

WHAT IS CLAIMED IS:

1. A method for operating a user equipment (UE) in a wireless communication system, the method comprising:

receiving modulation and coding scheme (MCS) information for each of two codewords from a base station (BS);

based on the received MCS information, determining a demodulation reference signal (DMRS) antenna port, among a plurality of DMRS antenna ports, to which a phase tracking reference signal (PTRS) antenna port has been mapped; and

receiving a PTRS via the PTRS antenna port,

wherein, in a case where the two codewords have a different MCS, the PTRS antenna port has been mapped to a DMRS antenna port with the lowest index among one or more DMRS antenna ports for a codeword with the highest MCS among the two codewords, and

wherein, in a case where the two codewords have the same MCS, the PTRS antenna port has been mapped to a DMRS antenna port with the lowest index among the plurality of DMRS antenna ports for the two codewords.

2. The method of claim 1, wherein all DMRS antenna ports related to the two codewords belong to one DMRS antenna port group.

3. The method of claim 1, wherein the PTRS antenna port has at least one of subcarrier indexes configured for the DMRS port to which the PTRS antenna port has been mapped.

4. The method of claim 1, wherein the PTRS antenna port and the DMRS port to which the PTRS antenna port has been mapped have the same precoding.

5. The method of claim 1, further comprising:

transmitting, to the BS, channel quality information (CQI) for each of the two codewords; and

transmitting, to the BS, information on layer index of a layer with the best channel quality among one or more layers included in a codeword with the highest CQI among the two codewords.

6. The method of claim 1, wherein the UE receives the PTRS via the PTRS antenna port, based on the determination.

7. A user equipment (UE) operating in a wireless communication system, the UE comprising:

a transmitter;

a receiver;

at least one processor; and

at least one computer memory operably connectable to the at least one processor and storing instructions that, when executed by the at least one processor, perform operations comprising:

receiving modulation and coding scheme (MCS) information for each of two codewords from a base station (BS);

based on the received MCS information, determining a demodulation reference signal (DMRS) antenna port, among a plurality of DMRS antenna ports, to which a phase tracking reference signal (PTRS) antenna port has been mapped; and

receiving a PTRS via the PTRS antenna port based on the determination,

wherein, in a case where the two codewords have a different MCS, the PTRS antenna port has been mapped to a DMRS antenna port with the lowest index among one or more DMRS antenna ports for a codeword with the highest MCS among the two codewords, and

wherein, in a case where the two codewords have the same MCS, the PTRS antenna port has been mapped to a DMRS antenna port with the lowest index among the plurality of DMRS antenna ports for the two codewords.

8. The UE of claim 7, wherein all DMRS antenna ports related to the two codewords belong to one DMRS antenna port group.

9. The UE of claim 7, wherein the PTRS antenna port has at least one of subcarrier indexes configured for the DMRS port to which the PTRS antenna port has been mapped.

10. The UE of claim 7, wherein the PTRS antenna port and the DMRS port to which the PTRS antenna port has been mapped have the same precoding.

11. The UE of claim 7, the operations further comprising:
transmitting, to the BS, channel quality information (CQI) for each of the two codewords; and

transmitting, to the BS, information on layer index of a layer with the best channel quality among one or more layers included in a codewords with the highest CQI among the two codewords.

12. The UE of claim 7, wherein the UE receives the PTRS via the PTRS antenna port, based on the determination.

13. A base station (BS) operating in a wireless communication system, the BS comprising:

a transmitter;

a receiver;

at least one processor; and

at least one computer memory operably connectable to the at least one processor and storing instructions that, when executed by the at least one processor, perform operations comprising:

transmitting to a user equipment (UE), modulation and coding scheme (MCS) information for each of two codewords;

transmitting to the UE, a phase tracking reference signal (PTRS) via a PTRS antenna port,

wherein the PTRS antenna port is mapped to a demodulation reference signal (DMRS) antenna port, among a plurality of DMRS antenna ports,

wherein, in a case where the two codewords have a different MCS, the PTRS antenna port is mapped to a DMRS antenna port with the lowest index among one or more DMRS antenna ports for a codeword with the highest MCS among the two codewords, and

wherein, in a case where the two codewords have the same MCS, the PTRS antenna port is mapped to a DMRS antenna port with the lowest index among the plurality of DMRS antenna ports for the two codewords.

14. The BS of claim 13, wherein all DMRS antenna ports related to the two codewords belong to one DMRS antenna port group.

15. The BS of claim 13, wherein the PTRS antenna port has at least one of subcarrier indexes configured for the DMRS port to which the PTRS antenna port is mapped.

16. The BS of claim 13, wherein the PTRS antenna port and the DMRS port to which the PTRS antenna port is mapped have the same precoding.

17. The BS of claim 13, the operations further comprising:
receiving from the UE, channel quality information (CQI) for each of the two codewords; and

receiving from the UE, information on layer index of a layer with the best channel quality among one or more layers included in a codewords with the highest CQI among the two codewords.