

R1-073984 – Dedicated Reference Signals for Beamforming

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Overview: Dedicated Reference Signals for Beamforming

- The gains and usefulness of dedicated RS are not clear
 - 4x2 SU-MIMO rank 1 transmission already available
 - For **>4 eNB antennas**, common RS not desired, dedicated RS provides some gain over 4x2 SU-MIMO rank 1 transmission
 - See contribution R1-073982 “*Comparison of MIMO and Beamforming Performance*”
- Dedicated RS is a late feature to add to FDD FS1
 - Will impact specification development schedule and UE complexity
 - Could have a ripple effect on CQI, scheduling, measurements, distributed transmission, ...
- To minimize potential impact, the dedicated RS feature, if agreed, should be agreed ***in detail***
 - Important to avoid incremental agreement over each of the next 4-5 meetings

Dedicated RS – Option #1

- **Option #1**
 - Avoid dedicated RS in FDD FS1
- **Benefits**
 - Avoids specification delay
 - Avoids complicating specification for potentially marginal gain
- **Drawbacks**
 - DL beamforming with >4 antennas not possible for FDD FS1

Dedicated RS – Option #2

- **Option 2:**
 - Specify low complexity, low-impact dedicated RS mode
- **Dedicated RS semi-statically configurable**
- **Applicable as phase reference for PDSCH only**
 - Not applicable to PDCCH, PCFICH, PHICH
- **Mobility measurements not impacted**
 - At least common RS's R0 and R1 must not be impacted to preserve mobility measurement integrity
- **CQI**
 - CQI for common RS should be provided
 - Perhaps at lower rate than if dedicated RS not configured
 - CQI based on dedicated RS *FFS*

Dedicated RS – Option #2 (Cont.)

- **Number of Common RS**
 - Either a) R0 or b) R0 and R1 transmitted in subframes containing dedicated RS
 - Pattern in accordance with existing specification
 - Transmission and reconfiguration of additional common RS's (i.e. R2, R3) FFS
- **Number of Dedicated RS**
 - At most one (1) single dedicated RS associated with an RB
 - Implies at most one (1) stream per UE when configured with dedicated RS
- **UE Capability**
 - Support for dedicated RS is UE capability