IEEE P802.11
Wireless LANs

|  |
| --- |
| Comment Resolutions on Sounding Protocol Part 1 |
| Date: 2017-11-27 |
| 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 |
| Youhan Kim |  |  | youhank@qca.qualcomm.com |
| Bin Tian |  |  | btian@qti.qualcomm.com |
| Mark Rison | Samsung |  |  | m.rison@samsung.com |
| Sigurd Schelstraete | Quantenna |  |  | sschelstraete@quantenna.com |

Abstract

This submission proposes resolutions for the following comments on Sounding Protocol of TGax D2.0:

12774, 12776, 13202, 13237, 13417

Revisions:

* Rev 0: Initial version of the document.

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.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Clause Number** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 12774 | 9.4.1.64 | 114.41 | "HE Compressed Beamforming Report information and HE MU Exclusive Beamforming Report information areincluded in the HE compressed beamforming and CQI feedback if the Feedback Type subfield in the HE MIMO Control field indicates SU or MU." is confusing: MU Excl is only for MU | Delete "SU or" in the cited text, and add a xref to 27.6.1, which states which fields are present in the HE CBF. Also add a similar xref from 115.54 (9.4.1.65) to 27.6.1 | Revised—There is a Typo in the description of HE MU Exclusive Beamforming Report field. The HE MU Exclusive Report field is feedback only if MU Type feedback is requested.TGax Editor to make the changes shown in IEEE 802.11-17/1826r0 under all headings that include CID 12774. |
| 12776 |  |  | Need to define when each subfield is present in HE CBR (cf. 11ac "The MU Exclusive Beamforming Report information is included in the VHT Compressed Beamforming feedback if the Feedback Type subfield in the VHT MIMO Control field indicates MU (see 9.4.1.48)." | As it says in the comment | Revised—Resolution description of CID 12774 is applicable here.TGax Editor to make the changes shown in IEEE 802.11-17/1826r0 under all headings that include CID 12774. |
| 13202 | 27.6.1 | 263.14 | This description for the HE compressed beamforming feedback contradicts that give in 9.4.1.64, P114L42. Does the SU report include the MU Exclusive Beamforming Report field or not? If it does, why is it called "MU Exclusive"? | Correct the desciption of the HE compressed beamforming report. If the difference between SU and MU reports is not in the fields present then identify the difference. | Revised—Resolution description of CID 12774 is applicable here.TGax Editor to make the changes shown in IEEE 802.11-17/1826r0 under all headings that include CID 12774. |
| 13237 | 9.4.1.64 | 114.45 | Why is the MU Exclusive Beamformig Report field present when the Feedback Type is SU? Isn't it MU exclusive? | Either remove the MU Exclusive Beamforming Report field from SU feedback or combine it with the HE Compressed Beamforming Report field. If the fields are always sent together why do we need both? | Revised—Resolution description of CID 12774 is applicable here.TGax Editor to make the changes shown in IEEE 802.11-17/1826r0 under all headings that include CID 12774. |
| 13417 | 27.6.1 | 263.16 | Section 27.6.1 states that "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."However, in section 9.4.1.64 it states that "HE Compressed Beamforming Report information and HE MU Exclusive Beamforming Report information are included in the HE compressed beamforming and CQI feedback if the Feedback Type subfield in the HE MIMO Control field indicates SU or MU."Note that the statement in 27.6.1 was not present in D1.0 and that the requirement to include HE MU Exclusive Beamforming Report information changed from SU only to SU and MU from D1.0 to D2.0. It looks like 27.6.1 is simply introductiory text that was proposed on the basis of D1.0, but that is now out of sync with D2.0. | Correct the text in 27.6.1 to be consistent with 9.4.1.64. | Revised—Resolution description of CID 12774 is applicable here.TGax Editor to make the changes shown in IEEE 802.11-17/1826r0 under all headings that include CID 12774. |

Discussion

**A Beamformer may request any of the following feedback types with Sounding protocol of 802.11ax:**

1. **SU (Single User) Feedback: An HE beamformer solicits SU type feedback from an HE beamformee by setting the Feedback Type subfield of the HE MIMO Control field to SU. An HE beamformee responds with an HE Compressed Beamforming And CQI frame that contains HE Compressed Beamforming Report field. *The HE Compressed Beamforming Report field carries average SNR of each space-time stream and compressed beamforming feedback matrices V.***
2. **MU (Multi User) Feedback: An HE beamformer solicits MU type feedback from an HE beamformee by setting the Feedback Type subfield of the HE MIMO Control field to MU. An HE beamformee responds with an HE Compressed Beamforming And CQI frame that contains HE Compressed Beamforming Report field and HE MU Exclusive Beamforming Report field. *The HE MU Exclusive Beamforming Report field carries delta SNR for each of the space-time streams, for a subset of subcarriers typically spaced Ng apart.***
3. **CQI (Channel Quality Indication)-only Feedback: An HE beamformer solicits CQI-only type feedback from an HE beamformee by setting the Feedback Type subfield of the HE MIMO Control field to CQI feedback. An HE beamformee responds with an HE Compressed Beamforming And CQI frame that contains HE CQI-only Report field. *The HE CQI-only Report field carries the per-RU average SNR of each of space-time stream, where each per-RU average SNR is the arithmetic mean of the SNR in decibels over a 26-tone RU for which the feedback is being requested.***

*Changes to D2.0 related to CIDS: 12774, 12776, 13202, 13237, 13417*

**9.4.1.63 HE Compressed Beamforming Report field**

***TGax Editor: Please edit the following text as shown below.***

The size of the HE Compressed Beamforming Report field depends on the values in the HE MIMO Control field. The HE Compressed Beamforming Report field contains HE Compressed Beamforming Report information or successive (possibly zero-length) portions thereof in the case of segmented HE compressed beamforming and CQI feedback (see 27.6.4 ~~(HE sounding protocol)~~ (Rules for generating segmented feedback)). HE Compressed Beamforming Report information is included in the HE compressed beamforming and CQI feedback if ~~an SU feedback type or an MU feedback type is indicated in~~ the Feedback Type subfield in the HE MIMO Control field indicates SU or MU. (#12774)

**9.4.1.64 HE MU Exclusive Beamforming Report field**

***TGax Editor: Please edit the following text as shown below.***

The size of the HE MU Exclusive Beamforming Report field depends on the values in the HE MIMO Control field. The HE MU Exclusive Beamforming Report field contains HE MU Exclusive Beamforming Report information or successive (possibly zero-length) portions thereof in the case of segmented HE compressed beamforming and CQI feedback (see 27.6.4 (Rules for generating segmented feedback)).

~~HE Compressed Beamforming Report information and~~ HE MU Exclusive Beamforming Report information ~~are~~is included in the HE compressed beamforming and CQI feedback (in addition to HE Compressed Beamforming Report information) if the Feedback Type subfield in the HE MIMO Control field indicates ~~SU or~~ MU. (#12774)

**9.4.1.65 HE CQI-only Report field**

***TGax Editor: Please edit the following text as shown below.***

The size of the HE ~~Compressed Beamforming~~CQI-only Report field depends on the values in the HE MIMO Control field. The HE ~~Compressed Beamforming~~CQI-only Report field contains HE CQI-only Report information ~~or successive (possibly zero-length) portions thereof in the case of segmented HE compressed beamforming and CQI feedback (see 27.6 (HE sounding protocol))~~. HE CQI-only Report information is included in the HE compressed beamforming and CQI feedback if ~~the CQI-only feedback type is indicated in~~ the Feedback Type subfield ~~of~~in the HE MIMO Control field indicates CQI feedback. (#12774)

<para break>

The HE CQI-only Report field has the structure and order defined in (#12774) ~~The structure of the HE CQI-only Report field is shown~~ in Table 9-76g (HE CQI-only Report information).

**9.6.28.2 HE Compressed Beamforming And CQI frame format**

***TGax Editor: Please edit the following text as shown below.***

The HE MIMO Control field is always present in the frame. The presence and contents of the HE Compressed Beamforming Report field, HE MU Exclusive Beamforming Report field and HE CQI-only Report field are dependent on the value~~s~~ of the Feedback Type subfield of the HE MIMO Control field (see 9.4.1.63, 9.4.1.64 and 9.4.1.65). (#12774)

**27.6 HE sounding protocol**

**27.6.1 General**

***TGax Editor: Please edit the following text as shown below.***

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~~only feedback (see 9.4.1.63, 9.4.1.64 and 9.4.1.65). (#12774)

[…]

For CQI-~~type~~only (#12774) feedback the HE compressed beamforming feedback is never segmented since the resulting MPDU size will always be less than 11 454 octets.

**References:**

1. **IEEE P802.11axTM/D2.0, Oct 2017.**