IEEE P802.11
Wireless LANs

|  |
| --- |
| Comment Resolutions on Clause 9.4.1 Part 2 |
| Date: 2016-08-02 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Lochan Verma | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92121 | +1-858-845-7832 | lverma@qti.qualcomm.com |
| Sameer Vermani | Qualcomm Inc. | 5775 Morehouse Dr, San Diego, CA 92121 | +1-858-845-3115 | svverman@qti.qualcomm.com |
| Kome Oteri | Inter Digital |  |  |  |
| Sriram Venkateswaran | Broadcom |  |  |  |

Abstract

The 11-16/0836r1 has the following issues. The document 11-16/1097r1 resolves all the issues. NOTE to ad-hoc Chairs: The proposed resolutions in this document are with respect to D0.4.

1. The HE Compressed Beamforming Report Information refers to Table 8-53f (VHT Compressed Beamforming Report information) from 802.11ac. This table includes a note only applicable to 802.11ac and not relavent to 802.11ax. Thus redefining Ns and scidx() as applicable to 802.11ax does not make the Table 8-53f completely reuseable.

This issue is resolved by defining a new table for HE Compressed Beamforming Report Information.

1. The HE MU Exclusive Beamforming Report information refers to Table 8-53i (MU Exclusive Beamforming Report information from 802.11ac. This table includes a note only applicable to 802.11ac and not relavent to 802.11ax. Thus redefining Ns’ and sscidx() as applicable to 802.11ac does not make the Table 8-53i completely reuseable. Furthermore, Ns’ and sscidx() are identical to Ns and scidx(), respectively. Hence defining new variables for representing the same information should be avoided.

The issue is resolved by defining a new table for HE MU Exclusive Beamfoming Report information.

1. Feedback subcarrier indices given by scidx(i) = scidx(i-1) + Ng. However, for 40 MHz/80 MHz this equation gives wrong subcarrier indexing when Ng = 16 and start RU Index is on the left side of the DC while end RU Index is on the right side. For e.g., Start RU Index = 0, End RU Index = 17, for 40 MHz and Ng = 16, results in scidx(0) = -244 and scidx(31) = 244. From the equations it says scidx = [-244 -228 -212 -196 -180 -164 -148 -132 -116 -100 -84 -68 -52 -36 -20 -4 *12 28 44 60 76 92 108 124 140 156 172 188 204 220 244*]. This is incorrect.

This issue is resolved by addition of clarification text.

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.***

***TGax Editor: Change the paragraphs below as follows.***

**9.4.1.63 HE Compressed Beamforming Report field**

The HE Compressed Beamforming Report information has the structure and order ~~as the VHT Compressed Beamforming Report Information as defined in Table 9-69 (VHT Compressed Beamforming Report Information)~~ as defined in Table A (HE Compressed Beamforming Report Information).

Table A – HE Compressed Beamforming Report information

|  |  |  |
| --- | --- | --- |
| Field | Size (bits) | Meaning |
| Average SNR of Space-Time Stream 1 | 8 | Signal-to-noise ratio at the beamformee for space-time stream 1 averaged over all data subcarriers. See Table 9-71 |
| … | … | … |
|  |  |  |
| Average SNR of Space-Time Stream Nc | 8 | Signal-to-noise ratio at the beamformee for space-time stream Nc averaged over all data subcarriers.See Table 9-71 |
| Compressed Beamforming Feedback Matrix *V* for subcarrier $k=scidx(0)$ | $$Na×(b\_{ψ}+b\_{φ})/2$$ | Compressed beamforming feedback matrix defined in Table 9-67 |
| Compressed Beamforming Feedback Matrix *V* for subcarrier $k=scidx(1)$ | $$Na×(b\_{ψ}+b\_{φ})/2$$ | Compressed beamforming feedback matrix defined in Table 9-67 |
| Compressed Beamforming Feedback Matrix *V* for subcarrier $k=scidx(2)$ | $$Na×(b\_{ψ}+b\_{φ})/2$$ | Compressed beamforming feedback matrix defined in Table 9-67 |
| … | … | … |
| Compressed Beamforming Feedback Matrix *V* for subcarrier $k=scidx(Ns-1)$ | $$Na×(b\_{ψ}+b\_{φ})/2$$ | Compressed beamforming feedback matrix defined in Table 9-67 |

~~In Table 9-69 (VHT Compressed Beamfomring Report Information)~~ In Table A, *Ns* is the number of subcarriers for which the Compressed Beamforming Feedback Matrix subfield is sent back to the beamformer. A beamformee may choose to reduce *Ns* by using a method referred to as grouping, in which only a single Compressed Beamforming Feedback Matrix is reported for each group of *Ng* adjacent subcarriers. For HE Compressed Beamforming Report, *Ns* is a function of the RU Start Index, RU End Index, and Grouping subfields in the HE MIMO Control field (see 9.4.1.62). Subcarriers *scidx(0)* and s*cidx(Ns-1)* represent the S (Start)-tone corresponding to the RU Start Index and E (End)-tone corresponding to the RU End Index, respectively. ~~For 40 MHz and 80 MHz, subcarrier~~ $scidx(i) = scidx(i-1)+Ng$~~, where~~ $1\leq i\leq Ns-2$~~.~~

For 40 MHz and 80 MHz, when the aforementioned S-tone and E-tone indices lie on the same side of DC, *scidx(i) = scidx(i-1) + Ng,* where $1\leq i\leq Ns-2$. However, when the S-tone and E-tone indices lie on different sides of DC, the following relationships hold separately for the two sides of DC.

*For the left of DC, scidx(i) = scidx(i-1) + Ng,* where $1\leq i\leq L and scidx\left(L\right)=-4$

*For the right of DC, scidx(i) = scidx(i-1) + Ng,* where $ L+2\leq i\leq Ns-2$ and scidx(L+1) = 4.

**9.4.1.64 HE MU Exclusive Beamforming Report field**

The HE MU Exclusive Beamforming Report information has the structure and order ~~as the VHT MU Exclusive Beamforming Report information defined in Table 9-72 (MU Exclusive Beamforming Report Information)~~ as defined in Table B (HE MU Exclusive Beamforming Report information).

Table B – HE MU Exclusive Beamforming Report information

|  |  |  |
| --- | --- | --- |
| Field | Size (Bits) | Meaning |
| Delta SNR for space-time stream 1 for subcarrier $k=scidx(0)$ | 4 | $ΔSNR\_{scidx\left(0\right),1}$ as defined in Equation (9-2) |
| … | … | … |
| Delta SNR for space-time stream Nc for subcarrier $k=scidx(0)$ | 4 | $ΔSNR\_{scidx\left(0\right),Nc}$ as defined in Equation (9-2) |
| Delta SNR for space-time stream 1 for subcarrier $k=scidx(1)$ | 4 | $ΔSNR\_{scidx\left(1\right),1}$ as defined in Equation (9-2) |
| … | … | … |
| Delta SNR for space-time stream Nc for subcarrier $k=scidx(1)$ | 4 | $ΔSNR\_{scidx\left(1\right),Nc}$ as defined in Equation (9-2) |
| … | … | … |
| Delta SNR for space-time stream 1 for subcarrier $k=scidx(Ns-1)$ | 4 | $ΔSNR\_{scidx\left(Ns-1\right),1}$ as defined in Equation (9-2) |
| … | … | … |
| Delta SNR for space-time stream Nc for subcarrier $k=scidx(Ns-1)$ | 4 | $ΔSNR\_{scidx\left(Ns-1\right),Nc}$ as defined in Equation (9-2) |

In Table B, *Ns* and scidx() are as defined in 9.4.1.63. ~~In Table 9-72 (MU Exclusive Beamforming Report information),~~ *~~Ns’~~* ~~is the number of subcarriers for which the Delta SNR subfield is sent back to the beamformer. Subcarriers~~ *~~sscidx~~*~~(0) and~~ *~~sscidx~~*~~(~~*~~Ns~~*~~’- 1) represent the S-tone corresponding to the RU Start Index and E-tone corresponding to the RU End Index, respectively. For 40 MHz and 80 MHz, subcarrier~~ *~~sscidx~~*~~(i) =~~ *~~sscidx~~*~~(~~*~~i-~~* ~~1) +~~ *~~Ng~~*~~, where 1 ≤ i ≤~~ *~~Ns~~*~~’- 2. The S-tone and E-tone corresponding to the possible RU indices are listed in Table 9-76b (Feedback subcarrier indices indicating start 26-tone RU index and end 26-tone RU index for Ng = 4) for~~ *~~Ng~~* ~~= 4 and Table 9-76c (Feedback subcarrier indices indicating start 26-tone RU index and end 26-tone RU index for Ng = 16) for~~ *~~Ng~~* ~~= 16. For 160 MHz, to determine the S-tone and E-tone, RUs 37 to 73 occupying the higher 80 MHz use the same entries in Table 9-76b (Feedback subcarrier indices indicating start 26-tone RU index and end 26- tone RU index for Ng = 4) and Table 9-76c (Feedback subcarrier indices indicating start 26-tone RU index and end 26-tone RU index for Ng = 16) as RUs 0 to 36 occupying the lower 80 MHz. For 20 MHz,~~ *~~sscidx~~*~~(~~*~~i~~*~~), where 1 ≤ i ≤~~ *~~Ns~~*~~’- 2, includes all subcarrier indices between the S-tone and the E-tone subcarrier indices described in Table 9-76d (Feedback subcarrier indices for 20 MHz bandwidth for Ng = 4 and Ng = 16) for~~ *~~Ng~~* ~~= 4 and~~ *~~Ng~~* ~~= 16.~~

**References:**

1. **IEEE P802.11axTM/D0.4, Aug 2016.**