IEEE P802.11
Wireless LANs

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| Miscellaneous for HE sounding |
| Date: 2017-08-21 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs (56 CIDs):

* 3303, 3304, 3305, 3306, 5193, 5194, 5195, 5367, 5368, 5812,
* 6010, 6011, 6012, 6104, 6732, 6733, 7111, 7637, 7638, 7639
* 7640, 7641, 7818, 7819, 8222, 8503, 8504, 8588, 8709, 8710,
* 8711, 8712, 8713, 8716, 9224, 9225, 9300, 9301, 9302, 9304,
* 9305, 9536, 9720, 9923, 9924, 9925, 9926, 9927, 9928, 9929,
* 10151, 10152, 10153, 10156, 10160, 8066

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Incoporated suggestions received by Robert, clarified some aspects and updated segmentation part to D1.4 (changes in green, except for segmentation that changes are all new as built on top of existing text).
* Rev 2: Added note that BRP Trigger contains one or more User Info fields, and some editorials (blue).

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** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 3303 | Albert Petrick | 177.19 | Text in sentence references table "Table YY-1". Table doesn't exist in .11ax D1.0 or in IEEE 802.11-2016 | Fix reference and add table or delete sentence referencing table | Revised –Agree in principle. Table reference is fixed in the proposed resolution. TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 3303. |
| 3304 | Albert Petrick | 177.43 | Figure 27-3 Example of sounding protocol not correct. | Re-draw diagram. Fix sounding protocol diagram to illustrate alignment of SIFS timing as beamformee from beamformer. | Revised –Agree in principle. Proposed resolution fixes the figure and provides visio file to the Editor.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 3304. |
| 3305 | Albert Petrick | 178.06 | Figure 27-4 Example of sounding protocol not correct. | Re-draw diagram. Fix sounding protocol diagram to illustrate alignment of SIFS timing, identify the beamformee "1 thru n" and spell out the word "TRIG" in UL TRIG PPDU | Revised –Agree in principle. Proposed resolution fixes the figure and provides visio file to the Editor.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 3305. |
| 3306 | Albert Petrick | 178.07 | "CSI" in Figure 27-4 is not defined or referenced in text | Expand on the term "CSI" and describe this term in the text with relationship with HE beamformee. | Revised –Agree in principle. Proposed resolution fixes the figure and provides visio file to the Editor. In addition the correct name of the frame is used throughout this subclause, namely HE Compressed Beamforming Feedback And CQI frame.TGAX EDITOR: PLEASE ADD SIFS BETWEEN HE NDPA AND HE NDP IN FIGURE 27-7.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 3306. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 5193 | Dorothy Stanley | 176.64 | If we are going to substantially improve efficiency over 11ac, we need HE beamformee's to support sounding equal to 8. | Change "For an HE beamformee, the value of thiscapability field shall be greater than or equal to 4." to "For an HE beamformee, the value of thiscapability field shall be greater than or equal to 8." | Rejected –The HE beamformee is required to at least support 4 SS, however it can indicate to support more (up to 8). This is allowed by the capability signalling. Requiring the beamformee to support 8 SS adds to complexity that may not be desirable in all cases.  |
| 5194 | Dorothy Stanley | 177.45 | In figure 27-3 "CSI From HE STA". Have we added CSI feedback again? Or is this Compressed Beamforming Report?As this amendment will eventually be merged into 802.11 baseline, the CSI label in this figure may be confused with 11n CSI feedback. Perhaps change "CSI" to "Feedback" | as in comment | Revised –Agree in principle. Proposed resolution fixes the figure and provides visio file to the Editor. In addition the correct name of the frame is used throughout this subclause, namely HE Compressed Beamforming Feedback And CQI frame.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 5194. |
| 5195 | Dorothy Stanley | 178.07 | In figure 27-4 "CSI From HE STA". Have we added CSI feedback again? Or is this Compressed Beamforming Report, MU-Exclusive or CQI-only report?As this amendment will eventually be merged into 802.11 baseline, the CSI label in this figure may be confused with 11n CSI feedback. Perhaps change "CSI" to "Feedback" | as in comment | Revised –Agree in principle. Proposed resolution fixes the figure and provides visio file to the Editor. In addition the correct name of the frame is used throughout this subclause, namely HE Compressed Beamforming Feedback And CQI frame.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 5195. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 5367 | EVGENY KHOROV | 177.45 | CSI is not defined | Define CSI or correct Figure 27-3 | Revised –Agree in principle. Proposed resolution fixes the figure and provides visio file to the Editor. In addition, the correct name of the frame is used throughout this subclause, namely HE Compressed Beamforming Feedback And CQI frame.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 5367. |
| 5368 | EVGENY KHOROV | 178.08 | CSI is not defined | Define CSI or correct Figure 27-4 | Revised –Agree in principle. Proposed resolution fixes the figure and provides visio file to the Editor. In addition the correct name of the frame is used throughout this subclause, namely HE Compressed Beamforming Feedback And CQI frame.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 5368. |
| 5812 | Huizhao Wang | 177.19 | Table YY-1 is missing | Please add the missing table YY-1 | Revised –Agree in principle. Proposed resolution accounts for the suggested change. TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 5812. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 6010 | Jarkko Kneckt | 176.50 | The Operating Mode Notification frame and the Operating Mode Indication subfield control the value of the RX NSS parameter. i.e. a non-AP STA does not have two separate RX NSS parameters as described in the current text. The last received Operating Mode Notification frame or Operating Mode Indication subfield defines the value of the RX NSS parameter. | Combine the bullets in line 50 and 57 into a single bullet. There is only a single RX NSS value.The Operating Mode Notification frame or the Operating Mode Indication HE Variant of the HT Control field that is received most recently defines the value of the RX NSS field. | Revised –Agree in principle and proposed resolution incorporates the suggested change.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 6010. |
| 6011 | Jarkko Kneckt | 177.44 | The figure 27-3 colors are very interesting. Why there are red and blue box? What does green and yellow color indicate? Why some text is in red and other in black? | Please simplify the figure and unify its colors. Please provide legend for the colors. | Revised –Agree that the colors of Figure 27-3 are very interesting. Based on my interpretation the colors are introduced to express the artistic creativity of the author of the contribution. The proposed resolution is to adopt a figure that is more streamline IEEE format. TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 6011. |
| 6012 | Jarkko Kneckt | 178.05 | The figure 27-4 colors are interesting. Why HE is in red? There could be just one Trigger and response that is repeated 1 ... N times. Please consider changing the green color to no color. | Please simplify the figure and unify its color coding and provide legend for the colors. | Revised –Agree that the colors of Figure 27-3 are very interesting. Based on my interpretation the colors are introduced to express the artistic creativity of the author of the contribution. The proposed resolution is to adopt a figure that is more streamline IEEE format. TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 6012. |
| 6104 | Jian Yu | 176.01 | A mechnasim to allow an AP to obtain UL CSI and do UL schedulign is missing. | Add the details, will bring a proposal | Rejected –The comment fails to identify a technical issue and lacks in details of the proposal. UL scheduling is already possible via generation of Trigger frames, and obtaining CSI information is already possible via other existing features (BQR, link adaptation, etc). |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 6732 | John Coffey | 177.16 | Inconsistent use of defined term: here we have "STA info", whereas elsewhere we have "STA Info". If the same item is intended, the same term must be used. | Change "STA info" to "STA Info". | Revised –Agree in principle. Proposed resolution accounts for the suggested change.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 6732. |
| 6733 | John Coffey | 177.20 | Missing cross-reference: "Table YY-1". There appears to be no such table. | Add the table. | Revised –Agree with comment. Proposed resolution is to add the correct reference to the table.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 6733. |
| 7111 | Junichi Iwatani | 179.09 | "The size of the HE compressed beamforming feedback requested" is unclear. | Clarify | Revised –Agree in principle with the comment. Proposed resolution is to clarify that the size is that of the soliciting HE beamformee.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 7111. |
| 7637 | Liwen Chu | 176.26 | "otherwise it shall be set to the MAC address ofthe STA whose AID is included in the STA Info field"This is not true. Otherwise HE sounding can't be used in IBSS, MBSS. | modify it to allow HE sounding in IBSS, MBSS. | Revised –Agree in principle with the comment. Proposed resolution modifies the statement to generalize it for allowing the cases mentioned by the commenter (using same terminology used in 11ac).TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 7637. |
| 7638 | Liwen Chu | 177.19 | Replace YY-1 with realreference. | As in comment | Revised –Agree and replaced.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 7638. |
| 7639 | Liwen Chu | 177.30 | CCFS 2 is not in VHT Operation Information field which needs to be used to decide maxmum 26-tone RU. Include CCFS 2. | As in comment | Revised – Agree in principle with the comment. CCFS2 is provided in transmitted HE Operation elements. Proposed resolution adds this clarification.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 7639. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 7640 | Liwen Chu | 178.22 | Change "shall compute the HE compressed beamformingfeedback after receiving the HE NDP" to "shall compute the HE compressed beamformingfeedback per NDPA's requirement (Feedback Type + Ng + codebook size) after receiving the HE NDP" | As in comment | Revised –Agree in principle. Proposed resolution is inline with the suggested change.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 7640. |
| 7641 | Liwen Chu | 176.01 | Sounding feedback segmentation rules are missing from the draft. Add them. | As in comment | Revised –Agree in principle with the comment. All these cases were discussed and covered by comment resolution of CID 1222 in motioned document 11-16-0773r3 that missed inclusion to the TGax draft (maybe D1.0?). The proposed resolution is to add that approved text in the current draft.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 7641. |
| 7818 | Mark Hamilton | 176.27 | AID in HE NDP Announcement is only the lower 11 bits of the AID | Change "the STA whose AID is" to "the STA whose least significant 11 bits of AID are" | Revised –Agree in principle with the comment. Proposed resolution is inline with that of other CIDs in this paragraph, which remove the citing of the AID in this paragraph and add another paragraph that state that the AID11 is set to the 11LSBs of the AID of the STA for which the STA Info field is addressed to, inline with the proposed change. TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 7818. |
| 7819 | Mark Hamilton | 177.55 | AID in HE NDP Announcement is only the lower 11 bits of the AID | Change "the HE beamformee's AID" to "the least significant 11 bits of the HE beamformee's AID". Same thing at P178L21, P178L25. | Revised –Agree in principle with the comment. Proposed resolution clarifies these aspects as appropriate.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 7819. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 8222 | Osama Aboulmagd | 177.44 | Figure 27-3 and 27-4 need to be updated. | as in comment | Revised –Agree in principle. Proposed resolution accounts for the suggested change.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8222. |
| 8503 | Robert Stacey | 179.04 | "... shall be transmitted in a single PPDU..." It may be impossible for the beamformee to meet this requirement if the report is sent in an HE trigger-based PPDU and the beamformer has not allocated sufficient resources. | Define beamformee behavior for all cases. If the beamformer allocates sufficient resources, the beamformee should return the complete beamfroming report in the HE trigger-based PPDU even if it has to segment to meet the 11454B MPDU length limit. If the beamformer has not allocated sufficient resources, the beamformee may send partial report or null (some beamformee implementations may not want to dynamically segment to meet allocaiton constraints). | Revised –Agree in principle with the comment. All these cases were discussed and covered by comment resolution of CID 1222 in motioned document 11-16-0773r3 that missed inclusion to the TGax draft (maybe D1.0?). The proposed resolution is to add that approved text in the current draft.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8503. |
| 8504 | Robert Stacey | 179.01 | Despite the sublcause title, there are no rules for segmenting (or fragmenting) an HE Compressed Beamforming report. | Define rules for fragmenting an HE Compressed Beamforming report along the lines of those defined for a VHT Compressed Beamforming report (10.34.5.3 of 802.11-2016) with one change: to help the beamformer implementation, require that the Compressed Beamforming Feedback Matrix V fields not be split: pad to octet boundary and then start again in next segment. | Revised –Agree in principle with the comment. All these cases were discussed and covered by comment resolution of CID 1222 in motioned document 11-16-0773r3 that missed inclusion to the TGax draft (maybe D1.0?). The proposed resolution is to add that approved text in the current draft.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8504. |
| 8588 | Sameer Vermani | 178.32 | "The HE Compressed Beamforming feedback is comprised of the HE Compressed Beamforming Reportinformation and the MU Exclusive Beamforming Report information." seems out of place | Delete the cocerned line. This belongs to another section. | Revised –Agree with comment. There are no words to state the obviousness of that statement. This information can be found in 9.6.28.2 and related subclauses (see HE MIMO Control field as well). TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8588. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 8709 | Sigurd Schelstraete | 176.60 | "the maximum number of space-time streams it can receive in an HE NDP"and "the total number of space-time streams (summed across all users) it can receive" are indicated by two different parameters in HE Capabilities, neither of which is called "Beamformee STS Capability". Reference should be made to "Beamformee STS" and "NSTS Total" fields respectively. Also note that these fields may have different values for BW<=80 and BW>80. | Replace reference to "Beamformee STS Capability field" with references to "Beamformee STS" and "NSTS Total" fields | Revised –Agree in principle. The correct capability fields are as indicated less than or eq 80 Mhz and more than 80 MHz. Proposed resolution is to fix this inconsistency. TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8709. |
| 8710 | Sigurd Schelstraete | 177.01 | "shall set the Ng field value in the STA Info field of the HE NDP Announcement frame to either 0 (for Ng = 4) or 1 (for Ng = 16).". There are no other possible values than 0 and 1, so this requirement is superfluous. There are a limited number of possible combinations of codebook and Ng however (see Table 9-25a). | Change statement to informative or delete the sentence. | Revised –Agree in principle that these two are the only two combinations. In order to avoid redundancy, the proposed resolution is to refer to the table, while keeping the normative behaviour as is.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8710. |
| 8711 | Sigurd Schelstraete | 177.19 | Wrong reference: Table YY-1 | Correct reference | Revised –Corrected reference.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8711. |
| 8712 | Sigurd Schelstraete | 177.35 | "An HE beamformer that transmits an HE NDP Announcement frame that has only one STA Info field shall set the Nc Index field to 0 and the Ng field to 0."Nc=0 and Ng=0 are still valid values, so setting them to zero does not explicitly indicate that the STA has to select the values, instead of the AP. | Add a requirement that the beamformee shall ignore the values of Nc and Ng when the HE NDP Announcement frame only has one STA Info field. | Revised –Agree in principle. Proposed resolution clarifies this aspect. TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8712. |
| 8713 | Sigurd Schelstraete | 178.44 | "Supporting MU-type feedback over full BW is mandatory for HE beamformees participating in HE sounding protocol with more than one beamformee.". STA's don't have a choice in who participates in the sounding. Does this refer to STAs declaring a specific capability? If so, clarify. | See comment. Similar comment for line 54. | Revised –Agree in principle. Proopsed resolution is to clarify the capability bits involved in these setups and remove the declarative statements.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8713. |
| 8716 | Sigurd Schelstraete | 179.05 | "The HE beamformer shall support maximum MPDU length for HECompressed beamforming feedback of size which is the minimum of:" How can the HE beamformer know which MPDU length it has to support based on this requirement? What is the minimum of 11 454 and an unknown number? | Clarify | Revised –Proposed resolution adds some more clarifications regarding this aspect. The HE beamformer can estimate the size of the he compressed beamforming report as it is the he beamformer that specifies the parameters for the channel estimation that directly impacts the size of such report sizes.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 8716. |
| 9224 | Tomoko Adachi | 3.05 | The definition of HE beamformee should be included. | Add a definition of HE beamformee in clause 3.2. | Revised –Agree and added.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9224. |
| 9225 | Tomoko Adachi | 3.05 | The definition of HE beamformer should be included. | Add a definition of HE beamformer in clause 3.2. | Revised –Agree and added.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9225. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 9300 | Tomoko Adachi | 176.25 | Make the description of AID11 subfield in the HE NDP Announcement frame more accurate. | Change the sentence "If the HE NDP Announcement frame includes more than one STA Info field, the RA field of the HE NDP Announcement frame shall be set to the broadcast address, otherwise it shall be set to the MAC address of the STA whose AID is included in the STA Info field." to "If the HE NDP Announcement frame includes more than one STA Info field, the RA field of the HE NDP Announcement frame shall be set to the broadcast address, otherwise it shall be set to the MAC address of the STA whose 11 least significant bits of the AID is included in the AID11 subfield of the STA Info field. If the intended STA is other than an AP, mesh STA, or STA that is a member of an IBSS, the AID11 subfield shall be set to a valid AID value not equal to 0 regardless of the RA field being set to a unicast address." | Revised –Agree in principle with the comment. Proposed resolution accounts for the suggested change, while accounting also for those suggested by other CIDs in the same paragraph.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9300. |
| 9301 | Tomoko Adachi | 176.48 | There is no subfield named Rx HE-MCS Map. It should be the Rx MCS NSS Descriptors subfield. | Change "Rx HE-MCS Map subfield" to "Rx MCS NSS Descriptors subfield" in page 176 line 48,in page 203 line 14, in page 205 line 10, and in page 205 line 12. | Revised –Agree in principle that the subfield naming is still not correct. Proposed resolution is to fix the naming according o the latest Draft 1.4.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9301. |
| 9302 | Tomoko Adachi | 176.48 | There is no field named supported HE-MCS and NSS set. It should be the Tx Rx HE MCS NSS Support field. | Change "supported HE-MCS and NSS set field" to "Tx Rx HE MCS NSS Support field" in page 176 line 48.Change "Supported HE-MCS and NSS set field" to "Tx Rx HE MCS NSS Support field" in page 179 line 34, in page 202 line 29, in page 202 line 30, in page 203, line 8, in page 203 line 35, in page 204 line 38, in page 205 line 10, in page 373 line 5, and in page 373 line 6. | Revised –Agree in principle that the subfield naming is still not correct. Proposed resolution is to fix the naming according o the latest Draft 1.4.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9302. |
| 9304 | Tomoko Adachi | 176.56 | There is no subfield named Received Operating Mode Indication. This should be the HE variant HT Control field when Control ID subfield is 1. | Change "... that carried a Received Operating Mode Indication subfield ..." to "... that carried the HE variant HT Control field with Control ID subfield set to 1 ...". | Revised –Agree in principle. Proposed resolution fixes this inconsistency.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9304. |
| 9305 | Tomoko Adachi | 176.62 | There is no field named Beamformee STS Capability. The target subfields should be the Beamformee STS For <= 80 MHz, Beamformee STS For > 80 MHz, NSTS Total For <= 80 MHz, and NSTS Total For > 80 MHz in the HE PHY Capabilities Information field. | Change "... through the Beamformee STS Capability field." to "... through the HE PHY Capabilities Information field." in page 176 line 62. | Revised –Agree in principle and incorporated the proposed change while keeping editorial freedom when doing so.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9305. |
| 9536 | Yasuhiko Inoue | 177.19 | "..., for 80 MHz full bandwidth feedback the RU Start Index and RU End Index is set to 0 and 36, respectively as shown in Table YY-1."The table number should be specified. | As in the comment. | Revised –Agree with comment. Proposed resolution fixes the table number.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9536. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 9720 | Yongho Seok | 179.03 | Rules for segmented feedback in HE sounding protocol sequences is not defined.Define the following sequnce:HE NDPA | HE NDP | HE Compressed Beamforming And CQI frame (segmented) | Beamforming Report Poll frame | HE Compressed Beamforming And CQI frame (segmented) | As per comment. | Revised –Agree in principle with the comment. All these cases were discussed and covered by comment resolution of CID 1222 in motioned document 11-16-0773r3 that missed inclusion to the TGax draft (maybe D1.0?). The proposed resolution is to add that approved text in the current draft.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9720. |
| 9923 | Young Hoon Kwon | 176.17 | Does this mean that an HE STA is not allowed to initiate VHT sounding sequnce? Further clarification is needed. | Modify the text to "The HE beamformer shall initiate an HE sounding sequence by transmitting an HE NDP Announcement frame followed by an HE NDP after a SIFS.". | Revised –Agree in principle. Proposed resolution clarifies this aspect.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9923. |
| 9924 | Young Hoon Kwon | 176.30 | If the NDPA frame has only one STA Info field, Ng, codebook, and Nc subfield in NDPA frame shall be reserved. | Insert the following text at the end of 9,3,1,20: "If the HE NDP Announcement frame contains only one STA Info field, Feedback Type and Ng subfield and Nc subfield are reserved.". | Revised –Agree in principle. Proposed resolution is to clarify that these field’s values are ignored.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9924. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
|  | Young Hoon Kwon | 177.01 | There's no separate Ng field. And, current Feedback Type and Ng subfield includes available Ng values for MU type feedback to be 4 and 16 only. Therefore, this sentence does not have any meaning. | Delete the text "An HE beamformer that sets the Feedback Type subfield of the STA Info field to MU shall set the Ng field value in the STA Info field of the HE NDP Announcement frame to either 0 (for Ng = 4) or 1 (for Ng = 16).". | Revised –Agree in prindiple with the comment. Proposed resolution is to keep the sentence and explicitly state the setting of the fields (named correctly) so that there is no ambiguity as suggested by other CIDs in the same paragraph.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9925. |
| 9926 | Young Hoon Kwon | 177.26 | Channel width information in Operation Mode Notification frame also needs to be considered for both starting RU index and ending RU index, similar to second bullet in P176L50. | As in the comment. | Revised –Agree in principle. Incorporated the proposed change in the proposed resolution.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9926. |
| 9927 | Young Hoon Kwon | 177.35 | There's no separate Ng field. Also, as shown in Table 9-25a, Feedback Type and Ng subfield and Codebook Size subfield are jointly encoded. Therefore, it's better to say that these two subfields are reserved in an HE NDPA frame has only one STA Info field. | As in the comment. | Revised –Agree in principle and accounted for the suggested change. TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9927. |
| 9928 | Young Hoon Kwon | 178.12 | In Figure 27-4, the brace on the bottom (saying "0..N times") shall include SIFS in front of the Trigger. | Modify the figure as in the comment | Revised –Agree with the comment. Incorporated suggestion while drawing the new figure.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9928. |
| 9929 | Young Hoon Kwon | 178.32 | Also, CQI-only feedback needs to be added. | As in the comment. | Revised –The sentence is redundant as pointed out by CID 8588, as such it is removed.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 9929. |
| 10151 | yujin noh | 176.46 | no "Feedback Type subfield" defined in the STA Info subfield of the HE NDP Announcement frame. It should be replaced with "Feedback Type And Ng subfield" which indicates the feedback type and Ng jointly. | As in the comment. | Revised –Agree in principle and accounted for the suggested change.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 10151. |
| 10152 | yujin noh | 176.62 | no "Beamformee STS Capability field" defined in Table 9-262aa HE PHY Capabilities Information field. Refer to "Beamformee STS For <= 80 MHz", "NSTS Total For <= 80 MHz", "Beamformee STS For > 80 MHz" and "NSTS Total For > 80 MHz" in Table 9-262aa | As in the comment. | Revised –Agree in principle and accounted for the suggested change.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 10152. |
| 10153 | yujin noh | 177.01 | no "Feedback Type subfield" and "Ng field" defined in the STA Info subfield of the HE NDP Announcement frame. It should be replaced with "Feedback Type And Ng subfield" which indicates the feedback type and Ng jointly. | As in the comment. | Revised –Agree in principle and accounted for the suggested change.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 10153. |

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| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 10156 | yujin noh | 177.36 | "Nc Index field" should be replaced with "Nc subfield" as described in Figure 9-51b. clarify the text "set the Nc Index field to 0 and the Ng field to 0." There is no Ng field in the NDP Announcement frame. | As in the comment. | Revised –Agree in principle. Proposed resolution is to clarify that the field is called Feedback Type and Ng field, and that the setting is referred to B26 of the STA Info field.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 10156. |
| 10160 | yujin noh | 178.25 | "Beamforming Report Poll variant Trigger frame" and "Beamforming Report Poll Trigger frame" are mixed in use. In order to be consistent, choose one and mofigy the rest. | As in the comment. | Revised—Agree in principle. Proposed resolution is to define the acronym and use it throughout the draft.TGax editor to make the changes shown in 11-17/1262r2 under all headings that include CID 10160. |
| 8066 | Massinissa Lalam | 179.28 | In "-- SPATIAL\_REUSE set to SR disallowed", what is "SR disallowed"? Please define it or rephrase if based on Table Table 28-19, e.g. "-- SPATIAL\_REUSE set to 0 (SR disallow)". | As in comment. | Revised –Agree in principle with the comment. This issue has been solved in D1.4.Note to Editor: No further changes are required for this instruction as these changes are already incorporated in D1.4.TGax editor to make the changes shown in TGax D1.4 in 27.6.4. |

**Discussion: *None.***

# 3.2 Definitions specific to IEEE Std 802.11

**TGax Editor: *Insert the following definitions (#CID 9224, 9225):***

**high efficiency (HE) beamformee:** An HE station (STA) that receives a HE physical layer (PHY) protocol data unit (PPDU) that was transmitted using a beamforming steering matrix.

**high efficiency (HE) beamformer:** An HE station (STA) that transmits a HE physical layer (PHY) protocol data unit (PPDU) using a beamforming steering matrix. *(#9224, 9225)*

# 3.4 Abbreviations and acronyms

**TGax Editor: *Insert the following acronym (#CID 10160):***

BRP Beamforming report poll

**TGax Editor: *Replace “Beamforming Report Poll variant Trigger ” and “Beamforming Report Poll Trigger” with “BRP Trigger” throughout the draft, starting from 9.3.1.23.3 (#CID 10160).***

# 27.6 HE sounding protocol

# 27.6.1 General

Transmit beamforming and DL MU-MIMO require knowledge of the channel state to compute a steering matrix that is applied to the transmit signal to optimize reception at one or more receivers. HE STAs use the HE sounding protocol to determine the channel state information. As with the VHT sounding protocol, the HE sounding protocol uses explicit feedback mechanism where the HE beamformee measures the channel using a training signal transmitted by the HE beamformer and sends back a transformed estimate of the channel state. The HE beamformer uses this estimate to derive the steering matrix.

The HE beamformee returns an estimate of the channel state in an HE compressed beamforming feedback. The HE compressed beamforming feedback is an HE Compressed Beamforming Report field for SU-type feedback, the concatenation of an HE Compressed Beamforming Report field and HE MU Exclusive Beamforming Report field for MU-type feedback, and a CQI-only Report field for CQI-type feedback. The HE compressed beamforming feedback is carried in a single HE Compressed Beamforming And CQI Report frame if the resulting frame is less than or equal to 11 454 octets in length. Otherwise, the HE beamforming feedback is segmented and each segment is carried in an HE Compressed Beamforming And CQI Report frame. For CQI-type feedback the HE compressed beamforming feedback is never segmented since the resulting MPDU size will always be less than 11 454 octets.

**TGax Editor: *Insert the paragraphs below as follows (#CID 8713, 8709, 9305, 10152, 9925):***

**27.6.1a Sounding sequences and support**

An HE STA indicates its role in a sounding sequence, the support of HE sounding sequences, and the supported type of sounding feedback by setting the subfields of the HE Capabilities element it transmits as follows:

* If a STA supports being an *SU beamformer* then it shall set the SU Beamformer subfield to 1; otherwise, set to 0. A non-AP STA may set the SU Beamformer subfield to 1. An AP that sets the MU Beamformer subfield to 1 shall set the SU Beamformer subfield to 1.
* If a STA supports being an *MU beamformer* then it shall set the MU Beamformer subfield to 1; otherwise, set to 0. A non-AP STA shall set the MU Beamformer subfield to 0. An AP shall set the MU Beamformer subfield to 1 if it supports transmitting 4 or more spatial streams.
* If a STA supports being an *SU beamformee* then it shall set the SU Beamformee subfield to 1; otherwise, set to 0. A non-AP STA shall set the SU Beamformee subfield to 1. An AP may set the SU Beamformee subfield to 1.
* A non-AP STA shall support being an *MU beamformee*. An AP does not support being an *MU beamformee*.
* An HE STA that is an *SU beamformer* or an *MU beamformer* is referred to as an *HE beamformer* and a STA that is an *SU beamformee* or an *MU beamformee* is referred to as an *HE beamformee*.
* If a STA is an *HE beamformee* then it shall set the Beamformee STS *cw* subfield, for *cw* = [<= 80 MHz, > 80 MHz], to the maximum number of space-time streams, *NSTS,max*, minus one supported when receiving an HE NDP in channel widths <= 80 MHz and > 80 MHz, respectively; otherwise, set to 0. An *HE beamformee* shall support an *NSTS, max* of at least 4 for <= 80 MHz, and an *NSTS,max* at least 4 for > 80 MHz when indicating channel widths > 80 MHz in the Channel Width Set subfield.*(#8709, 9305, 10152, 9925)*
* If a STA is an *HE beamformer* then it shall set the Number Of Sounding Dimensions *cw* subfield, for *cw* = [<= 80 MHz, > 80 MHz], to the maximum number of space-time streams, *NUM\_STSmax*, minus one supported for the TXVECTOR parameter NUM\_STS of an HE NDP sent in channel widths <= 80 MHz and > 80 MHz, respectively; otherwise, set to 0.
* If a STA is an *HE beamformee* then it shall set the Ng = 16 *m* Feedback subfield, for *m* = [SU, MU], to 1 if it supports including in the HE Compressed Beamforming Report field a SU feedback for a tone grouping of 16 and a MU feedback for a tone grouping of 16, respectively; otherwise, set to 0.
* If a STA is an *HE beamformee* then it shall set the Codebook Size (ϕ, ψ) = *cm* Feedback subfield, for c*m* = [{4, 2} SU, {7, 5} MU], to 1 if it supports including in the HE Compressed Beamforming Report field a SU feedback of codebook size (ϕ, ψ) = {4, 2} and a MU feedback of codebook size (ϕ, ψ) = {7, 5}, respectively; otherwise, set to 0.
* If an AP is an *HE beamformer* then it shall set the Triggered MU Beamforming Feedback subfield to 1 if it supports receiving in the HE Compressed Beamforming Report field a partial bandwidth MU feedback; otherwise, set to 0.
* If a non-AP STA is an *HE beamformee* then it shall set the Triggered MU Beamforming Feedback subfield to 1 if it supports including in the HE Compressed Beamforming Report field a partial bandwidth MU feedback; otherwise, set to 0.
* If an AP is an *HE beamformer* then it shall set the Triggered *m* Beamforming Feedback subfield, for *m* = [SU, CQI], to 1 if it supports receiving in the HE Compressed Beamforming Report field SU and CQI feedback, respectively, where the feedback is full and partial bandwidth; otherwise, set to 0.
* If a non-AP STA is an *HE beamformee* then it shall set the Triggered *m* Beamforming Feedback subfield, for *m* = [SU, CQI], to 1 if it supports including in the HE Compressed Beamforming Report field SU and CQI feedback, respectively, where the feedback is full and partial bandwidth; otherwise, set to 0. *(#8713)*

# Rules for HE sounding protocol sequences

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 8713):***

An *HE beamformer* initiates an HE non-trigger-based (non-TB) sounding sequence by sending an individually addressed NDP Announcement frame that contains one STA Info field that is addressed to an *HE beamformee*.

An *HE beamformer* may initiate an HE non-TB sounding sequence with an *HE beamformee* to solicit SU feedback over full bandwidth (BW).

An *HE beamformer* may initiate an HE non-TB sounding sequence with an *HE beamformee* to solicit a feedback variant over full BW only if the feedback variant is computed based on parameters supported by the *HE beamformee*; otherwise the *HE beamformer* shall not solicit a feedback variant over full BW computed based on parameters not supported by the *HE beamformee* (see 27.6.1a (Sounding sequences and support)).

An *HE beamformer* shall not initiate an HE non-TB sounding sequence to solicit any feedback variant over partial BW from an *HE beamformee*.

An *HE beamformer* initiates an HE trigger-based (TB) sounding sequence by sending a broadcast NDP Announcement frame that contains two or more STA Info fields, where each STA Info field is addressed to an *HE beamformee*.

An *HE beamformer* may initiate an HE TB sounding sequence to solicit MU feedback over full BW from an *HE beamformee*

An *HE beamformer* may initiate an HE TB sounding sequence to solicit a feedback variant only if the feedback variant is computed based on parameters supported by the *HE beamformee*; otherwise the *HE beamformer* shall not solicit a feedback variant computed based on parameters not supported by the *HE beamformee* (see 27.6.1a (Sounding sequences and support)).

 *(#8713)***TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 9923):***

The HE beamformer shall initiate an HE sounding sequence by transmitting an HE NDP Announcement frame followed by an HE NDP frame after a SIFS. The HE sounding sequence is a non-TB sounding sequence if the HE NDP Announcement frame is an individually addressed frame; otherwise it is a TB sounding sequence.*(#9923)*

An HE AP shall not send an HE NDP Announcement frame with STA Info fields that are 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.*(#Ed)*

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

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 7637, 7818, 9300):***

An AP that transmits an HE NDP Announcement frame shall set the RA field of the frame to the broadcast address when the frame includes more than one STA Info field, otherwise the AP shall set the RA field to the MAC address of the HE beamformee.

An HE beamformer that transmits an HE NDP Announcement frame to an HE beamformee that is an AP, mesh STA or STA that is a member of an IBSS, shall include one STA Info field in the HE NDP Announcement frame and shall set the AID11 field in the STA Info field of the frame to 0. An HE beamformer that transmits an HE NDP Announcement frame to one or more HE non-AP STA beamformee shall set the AID11 field in each STA Info field to the 11 LSBs of the AID of the non-AP STA to which the STA Info field is addressed to. An HE NDP Announcement frame shall not include more than one STA Info fields that have the same value in the AID11 subfield. *(#7637, 7818, 9300)*

The HE NDP Announcement frame shall indicate the *Ng*, codebook and *Nc* to be used by each receiver STA for the generation of the HE compressed beamforming feedback except when the HE NDP Announcement frame contains only one STA Info field in which case the *Ng*, codebook and *Nc* to be used for the generation of the HE compressed beamforming feedback shall be determined by the recipient of the HE NDP Announcement frame.

An HE beamformer that transmits an HE NDP Announcement frame with more than one STA Info field shall transmit a BRP Trigger frame a SIFS after the HE NDP to solicit HE compressed beamforming feedback from the intended HE beamformees in the same TXOP. The HE beamformer may send additional BRP Trigger frames to solicit a subset of the HE compressed beamforming feedback in the same TXOP as shown in Figure 27.7.

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 6010, 9301, 9302, 9304, 10151):***

An HE beamformer that transmits an HE NDP Announcement frame and sets the Feedback Type And Ng subfield of a STA Info field to indicate MU*(#10151)* shall set the Nc field of the STA Info field to a value less than or equal to the minimum of:

* The maximum number of supported spatial streams according to the corresponding HE beamformee's Rx HE-MCS Map For *b* subfield, *b* in {<=80 MHz, 160 MHz, 80+80 MHz} in the Supported HE-MCS And NSS Set field of the HE Capabilities element sent by the HE beamformee *(#9301, 9302)*
* The maximum number of supported spatial streams according to the Rx NSS subfield value in the most recently received Operating Mode Notification frame, Operating Mode Notification element with the Rx NSS Type subfield equal to 0, or OM Control field sent by the corresponding HE beamformee (see 27.8 (Operating mode indication) *(#9304)*
* *(#6010)*
* The maximum Nc indicated by the Max Nc subfield in the HE PHY Capabilities Information field of the HE Capabilities element sent by the HE beamformee.(#8676, #Ed)

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 8709, 8710, 9305, 10152, 10153, 9925):***

The HE beamformee indicates the maximum number of space-time streams it can receive in an HE NDP, *NSTS,max*, as defined in 27.6.1a . *(#8709, 9305, 10152, 9925)*

An HE beamformer that transmits an HE NDP Announcement frame and sets the Feedback Type And Ng subfield of a STA Info field to indicate MU shall indicate either *Ng* = 4 or *Ng* = 16 in the Feedback Type And Ng subfield of the STA Info field (see Table 9-25a) *(#10153, 9925, 8710)*.

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 3303, 5812, 6732, 6733, 7638, 8711, 9536, 8713):***

An HE beamformer that transmits an HE NDP Announcement frame shall set the RU Start Index and RU End Index in a STA Info field to indicate the starting 26-tone RU and the ending 26-tone RU, respectively, of the solicited HE compressed beamforming feedback (see 9.3.1.20 VHT/HE NDP Announcement frame format). The HE beamformer shall indicate a starting 26-tone RU and an ending 26-tone RU that is equal to the lowest 26-tone RU and the highest 26-tone RU, respectively, to indicate that the feedback is solicited over full bandwidth. The HE beamformer may indicate a starting 26-tone RU and an ending 26-tone RU that is greater than the lowest 26-tone RU and less than the highest 26-tone RU, respectively, to indicate that the feedback is solicited over partial bandwidth.. Each 26-tone RU location is based on the RXVECTOR parameter CH\_BANDWIDTH of the HE NDP Announcement when received in an HE PPDU or the RXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT when the HE NDP Announcement is received in a non-HT PPDU. The HE beamformer shall solicit feedback over full bandwidth when the HE NDP Announcement frame has only one STA Info field or when the STA Info field is addressed to an HE beamformee that has indicated no support for partial bandwidth feedback. The HE beamformer may solicit feedback over full bandwidth or partial bandwidth when the STA Info field is addressed to an HE beamformee that has indicated support for partial bandwidth feedback (see 27.6.1a). For example, the HE beamformer can request full 80 MHz bandwidth feedback for *Ng* = 4 by setting the RU Start Index and RU End Index field in the STA Info field to 0 and 36, respectively, as shown in Table 28-5 (Subcarrier indices for RUs in an 80 MHz HE PPDU).*(#3303, 5812, 6733, 7638, 8711, 9536, 6732, 8713)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 7639, 9926):***

The HE beamformer shall use a lowest 26-tone RU, which is the lower bound of the starting 26-tone in the RU Start Index subfield of a STA Info field , that is equal to the maximum of:

* The minimum 26-tone RU located within the channel width in the VHT Operation Information field of the HE Operation element or VHT Operation element (if present), and within the channel width in the HT Operation element *(#7639)*
* The minimum 26-tone RU located within the channel width in the most recently received Operating Mode Notification frame, Operating Mode Notification element with the Rx NSS Type subfield equal to 0, or OMI Control field sent by the corresponding HE beamformee (see 27.8 (Operating mode indication)) *(#9926)*

The HE beamformer shall use a highest 26-tone RU, which is the upper bound of the ending 26-tone RU in the RU End Index subfield of a STA Info field, that is equal to the minimum of:

* The maximum 26-tone RU located within the channel width in the VHT Operation Information field of the HE Operation element or VHT Operation element (if present), and within the channel width in the HT Operation element *(#7639)*
* The maximum 26-tone RU located within the channel width in the most recently received Operating Mode Notification frame, Operating Mode Notification element with the Rx NSS Type subfield equal to 0, or OMI Control field sent by the corresponding HE beamformee (see 27.8 (Operating mode indication) *(#9926)*

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 8712, 10156, 9924, 9927):***

An HE beamformer that transmits an HE NDP Announcement frame that has only one STA Info field shall set the Nc field to 0 and the Feedback Type And Ng field to 0. The HE beamformee that is the intended receiver of an HE NDP Announcement frame that has only one STA Info field shall ignore the values of the Nc subfield, Ng subfield (B26 of the STA Info subfield) and Codebook Size subfield.*(#8712, 10156, 9924, 9927)*

An example of the HE non-TB sounding protocol with a single HE beamformee is shown in Figure 27-6 (An example of the sounding protocol with a single HE beamformee).

**TGax Editor: *Change the figure below of this subclause as follows (#CID 3304, 3306 5194, 5195, 5367, 5368, 6011, 8222):***

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|  |
| * An example of the HE non-TB sounding protocol with a single HE beamformee *(#3304, 3306, 5194, 5195, 5367, 5368, 6011, 8222)*
 |

**TGax Editor: *Change the paragraphs below of this subclause as follows (#CID 7819):***

An HE beamformee that receives an HE NDP Announcement frame from an HE beamformer that contains the HE beamformee's MAC address in the RA field *(#7819)* and also receives an HE NDP a SIFS after the HE NDP Announcement frame shall transmit the PPDU containing its HE compressed beamforming feedback a SIFS after the HE NDP. The TXVECTOR parameter CH\_BANDWIDTH for the PPDU containing the HE compressed beamforming feedback shall be set to indicate a bandwidth not wider than that indicated by the RXVECTOR parameter CH\_BANDWIDTH of the HE NDP. *(#Ed)*

An example of HE TB sounding protocol with more than one HE beamformee is shown in Figure 27-7 (An example of the sounding protocol with more than one HE beamformee).

**TGax Editor: *Change the figure below of this subclause as follows (#CID 3305, 3306, 5194, 5195, 5367, 5368, 6012, 8222, 9928) AND ADD “SIFS” BETWEEN HE NDPA AND HE NDP:***

|  |
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| * An example of the HE TB sounding protocol with more than one HE beamformee *(#3305, 3306, 5194, 5195, 5367, 5368, 6012, 8222, 9928)*
 |

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 7640, 7819):***

A non-AP HE beamformee that receives a broadcast HE NDP Announcement frame from the HE beamformer with which it is associated and that contains the HE beamformee's 11 LSBs of the AID in any of the STA Info fieldsand also receives an HE NDP frame a SIFS after the HE NDP Announcement frame shall compute the HE compressed beamforming feedback using the Feedback Type, Ng and Codebook Size indicated in the received HE NDP Announcement frame*(#7640)*. The HE beamformee shall transmit the HE TB PPDU containing its HE compressed beamforming feedback in response to a BRP Trigger frame(#8485) that contains the 11 LSBs of the AID of the HE beamformee in any of the User Info fields following the rules defined in 27.5.2.3 (STA behavior for UL MU operation(#8151)) or in response to a Beamforming Report Poll frame addressed to it.*(#7819)* 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 feedback sent in response shall have the RA field set to either the nontransmitted BSSID or the transmitted BSSID.

NOTE—A non-AP HE beamformee that transmits an OM Control field with UL MU Disable field set to 1 does not respond to BRP Trigger frames (see 27.8 (Operation mode indication).

*(#Ed)*The value of the Sounding Dialog Token Number in the HE MIMO Control field shall be set to the same value as the Sounding Dialog Token Number field in the corresponding HE NDP Announcement frame.

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 8588, 9929):***

 *(#8588, 9929)***TGax Editor: *Delete the paragraphs below of this subclause (#CID 8713):***

**TGax Editor: *Insert the paragraph below at the end of this subclause as follows (#CID 7111, 8716):***

The HE compressed beamforming feedback shall be transmitted in a single HE Compressed Beamforming And CQI frame unless the size of the feedback results in an HE Compressed Beamforming And CQI frame that would exceed 11 454 octets, in which case the feedback shall be segmented as defined in 27.6.3(Rules for generating segmented feedback).

An HE beamformer shall support a maximum MPDU length for HE Compressed beamforming feedback which is the minimum between 11 454 octets and the maximum length of the HE compressed beamforming feedback that the HE beamformer intends to solicit from its HE beamformees.*(#7111, 8716)*

An HE beamformer that sends a BRP Trigger frame or Beamforming Report Poll frame shall set the Feedback Segment Retransmission Bitmap fields of the BRP Trigger frame to all ones except when the HE beamformer intends to solicit the retransmission of segmented feedback as defined in 27.6.3 (Rules for generating segmented feedback).

NOTE—The BRP Trigger frame contains one or more User Info fields, each of the which is addressed to an HE beamformee.

# Rules for generating segmented feedback

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 7111, 8716):***

**TGax Editor: *Change the paragraph below of this subclause as follows (#CID 7641, 8503, 8504, 9720):***

If the HE compressed beamforming feedback solicited by the HE beamformer would result in an HE Compressed Beamforming And CQI frame that exceeds 11 454 octets, then the HE compressed beamforming feedback shall be split into up to 8 feedback segments. Each feedback segment shall be included in a separate HE Compressed Beamforming And CQI frame and shall contain successive portions of the HE compressed beamforming feedback, which consists of the HE Compressed Beamforming Report information followed by any MU Exclusive Beamforming Report information. Each feedback segment shall be of equal length except for the last feedback segment that may be smaller Each feedback segment, except for the last feedback segment, shall contain the maximum number of octets allowed by the HE beamformer's maximum MPDU length capability. Each feedback segment is identified by the value of the Remaining Feedback Segments subfield and the First Feedback Segment subfield in the HE MIMO Control field as defined in 9.4.1.62 (HE MIMO Control field); the other nonreserved subfields of the HE MIMO Control field shall be the same for all feedback segments. All feedback segments shall be sent in a single A-MPDU contained in a PPDU and shall be included in the A-MPDU in the descending order of the Remaining Feedback Segments subfield values.

An AP that sends a BRP Trigger frame shall allocate sufficient resources for the HE beamformee to send all the solicited feedback segments in the HE TB PPDU that is sent in response to the BRP Trigger frame.

An HE beamformer that sends a BRP Trigger frame, in its first attempt to retrieve HE compressed beamforming feedback from an HE beamformee, shall solicit all possible feedback segments by setting all of the bits in the Feedback Segment Retransmission Bitmap subfield to 1 in the User Info field addressed to the HE beamformee.(#Ed)

An HE beamformer that fails to receive some or all of the feedback segments of the HE compressed beamforming feedback from an HE beamformee may solicit the selective retransmission of missing feedback segments by sending a Beamforming Report Poll frame or a BRP Trigger frame that indicates in the Feedback Segment Retransmission Bitmap subfield of the User Info field addressed to the HE beamformee the list of feedback segments solicited for retransmission (see 9.3.1.23.2).

An HE beamformer that fails to receive the first feedback segment (identified by the First Feedback Segment field set to 1) may solicit the selective retransmission of the missing feedback segments assuming the HE compressed beamforming feedback is split into 8 feedback segments. The HE beamformer may also solicit the retransmission of all feedback segments by setting all of the bits in the Feedback Segment Retransmission Bitmap subfield to 1 in the User Info field addressed to the HE Beamformee.

An HE beamformee that transmits HE compressed beamforming feedback, including the HE Compressed Beamforming Report information and any MU Exclusive Beamforming Report information, in response to a BRP Trigger frame shall either transmit only the feedback segments indicated in the Feedback Segment Retransmission Bitmap field in the Beamforming Report Poll frame or in the User Info field of the BRP Trigger frame addressed to the HE beamformee or transmit all the feedback segments available at the HE beamformee, excluding the feedback segments that do not exist at the HE beamformee.(#7686)*(#7641, 8503, 8504, 9720)*