changes remove reference to “more than one STA Info field” and correctly references the STA Info field rather than the HE NDP Announcement frame as the source of the parameters. The requirement is on the generation of the HE compressed beamforming/CQI report. The requirement for sending the report is in the second sentence. |

# Discussion

It seems that existing implementations take two different approaches to distinguishing between HE TB and HE non-TB sounding sequences. Some implementations look at the number of STA Info fields and some implementations look at the RA field. So it would be prudent to define the sequences as follows:

* broadcast HE NDP Announcement frame with two or more STA Info fields 🡪 HE TB sounding sequence
* individually addressed HE NDP Announcement frame with one STA Info field 🡪 HE non-TB sounding sequence

The changes below define how the sequences are distinguished and then uses the sequence name in further requirements rather than with references to RA and/or number of STA Info fields.

Some additional improvements are made to various statements.

# Editing instructions

**9.3.1.20 VHT/HE NDP Announcement frame format**

***Change the following paragraph in the baseline:***

The VHT/HE NDP Announcement frame contains at least one STA Info field. If the VHT/HE NDP Announcement frame contains only one STA Info field, then the RA field is set to the address of the STA that can provide feedback (see 10.34.5.2). If the VHT/HE NDP Announcement frame contains more than one STA Info field, then the RA field is set to the broadcast address.

***Change the last paragraph as follows:***

 If theIn a broadcast HE NDP Announcement frame that has more than one STA Info field, the Nc field indicates the number of columns Nc, in the Compressed Beamforming Feedback Matrix subfield minus 1. Set to 0 to request *Nc* = 1, set to 1 to request *Nc* = 2, ..., set to 7 to request *Nc* = 8. In an individually addressed HE NDP Announcement frame that has only one STA Info field the Nc field is reserved.

* HE sounding protocol
	+ 1. Rules for HE sounding protocol sequences

***Change the 1st paragraph as follows:***

An HE non-TB sounding sequence is a sounding sequence initiated by an HE beamformer with a burst of two frames comprising an individually addressed HE NDP Announcement frame with a single STA Info field followed after a SIFS(#15928) by an HE NDP. The HE beamformer that initiates the HE non-TB sounding sequence shall transmit the HE NDP Announcement frame with a single STA Info field and with the AID11 field in the STA Info field set to the AID of the STA identified by the RA field or to 0 if the STA identified by the RA field is a mesh STA, AP or IBSS member STA .(#16673)

***Change the 4th paragraph as follows:***

An HE TB sounding sequence is a sounding sequence initiated by an HE beamformer with a burst of three frames comprising a broadcast HE NDP Announcement frame with two or more STA Info fields followed after a SIFS(#15928) by an HE NDP followed after a SIFS(#15928) by a BFRP Trigger frame. The HE beamformer that initiates an HE TB sounding sequence shall transmit the HE NDP Announcement frame with two or more STA Info fields and the RA field set to the broadcast address.(#16674)***Change the 11th and 12th paragraph as follows:***

In an HE TB sounding sequence, each STA Info field in the HE NDP Announcement frame that solicits SU or MU feedback indicates the subcarrier grouping, *Ng*, codebook size and the number of columns, *Nc*, to be used by the HE beamformee addressed by the STA Info field for the generation of HE compressed beamforming/CQI report(#16328) carrying the SU or MU feedback. In an HE non-TB sounding sequence where the STA Info field in the HE NDP Announcement frame solicits SU feedback, the subcarrier grouping, *Ng*, codebook size and the number of columns, *Nc*, used for the generation of the HE compressed beamforming/CQI report(#16328) carrying the SU feedback are determined by the HE beamformee.(#16675)

 An HE beamformer that has initiated an HE TB sounding sequence may send another BFRP Trigger frame in the same TXOP as shown in Figure 27-7 (An example of the sounding protocol with more than one HE beamformee). The HE beamformer uses the additional BFRP Trigger frames to solicit HE compressed beamforming/CQI reports from HE beamformees not addressed in a previous BFRP Trigger frame or to solicit retransmission of an HE compressed beamforming/CQI report. An HE beamformer shall not transmit a BFRP Trigger frame that addresses a STA addressed in the HE NDP Announcement frame of an HE TB sounding sequence unless it is in the same TXOP as the HE TB sounding sequence.(#16676)

***Change the 3rd from last paragraph on P310 of D3.1 as follows:***

In an HE non-TB sounding sequence, an HE beamformer shall solicit full bandwidth feedback. In an HE TB sounding sequence, an HE beamformer shall solicit full bandwidth feedback in a STA Info field addressed to an HE beamformee that has not indicated support for partial bandwidth feedback. In an HE TB sounding sequence, an HE beamformer may solicit full bandwidth or partial bandwidth feedback in a STA Info field addressed to an HE beamformee that has indicated support for partial bandwidth feedback (see 27.6.2 (Sounding sequences and support)).(#16677)

***Change the last paragraph on P311 of D3.1 as follows:***

An HE beamformer soliciting SU feedback in an HE non-TB sounding sequence shall set the Feedback Type And Ng subfield in the HE NDP Annoucement frame to 0. . An HE beamformee that receives an HE NDP Announcement frame soliciting SU feedback as part of an HE non-TB sounding sequence shall generate an HE compressed beamforming/CQI report for SU feedback with *Nc* in the range 1 to 8, *Ng* = 4 or *Ng* = 16, and codebook size (ϕ, ψ) = {4, 2} or (ϕ, ψ) = {6, 4}. The HE beamformee shall transmit the HE compressed beamforming/CQI report a SIFS after the HE NDP.

An HE beamformee that receives an HE NDP Announcement frame soliciting CQI feedback shall generate an HE compressed beamforming/CQI report for CQI feedback with *Nc* indicated by the Nc subfield in the STA Info field.(#16678)

***Change the last paragraph on P312 of D3.1 as follows:***

An HE beamformee that receives an HE NDP Announcement frame as part of an HE TB sounding sequence with a STA Info field addressed it soliciting SU or MU feedback shall generate an HE compressed beamforming/CQI report(#16328) using the feedback type, *Ng* and codebook size indicated in the STA Info field. If the HE beamformee then receives a BFRP Trigger frame with a User Info field addressed to it, the HE beamformee transmits an HE TB PPDU containing(#17069) the HE compressed beamforming/CQI report(#16328) following the rules defined in 27.5.3.3 (STA behavior for UL MU operation). If the HE NDP Announcement frame has the TA field set to the transmitted BSSID, and the HE beamformee is a non-AP STA associated to a nontransmitted BSSID that supports receiving Control frames with TA set to the transmitted BSSID, then the HE compressed beamforming/CQI report(#16328) sent in response shall have the RA field set to either the nontransmitted BSSID or the transmitted BSSID.(#16681)