IEEE P802.11
Wireless LANs

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| MU Exclusive Beamforming Report field |
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Abstract

The document provides draft text for MU Exclusive Beamforming Report field

9.4.2.x Digital BF Feedback Element

The MU Exclusive Beamforming Report field is used by the Digital Feedback element to carry explicit feedback information in the form of Differential SNRs. The information in the Digital BF Feedback element can be used by the transmit MU beamformer to determine steering matrices *Q*.

The size of the MU Exclusive Beamforming Report field depends on the values in the Digital Feedback Control field. The MU Exclusive Beamforming Report information is included in the Digital Beamforming Feedback Information if the SU/MU field in MIMO Feedback control element is 0 indicating MU transmission and the Feedback Type field of the Digital BF Feedback Control field is set to 1 indicating OFDM feedback.

The MU Exclusive Beamforming Report information consists of Differential SNR subfields for each space-time stream (1 to *Nc*) of a subset of the subcarriers typically spaced *Ng* apart, where *Ng* is signaled in the Grouping subfield of the Digital BF Feedback Control field, starting from the lowest frequency subcarrier and continuing to the highest frequency subcarrier. No padding is present between *D\_SNRk,i* in the MU Exclusive Beamforming Report field, even if they correspond to different subcarriers. The subset of subcarriers included is determined by the values of Table 9-xx (Subcarriers for which a Compressed Beamforming Feedback Matrix subfield is sent back). For each subcarrier included, the deviation in dB of the SNR of that subcarrier for each column of V relative to the adjacent subcarrier spaced *Ng* apart of the corresponding space-time stream is computed using Equation (9-xx).

$D\\_SNR\_{k,i}=min⁡(max⁡(round(10log\_{10}\left(\frac{\left‖H\_{k}V\_{k,i}\right‖^{2}}{N}\right)-10log\_{10}\left(\frac{\left‖H\_{\tilde{k}}V\_{\tilde{k},i}\right‖^{2}}{N}\right) ), -8),7)$(9-xx)

where

|  |  |
| --- | --- |
| *k* | is the subcarrier index in the range *scidx*(1), …, *scidx*(*Nsc*–1) |
| $$\tilde{k}$$ | is the subcarrier index in the range *scidx*(0), …, *scidx*(*Nsc*–2) |
| *i* | is the space-time stream index in the range 1, …, *Nc* |
| $$H\_{k}$$ | is the estimated MIMO channel for subcarrier *k* |
| $$V\_{k,i}$$ | is column *i* of the beamforming matrix *V* for subcarrier *k* |
| $$N$$ | is the average noise plus interference power, measured at the beamformee |

Each Differential SNR subfield contains the *D\_SNRk,i* computed using Equation (9-xx) and quantized to 4 bits in the range –8 dB to 7 dB with 1 dB granularity except for *k=scidx*(0).

*D\_SNRscidx(0),i* is computed using Equation (9-xxx) and quantized to 8bits in the range -8 dB to 55.75 dB with 0.25 dB granularity.

*D\_SNRscidx(0),i* =$10log\_{10}\left(\frac{\left‖H\_{scidx(0)}V\_{scidx(0),i}\right‖^{2}}{N}\right)$ (9-xxx)

The structure of the MU Exclusive Beamforming Report field is shown in Table 9-xx.

Table 9.xx Digital BF Feedback element

|  |  |  |
| --- | --- | --- |
| **Field** | **Size** | **Meaning** |
| Element ID | 8 bits |  |
| Length | 8 bits |  |
| … | … | … |
| MU Exclusive Beamforming Report  | Differential SNR for space-time stream 1 for subcarrier *k = scidx(0)* | 8 bits | *D\_SNRscidx(0),1* as defined in Equation (9-xxx) |
| … | … | … |
| Differential SNR for space-time stream *Nc* for subcarrier *k = scidx(0)* | 8 bits | *D\_SNRscidx(0),Nc* as defined in Equation (9-xxx)  |
| Differential SNR for space-time stream 1 for subcarrier *k = scidx(1)* | 4 bits | *D\_SNRscidx(1),1* as defined in Equation (9-xx) |
| … | … | … |
| Differential SNR for space-time stream *Nc* for subcarrier *k = scidx(1)* | 4 bits | *D\_SNRscidx(1),Nc* as defined in Equation (9-xx) |
| … | … | … |
| Differential SNR for space-time stream 1 for subcarrier *k = scidx(Nsc–1)* | 4 bits | *D\_SNRscidx(Nsc-1),1* as defined in Equation (9-xx) |
| … | … | … |
| Differential SNR for space-time stream *Nc* for subcarrier *k = scidx(Nsc–1)* | 4 bits | *D\_SNRscidx(Nsc-1),Nc* as defined in Equation (9-xx) |

* **Do you agree**
	+ **to accept the text in11-18/0850r1 -Draft text for MU Exclusive Beamforming Report field?**