IEEE P802.11
Wireless LANs

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| 11ax D1.0 MAC Comment Resolution for 9.3.1.20 |
| Date: 2017-05-08 |
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Abstract

This submission proposes resolutions for comments of TGax Draft 1.0 with the following CIDs:

3116, 3385, 3493, 3823, 3910, 4375, 4444, 5314, 6077, 6078, 7478, 7479, 7480, 7481, 7738, 7739, 7740, 7741, 7900, 7901, 7902, 7903, 7904, 8188, 8648, 8649, 9106, 9254, 9627, 9628, 9819

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 3116 | 9.3.1.20P40L32 | I don't see that all the fields in Figure 9-51b are defined in the text that follows it. | Review text that follows and ensure a proper definition for the field is provided.For example The AID11 field appears to have no definition.The definition of Disambiguation is not "proper"in the sense that it does not indicate the meaning of the values of the field, only the intended purpose of the field:"The Disambiguation subfield is set to 1 to prevent a VHT STA from wrongly determining it's AID in the HE STA Info." |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 338534933823391043754444 | 9.3.1.20P41L23 | CQI acronym not defined in Table 9-25a | Add definition for CQI in clause 3.4 Definitions, acronyms, and abbreviations |

Proposed Resolution:

Revised. Agree in principle. In subclause 3.4, add an acronym CQI with the meaning "Channel Quality Indicator".

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 5314 | 9.3.1.20P40L53 | How to incode 26-tone RU with 7 bits of RU Start Index and Ru End Index is not defined | Add the rule similar to Table 9.25f. The first bit is 0 for the primary 80MHz channel and 1 for the secondary 80 MHz channel. The remaning 6 bits can have values from 000000 to 100100 which correspond to 37 possible 26-tone RUs |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 6077 | 9.3.1.20P40L6 | Same type and subtype | Add and Subtype after Type |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 6078 | 9.3.1.20P41L28 | Prevent a VHT from wrongly determinining it's AID in the VHT STA info. Should be VHT, not HE | Change to VHT from HE |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7478 | 9.3.1.20P41L8 | "Feedback Type+Ng+codebook size" should be changed to "Feedback Type And Ng + Codebook Size" since Table 9-26a shows the joint encoding for two subfields instead of three subfields. | As per comment |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7479 | 9.3.1.20P41L19 | It is better to change "MU+Ng4" to "MU, Ng=4" and change "MU+Ng16" to "MU, Ng=16" in Table 9-25a | As per comment |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7480 | 9.3.1.20P41L12 | It is better to change "Ng4" to "Ng=4" and change "Ng16" to "Ng=16" in Table 9-25a | As per comment |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7481 | 9.3.1.20P41L28 | There is no HE STA Info field. It is better to change "in the HE STA Info" to "in an STA Info field of the HE NDP Announcement frame" | As per comment |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7738 | 9.3.1.20P40L22 | If the previously reserved bits in the Sounding Dialog Token field are to be used to distinguish between a VHT NDP Announcement and an HE NDP Announcement, that should be stated explicitly, with appropriate changes to Figure 9-50 and related text. | Add text, a generic VHT/HE NDP Announcement frame format (with "variable" sized STA Info field), and an updated Figure 9-50, indicating a new use for B1 of the Sounding Dialog Token field, as the VHT/HE identifier, that distinguishes these two formats of the STA Info field. Delete the paragraph at P40L22, instead putting this concept earlier in the subclause (near Figure 9-50). Move the baseline text and Figure 9-49 to follow this new text, explicitly for the VHT/HE field set to 0 case. Replace the first sentence at P40L6 with something like "When the VHT/HE field is set to 1, the VHT/HE NDP Announcement frame format is shown in Figure 9-51a." |

Proposed Resolution:

Rejected. The new frame format is adequately defined to allow interoperable implementations.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7739 | 9.3.1.20P40L39 | No description of the AID11 subfield. | Insert paragraph: "The AID11 subfield contains the least significant 11 bits of the AID of the STA expected to process this STA Info subfield. The AID11 subfield is equal to zero if the STA is an AP, mesh STA, or a member of an IBSS." |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7740 | 9.3.1.20P41L8 | Use of "+" for natural language "and" is a poor choice. It can be confused with addition. Also, which bits in the column relate to which subfield is unclear | Change the column heading to "Feedback Type And Ng, and Codebook Size subfield values". Either split the column into two, to indicate which bits are which subfield, or provide a bit mapping hint similar to "B25, B26, B28". |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7741 | 9.3.1.20P41L28 | How does the Disambiguation subfield prevent this? There is no explanation anywhere I can find. | Add a description (here, or perhaps better in clause 10 or 27) of how this mechanism works. |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7900 | 9.3.1.20P40 L5 | "The frame format of the HE NDP Announcement frame with multiple STA info field is shown in Figure 9-51a" implies there's a different format without multiple STA Info fields | Delete "with multiple STA info field" (sic) |

Proposed Resolution:

Agreed.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7901 | 9.3.1.20P41 L28 | "The Disambiguation subfield is set to 1 to prevent a VHT STA from wrongly determining it's AID in the HESTA Info." is not clear (and grammatically wrong) | Change to "The Disambiguation subfield is set to 1.NOTE---A VHT STA interprets this as a STA Info field with an invalid AID." |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7902 | 9.3.1.20P40 L6 | The format/contents of the RA, TA and Sounding Dialog Token fields in an HE NDPA is not specified | Change the para at line 22 to: "The RA, TA and Sounding Dialog Token fields are set as in a VHT NDP Announcement frame, except that bit 1 of the Sounding Dialog Token field is set to 1." |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7903 | 9.3.1.20P41 L9 | Showing "Feedback Type + Ng + codebook size" is a recipe for interop problems | Show the information in three columns, one for b25 of the STA Info, one for b26 and one for b28 |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 7904 | 9.3.1.20P40 L53 | "indicates the first 26-tone RU" -- how exactly? Does it start from 0 or from 1? What does 0/1 indicate? This is not clear | Append ", where tone 0 is the lowest-frequency tone," |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 8188 | 9.3.1.20P40 L22 | B0 and B1 of the sounding dialog token in VHT are reserved. Does this mean a VHT device always set those two bits to 0? Would it be possible for a VHT device to set B0 or B1 or both to 1? Is it an implementation issue. | if a VHT device sets B1 to 1 for any reason, what would be the behavior of an HE device? Clarify |

Proposed Resolution:

Rejected. Reserved bits are set to 0 on transmission and ignored on reception, per 9.2.2 (Conventions).

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 8648 | 9.3.1.20P40 L32 | The Nc subfield in Figure 9-25a is not defined. | Add description after line 30 on page 41 |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 8649 | 9.3.1.20P41 L6 | "Feedback Type And Ng" and "Codebook Size" are two separate fields in Figure 9-51b. However, they are treated as a single 3-bit field in Table 9-25a. Split the first column into two columns to show the value of each of the fields. | See comment |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 9106 | 9.3.1.20P40 L31 | Within Figure 9-51b, the initial sub-field is shown as "AID11". This is not defined within the document. | Either remove this sub-field from the figure, or replace it with "AID" |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 9254 | 9.3.1.20P40 L32 | The AID11 subfield in the HE NDPA frame needs to be explained. | "Add the following sentence before line 40: |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 9627 | 9.3.1.20P40 L53 | Please describe how to encode the RU Start Index and RU End Index subfields. | As per comment. |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 9628 | 9.3.1.20P41 L28 | The Disambiguation subfield is not a variable because it is always to set to 1.Please change B27 of STA Info subfield to Reserved subfield as the following."The B27 of the STA Info subfield is reserved and is set to 1." | As per comment. |

Proposed Resolution:

Rejected. Reserved subfields are ignored on receive, per 9.2.2 (Conventions), but the field is not ignored by legacy receivers. Therefore it can not be reserved.

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| **CID** | **Identifiers** | **Comment** | **Proposed Change** |
| 9819 | 9.3.1.20P40 L53 | How to encode RU Start/End index to 7 bit needs to be described. Please add the rule. | As in the comment. |

Proposed Resolution:

Revised. Agree in principle. Make changes as outlined in <this document>.

***Modify 9.3.1.20 as shown in revision marks (changes relative to 802.11ax draft 1.2:***

* VHT/HE NDP Announcement frame format

Insert the following at the end of 9.3.1.20:

The HE NDP Announcement uses the same Frame Control subtype as the VHT NDP Announcement. The frame format of the HE NDP Announcement frame is shown in Figure 9-51a (HE NDP Announcement frame format).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Frame Control | Duration | RA | TA | Sounding Dialog Token | STA Info 1 | … | STA Info *n* | FCS |
| Octets: | 2 | 2 | 6 | 6 | 1 | 4 |  | 4 | 4 |
| * HE NDP Announcement frame format
 |

The Duration, RA, TA and Sounding Dialog Token fields are set as in a VHT NDP Announcement frame, except that bit 1 of the Sounding Dialog Token is set to 1 to indicate an HE NDP Announcement frame.

The format of the STA Info subfield in an HE NDP Announcement Frame is defined in Figure 9-51b(STA Info subfield format in an HE NDP Announcement frame). An HE NDP Announcement frame contains at most 1 STA Info field per STA.

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|  | B0           B10 | B11          B24 | B25        B26 | B27 | B28 | B29        B31 |
|  | AID11 | Partial BW Info | Feedback Type And Ng | Disambiguation | Codebook Size | Nc |
| Bits: | 11 | 14 | 2 | 1 | 1 | 3 |
| * STA Info subfield format in an HE NDP Announcement frame
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The AID11 subfield contains the 11 least significant bits of the AID of a STA expected to process the following HE NDP and prepare the sounding feedback.

The Partial BW Info subfield is defined in Figure 9-51c (Partial BW Info subfield).

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| --- | --- | --- |
|  | B0                B6 | B7             B13 |
|  | RU Start Index | RU End Index |
| Bits: | 7 | 7 |
| * Partial BW Info subfield
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The RU Start Index subfield of the Partial BW subfield indicates the first 26-tone RU for which the HE beamformer is requesting feedback. The RU End Index subfield of the Partial BW subfield indicates the last 26-tone RU for which the HE beamformer is requesting feedback. The 26-tone RU is encoded in increasing order:

* For 20 MHz BW of the HE NDP Announcement frame, RU1 is encoded as 0 and RU9 is encoded as 8. Values 9-127 are reserved. See Table 28-3 (Subcarrier indices for RUs in a 20 MHz HE PPDU).
* For 40 MHz BW of the HE NDP Announcement frame (possibly in non-HT Duplicate format), RU1 is encoded as 0 and RU18 is encoded as 17. Values 18-127 are reserved. See Table 28-4 (Subcarrier indices for RUs in a 40 MHz HE PPDU).
* For 80 MHz BW of the HE NDP Announcement frame (possibly in non-HT Duplicate format), RU1 is encoded as 0 and RU37 is encoded as 36. Values 37-127 are reserved. See Table 28-5 (Subcarrier indices for RUs in an 80 MHz HE PPDU).
* For 80+80 or 160 MHz BW of the HE NDP Announcement frame (possibly in non-HT Duplicate format), RU1 in the lower 80 MHz segment is encoded as 0 and RU37 in the lower 80 MHz segment is encoded as 36. RU1 in the upper 80 MHz segment is encoded as 37 and RU37 in the upper 80 MHz segment is encoded as 74. Values 75-127 are reserved. For 80+80 MHz, feedback is not requested for the gap between the 80 MHz segments. See Table 28-5 (Subcarrier indices for RUs in an 80 MHz HE PPDU).

The Feedback Type And Ng and Codebook Size subfields are defined in Table 9-25a (Feedback Type And Ng subfield and Codebook Size subfield encoding).

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| * Feedback Type And Ng subfield and Codebook Size subfield encoding
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| **Feedback Type And Ng** | **Codebook Size** | **Description** |
| **B25** | **B26** | **B28** |
| 0 | 0 | 0 | SU, Ng4, quantization resolution (∆, ) = {4, 2} |
| 0 | 0 | 1 | SU, Ng4, quantization resolution (∆, ) = {6, 4} |
| 0 | 1 | 0 | SU, Ng16, quantization resolution (∆, ) = {4, 2} |
| 0 | 1 | 1 | SU, Ng16, quantization resolution (∆, ) = {6, 4} |
| 1 | 0 | 0 | MU, Ng4, quantization resolution (∆, ) = {7, 5} |
| 1 | 0 | 1 | MU, Ng4, quantization resolution (∆, ) = {9, 7} |
| 1 | 1 | 0 | CQI only feedback |
| 1 | 1 | 1 | MU, Ng16, quantization resolution (∆, ) = {9, 7} |

The Disambiguation subfield is set to 1 to prevent a VHT non-HE STA from wrongly determining its AID in the HE NDP Announcement frame. The Disambiguation subfield coincides with the MSB of the AID12 subfield of an expected VHT NDP Announcement when the HE NDP Announcement field is parsed by a VHT non-HE STA. The MSB of the AID12 subfield is always 0 for a VHT non-HE STA due to the limitation of the AID to a maximum of 2007.

The Nc field indicates the number of columns Nc, in the Compressed Beamforming Feedback Matrix subfield minus 1, if the requested feedback type is MU. Set to 0 to request Nc = 1, set to 1 to request Nc = 2, ..., set to 7 to request Nc = 8. Reserved if the requested feedback type is SU.

***Modify 27.6.2 as shown in revision marks:***

**27.6.2 Rules for HE sounding protocol sequences**

[...]

An HE beamformer with multiple STA Info elements shall set the RU Start Index and RU End Index in the STA Info field to indicate the starting 26-tone RU and the ending 26-tone RU of the requested HE compressed beamforming feedback report.

The RU Start Index is 7 bits and indicates the lowest 26-tone RU for which the HE beamformer is requesting feedback. The RU End Index is 7 bits and indicates the highest 26-tone RU for which the HE beamformer is requesting feedback.

The 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.

If the HE beamformee is not capable of partial bandwidth feedback or if there is only one STA info element in the NDP Announcement frame, then the HE beamformer shall set the RU Start Index and the RU End Index to values indicating the full bandwidth of the HE NDP Announcement frame. (For example in the case of Ng = 4, for 80 MHz full bandwidth feedback, the RU Start Index and RU End Index are 0 and 36, respectively. For Ng = 4 and 160 or 80+80 MHz full bandwidth feedback, the RU Start Index and RU End Index are 0 and 74, respectively.)

For 80+80 MHz, feedback is not requested for the gap between the 80 MHz segments.

[...]