CLAIMS

1. A method for wireless communications by a user equipment (UE), comprising:

receiving a single physical downlink control channel (PDCCH) scheduling a joint transmission of a transport block (TB) involving at least first and second disjoint sets of resource blocks (RBs), wherein:

the single PDCCH includes an indication of the at least first and second disjoint sets of RBs, first and second quasi co-location (QCL) relationships, and an indication of which QCL relationship corresponds to which of the first and second sets of RBs; and

the single PDCCH includes a frequency domain resource assignment (FDRA) for both the first and second sets of RBs, wherein the FDRA is based on one of a plurality of resource mapping configurations, which is resource block group (RBG) based;

receiving the joint transmission of the TB on the first and second sets of RBs; and

processing the joint transmission of the TB based on QCL relationships,

wherein the single PDCCH includes an indication, for each RBG, of whether that RBG is unscheduled, scheduled and associated to the first QCL relationship, or scheduled and associated for the second QCL relationship.

2. The method of claim 1, wherein the QCL relationships are indicated via at least two Transmission Configuration Indicator (TCI) states.

3. The method of claim 2, wherein the at least two TCI states are indicated by a TCI field code point of a downlink control information (DCI) that maps to the two TCI states.

4. The method of claim 2, wherein each of the two TCI states is associated with one of the first or second sets of RBs.

5. The method of claim 4, wherein each of the two TCI states is associated with one of a first transmission reception point (TRP) or a second TRP.

6. The method of claim 1, wherein:

the one of a plurality of resource mapping configurations is contiguous virtual resource block (VRB) based; and

the single PDCCH indicates which VRBs are associated with which QCL relationship.

7. The method of claim 6, wherein:

the first and second sets of RBs each have the same number of RBs;

the single PDCCH indicates which half of the RBs are associated with which QCL relationship; and

the single PDCCH indicates whether the RBs are contiguous or interleaved.

8. The method of claim 6, wherein:

the first and second sets of RBs are split unequally with different numbers of RBs;

the single PDCCH indicates which split of the RBs are associated with which QCL relationship; and

the single PDCCH indicates whether the RBs are contiguous or interleaved.

9. The method of claim 8, wherein the indication of which split of the RBs are associated with which QCL relationship comprises:

an indication of one of a limited number of possible split combinations.

10. The method of claim 1, wherein the single PDCCH comprises:

a first PDCCH that includes FDRA for only the first set of RBs and QCL relationships for a first TRP.

11. The method of claim 10, wherein:

a second TRP transmits a second PDCCH that includes frequency domain resource assignment for only the second set of RBs and QCL relationships for the second TRP; and

the first and second PDCCH each indicate downlink control information (DCI) carried therein is for the same TB.

12. The method of claim 11, wherein the UE determines the DCI in the first and second PDCCH are for the same TB based on at least one of:

a configuration of the UE to receive multi-TRP transmissions; or

a determination that time domain resources in the two DCI at least partially overlap.

13. The method of claim 10, wherein both the first and second PDCCHs are received from the first TRP.

14. The method of claim 1, wherein the single PDCCH comprises a first part common to both the first and second TRPs and a second part that is TRP-specific.

15. The method of claim 1, wherein the UE monitors for a same length of downlink control information (DCI) for both multi-TRP DCI and single-TRP DCI.

16. The method of claim 1, wherein the UE monitors a different length of downlink control information (DCI) for both multi-TRP DCI than for single-TRP DCI.

17. A method for wireless communications by a first transmission reception point (TRP), comprising:

determining quasi co-location (QCL) parameters for a joint transmission of a transport block (TB) using at least first and second disjoint sets of resource blocks (RBs), and a frequency domain resource assignment (FDRA) for both the first and second sets of RBs, wherein the FDRA is based on one of a plurality of resource mapping configurations, wherein the one of a plurality of resource mapping configurations is resource block group (RBG) based and the PDCCH includes an indication, for each RBG, of whether that RBG is unscheduled, scheduled and associated to the first QCL relationship, or scheduled and associated for the second QCL relationship;

transmitting a single physical downlink control channel (PDCCH) with FDRA information indicating at least the first set of RBs, at least first and second QCL relationships, and an indication of which QCL relationship corresponds to which of the first and second sets of RBs; and

transmitting the TB to a user equipment (UE) using the first set of RBs, as part of the joint transmission.

18. The method of claim 17, wherein the QCL relationships are indicated via at least two Transmission Configuration Indicator (TCI) states.

19. The method of claim 18, wherein the at least two TCI states are indicated by a TCI field code point of the a downlink control information (DCI) that maps to the two TCI states.

20. The method of claim 18, wherein each of the two TCI states is associated with one of the first or second sets of RBs.

21. The method of claim 20, wherein each of the two TCI states is associated with one of the first TRP or a second TRP.

22. The method of claim 17, wherein the single PDCCH comprises:

a first PDCCH that includes FDRA for only the first set of RBs and QCL relationships for the first TRP.

23. The method of claim 22, wherein:

the a second TRP transmits a second PDCCH that includes frequency domain resource assignment for only the second set of RBs and QCL relationships for the second TRP; and

the first and second PDCCH each indicate downlink control information (DCI) carried therein is for the same TB.

24. The method of claim 22, further comprising transmitting a second PDCCH that includes FDRA for only the second set of RBs and QCL relationships for the a second TRP.

25. The method of claim 17, wherein the single PDCCH comprises a first part common to both the first and second TRPs and a second part that is TRP-specific.

26. The method of claim 17, wherein multi-TRP downlink control information (DCI) carried in the single PDCCH has a same length as single-TRP DCI.

27. The method of claim 17, wherein multi-TRP downlink control information (DCI) carried in the single PDCCH has a different length as single-TRP DCI.

28. A method for wireless communications by a first transmission reception point (TRP), comprising:

determining quasi co-location (QCL) parameters for a joint transmission of a transport block (TB) using at least first and second disjoint sets of resource blocks (RBs), and a frequency domain resource assignment (FDRA) for both the first and second sets of RBs, wherein the FDRA is based on one of a plurality of resource mapping configurations, wherein the one of a plurality of resource mapping configurations is contiguous virtual resource block (VRB) based and the PDCCH indicates which VRBs are associated with which QCL relationship;

transmitting a single physical downlink control channel (PDCCH) with FDRA information indicating at least the first set of RBs, at least first and second QCL relationships, and an indication of which QCL relationship corresponds to which of the first and second sets of RBs; and

transmitting the TB to a user equipment (UE) using the first set of RBs, as part of the joint transmission.

29. The method of claim 28, wherein:

the first and second sets of RBs each have the same number of RBs;

the single PDCCH indicates which half of the RBs are associated with which QCL relationship; and

the single PDCCH indicates whether the RBs are contiguous or interleaved.

30. The method of claim 28, wherein:

the first and second sets of RBs are split unequally with different numbers of RBs;

the single PDCCH indicates which split of the RBs are associated with which QCL relationship; and

the single PDCCH indicates whether the RBs are contiguous or interleaved.

31. The method of claim 30, wherein the indication of which split of the RBs are associated with which QCL relationship comprises:

an indication of one of a limited number of possible split combinations.