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| **Agreement (RAN#104-e)**  For PS codebook enhancements utilization DL/UL reciprocity of angle and/or delay, support codebook structure **W=W1W2 WfH** where   * **W1** is a free selection matrix, with identity matrix as special configuration   + FFS polarization-common/specific selection * **Wf** is a DFT based compression matrix in which N3 = NCQISubband\*R and Mv>=1   + At least one value of Mv>1 is supported     - Decide on the value(s) of Mv, e.g. Mv=2,  in RAN1# 104bis-e   + Working assumption:  Support of Mv>1 is a UE optional feature if the UE supports Rel-17 PS codebook enhancement, taking into account UE complexity related to codebook parameters   + FFS candidate value(s)  of R, mechanism for configuring/indicating to the UE and/or mechanism for selecting/reporting by UE for **Wf** * **Wf** can be turned off by gNB. When turned off, **Wf**is an all-one vector (FFS; the length of all-one vector) * FFS other signaling/CSI reporting mechanism for trade-off among signaling overhead, UE complexity and UPT gain |

Comment based on agreement:

* according to the above agreement, when Wf is OFF, Wf is an all-one vector
* 🡪 a single precoding matrix indicated by the PMI for all SBs or for the entire CSI reporting band
* 🡪 WB pmi
* (A) When cqi format = WB, both cqi and pmi are essentially WB 🡪 freq granularity of CSI = WB

**Spec related issue 1**:

* (B) If pmi format is not provided (similar to R16), then otherwise (yellow highlighted) of the following text from 214 spec applies (SB freq granularity).
* **(B) is contradictory to (A) which is based on agreement,** when Wf OFF (WB pmi) and cqi format = WB.
* The correct text is 1st subbullet (green highlighted).
* Note: this is also an issue in R16 codebook also since Mv=1 is also possible there, though such cases can be argued to be corner cases.
* **Pmi format = WB is straightforward solution to avoid the contradictory specification**

Section 5.2.1.4, 38.214

A CSI Reporting Setting is said to have a wideband frequency-granularity if

- *reportQuantity* is set to 'cri-RI-PMI-CQI', or 'cri-RI-LI-PMI-CQI', *cqi-FormatIndicator* is set to 'widebandCQI' and *pmi-FormatIndicator* is set to 'widebandPMI', or

- *reportQuantity* is set to 'cri-RI-i1' or

- *reportQuantity* is set to 'cri-RI-CQI' or 'cri-RI-i1-CQI' and *cqi-FormatIndicator* is set to 'widebandCQI', or

- *reportQuantity* is set to 'cri-RSRP' or 'ssb-Index-RSRP' or 'cri-SINR', or 'ssb-Index-SINR'

otherwise, the CSI Reporting Setting is said to have a subband frequency-granularity.

**Spec related issue 2**:

* N3 is defined as the total number of precoding matrices (cyan text).
* If N3 >1, we can’t say “N3 precoding matrices” for Mv=1 since there is only one precoding matrix indicated by the PMI.
* We have to say one of the following:
  + A single precoding matrix is indicated by the PMI
  + N3 precoding matrices indicated by the PMI, but they are the same when Mv=1

Section 5.2.2.2.5, 38.214

The parameter is configured with the higher-layer parameter *numberOfPMI-SubbandsPerCQI-Subband*. This parameter controls the total number of precoding matrices indicated by the PMI as a function of the number of configured subbands in *csi-ReportingBand*, the subband size configured by the higher-level parameter *subbandSize* and of the total number of PRBs in the bandwidth part according to Table 5.2.1.4-2, as follows

***Proposal 5-1: For Rel-17 PS codebook***

* ***Wf OFF and Wf ON with Mv=1 are same, and Wf is an all-one vector of length N3***
* ***Support pmiReportingFormat = WB [if N3=1]***
* ***FFS: the case when no SB size is configured (from RAN1#105-e agreement)***
* ***For Wf OFF, one of the following is included in the codebook description***
  + ***Alt1: a single precoding matrix is indicated by the PMI***
  + ***Alt2: N3 precoding matrices indicated by the PMI, but they are the same when Mv=1***