***Proposal 3.4b:***

For partially coherent uplink precoding by an 8TX UE codebook, Ng=4,

* Following rank cases are supported,
* Down-select number of permutations for each cases based on the potential use-case, performance, and overall DCI overhead

|  |  |  |  |
| --- | --- | --- | --- |
| *Rank* | *All layers in one Antenna Group* | *Layers split across 4 Antenna Groups*  *(All possible permutations)* | *Supported permutations* |
| *2* |  | *Transmission by 2 of the 4 antenna groups:*  *(1,1,0,0), (1,0,1,0), (1,0,0,1)*  *(0,1,1,0), (0,1,0,1), (0,0,1,1)* | * Ericsson: No pruning; use permutations shown. * vivo: keep it all possible combinations and potentially down-select next when the proposals on precoders are clear * OPPO: Agreed. |
| *3* |  | *Transmission by 2 of the 4  antenna groups:*  *(2,1,0,0), (2,0,1,0), (2,0,0,1)*  *(1,2,0,0), (0,2,1,0), (0,2,0,1)*  *(1,0,2,0), (0,1,2,0), (0,0,2,1)*  *(1,0,0,2), (0,1,0,2), (0,0,1,2)*    *Transmission by 3 of the 4  antenna groups:*  *(1,1,1,0), (1,1,0,1), (1,0,1,1), (0,1,1,1)* | * Ericsson: No pruning; use permutations shown. * vivo: keep it all possible combinations and potentially down-select next when the proposals on precoders are clear * OPPO: We think selection of antenna port group is more important than allocation of layers to selected antenna port group. For 2 groups, (2,1,0,0), (2,0,1,0), (2,0,0,1) (0,2,1,0), (0,2,0,1) (0,0,2,1) can be prioritized and others can be considered for overhead reduction. |
| *4* |  | *Transmission by 2 of  the 4  antenna groups:*  *(2,2,0,0), (2,0,2,0), (2,0,0,2)*  *(0,2,2,0), (0,2,0,2), (0,0,2,2)* | * Ericsson: No pruning; use permutations shown. * vivo: keep it all possible combinations and potentially down-select next when the proposals on precoders are clear * OPPO: Fine. |
| *5* |  | *Transmission by 3 of the antenna groups:*  *(2,2,1,0), (2,2,0,1), (2,1,2,0), (2,1,0,2), (2,0,1,2), (2,0,2,1), (0,2,2,1), (0,2,1,2), (1,2,2,0), (1,2,0,2)*  *(0,1,2,2), (1,0,2,2)*    *Transmission by 2 of the 4 antenna groups:*  *(1,1,2,1), (1,1,1,2)* | * Ericsson: support only (1,1,2,1), (1,1,1,2); and (2,0,2,1), (0,2,1,2) * vivo: keep it all possible combinations and potentially down-select next when the proposals on precoders are clear * OPPO: It should be “Transmission by 4 antenna groups”. We think selection of antenna port group is more important than allocation of layers to selected antenna port group. For 3 groups, (2,2,1,0), (2,2,0,1), (2,0,2,1), (0,2,2,1) can be prioritized and others can be considered for overhead reduction. For 4 groups, one of the permutations may be sufficient for such a high rank. |
| *6* |  | *Transmission by 3 of the 4 antenna groups:*  *(2,2,2,0), (2,2,0,2), (2,0,2,2), (0,2,2,2)*    *Transmission by four antenna groups:*  *(2,1,2,1), (1,2,1,2)* | * Ericsson: support only (2,1,2,1), (1,2,1,2); this saves 32 out of 160 precoders (without other optimizations) * vivo: keep it all possible combinations and potentially down-select next when the proposals on precoders are clear * OPPO: We think selection of antenna port group is more important than allocation of layers to selected antenna port group. For 4 groups, one of the permutations may be sufficient for such a high rank. |
| *7* |  | *(2,2,2,1), (2,2,1,2), (2,1,2,2), (1,2,2,2)* | * Ericsson: support only (2,1,2,2), (1,2,2,2); this saves 64 out of 128 precoders (without other optimizations) * vivo: keep it all possible combinations and potentially down-select next when the proposals on precoders are clear * OPPO: We think one of the permutations may be sufficient for such a high rank. |

*Note: Above is not relevant to how precoders are indicated.*