**FDD CSI**

Study following alternatives, down-select one or more alternatives in RAN1 104e:

**Proposal 3-0: Alt 0:** Based on or **,** can be an identity matrix

**Proposal 3-1**: Based on **,**  study following detailed design of matrices at least for rank 1.

* Alt1: () is a port selection matrix in order to freely select ports out of CSI-RS ports or ports out of CSI-RS ports (FFS polarization-common/specific selection) whereas each column of has only one element of “1”
* Alt2: () is a SD-FD basis selection matrix in order to freely select bases out of bases or bases out of bases (FFS polarization-common/specific selection) whereas each column of has only one element of “1”
  + FFS the mechanism of conveying more than one SD-FD beamforming bases per CSI-RS port which is to be discussed in Proposal 4
* ~~Note that~~ ~~can be an identity matrix for above Alternative~~

**Proposal 3-2**: Based on **,**  study following detailed design of matrices and , at least for rank 1.

* Alt3: () is a port selection matrix in order to freely select ports out of CSI-RS ports or ports out of CSI-RS ports (FFS polarization-common/specific selection) whereas each column of has only one element of “1”, i.e.
  + Alt3-0 (one SD-FD/SD pair per port):() is a DFT based compression matrix (FFS: configured/indicated to the UE and/or selected/reported by the UE), whereas = NCQISubband\*R and .
  + Alt3-1 (Multi-SD-FD pairs per port):() is a DFT matrix selected by the UE from N pre-configured/pre-defined DFT vectors, whereas = NCQISubband\*R and .
    - FFS the mechanism of conveying more than one SD-FD beamforming bases per CSI-RS port which is to be discussed in Proposal 4
    - Note that is not excluded by gNB/codebook configuration.
  + Alt3-2 (Multi-SD-FD/SD pairs per port):() is a selection matrix in order to select M SD-FD basis whereas each column of has only one element of “1”,
    - FFS the mechanism of conveying more than one SD-FD beamforming bases per CSI-RS port which is to be discussed in Proposal 4
    - Note that can be an identity matrix
* Alt4: ( ) is a port-group selection matrix to freely select groups out of port groups or groups out of port groups (FFS polarization-common/specific selection) whereas CSI-RS ports in a resource are divided into groups with ports per group, and each port group corresponding to the same SD basis, i.e.
  + () is a selection matrix to select the same M ports across all port groups each column of has only one element of “1”.
* Alt5: () is a SD-FD basis selection matrix in order to freely select bases out of bases or bases out of bases (FFS polarization-common/specific selection) whereas each column of has only one element of “1”
  + () is a DFT based compression matrix (FFS: configured/indicated to the UE and/or selected/reported by the UE), whereas = NCQISubband\*R and ..
  + FFS the mechanism of conveying more than one SD-FD beamforming bases per CSI-RS port which is to be discussed in Proposal 4
* Note that can be an identity matrix for above Alternative