

CLAIMS:

1. A method for supporting channel estimation and detection in a Multiple-Input-Multiple-Output, MIMO, system, the method comprising:
generating, by a demodulation reference signal, DM-RS, pattern for subframe with an extended cyclic prefix, CP; and
sending the generated DM-RS pattern to a user equipment for estimating and detecting channel performance,
wherein, the DM-RS pattern includes rank 1-2 pattern which supports for up to 2 layer transmission, and
wherein the DM-RS pattern comprises a punctured version of normal subframe used for different downlink pilot time slot, DwPTS, cases.
2. The method according to claim 1, wherein the DM-RS pattern comprises a staggered structure for normal subframe.
3. The method according to claim 1, wherein the DM-RS pattern adopts a DM-RS overhead of max 16 resource elements, REs, per layer for an extended CP.
4. The method according to claim 1, wherein the DwPTS cases comprises DwPTS with 8, 9 or 10 OFDM symbols.
5. The method according to claim 1, wherein an orthogonal cover code which is used for each group is constructed in time-frequency domain for both normal subframe and DwPTS.

6. A transmitter comprising,
a demodulation reference signal, DM-RS, pattern generator, configured to generate a DM-RS pattern for subframe with an extended cyclic prefix, CP; wherein,
the DM-RS pattern includes rank 1-2 pattern which supports for up to 2 layer transmission, and
the DM-RS pattern comprises a punctured version of normal subframe used for different downlink pilot time slot, DwPTS, cases.

7. The transmitter according to claim 6, wherein the DM-RS pattern comprises a staggered structure for normal subframe.

8. The transmitter according to claim 6, wherein the DM-RS pattern adopts a DM-RS overhead of max 16 resource elements, REs, per layer for an extended CP.

9. A receiver comprising:
a channel estimator module configured to estimate channel performance by using a received demodulation reference signal, DM-RS, pattern for subframe with an extended cyclic prefix; and
a channel detector module configured to detecting coherently by using estimated channel state information, CSI, contained in the received DM-RS, wherein,
the DM-RS pattern includes rank 1-2 pattern which supports for up to 2 layer transmission.

10. The receiver according to claim 9, wherein the DM-RS pattern comprises a staggered structure for normal subframe.

11. The receiver according to claim 9, wherein the DM-RS pattern adopts a DM-RS overhead of max 16 resource elements, REs, per layer for an extended CP.

12. The receiver according to claim 9, wherein the DM-RS pattern comprises a punctured version of normal subframe used for different downlink pilot time slot, DwPTS, cases.

13. A transmitter transmitting the DM-RS pattern according to claim 1.

14. A receiver receiving the DM-RS pattern according to claim 1.

15. A system comprising:

a transmitter having a demodulation reference signal, DM-RS, pattern generator, configured to generate a DM-RS pattern for subframe with an extended cyclic prefix, wherein the DM-RS pattern includes rank 1-2 pattern which supports for up to 2 layer transmission; and

a receiver having

a channel estimator module configured to estimating channel performance by using a received demodulation reference signal, DM-RS, pattern for subframe with an extended cyclic prefix; and

a channel detector module configured to detecting coherently by using estimated channel state information, CSI, contained in the received DM-RS, wherein the DM-RS pattern includes rank 1-2 pattern which supports for up to 2 layer transmission.