

CLAIMS

What is claimed is:

1. A method of managing cross-carrier scheduling by a processor of a wireless device, comprising:
 - determining whether downlink control information (DCI) received from a secondary cell schedules communications on a primary cell; and
 - determining cross-carrier scheduling of communications on the primary cell in response to determining that the DCI received from the secondary cell schedules communications on the primary cell.
2. The method of claim 1, further comprising determining that the DCI received from the secondary cell schedules communications on the primary cell in response to determining that the DCI from the secondary cell comprises a DCI format configured to schedule communications on the primary cell.
3. The method of claim 1, further comprising determining that the DCI received from the secondary cell schedules communications on the primary cell in response to determining that the DCI from the secondary cell comprises a Carrier Indication Field (CIF) configured to schedule communications on the primary cell.
4. The method of claim 1, further comprising determining that the DCI provides scheduling information for communications on the primary cell in response to determining that the DCI provides scheduling information for communications on one of a physical downlink shared channel (PDSCH) or a physical uplink shared channel (PUSCH) of the primary cell.
5. The method of claim 3, further comprising:
 - monitoring one or more of DCI formats 0_1, 0_2, 1_1, and 1_2 on the secondary cell; and

determining that the DCI received from the secondary cell comprises the CIF configured to schedule communications on the primary cell based on the information in the monitored DCI formats.

6. The method of claim 3, further comprising:

monitoring one or more DCI formats on the secondary cell and monitoring common search spaces corresponding to DCI formats 0_0 and 1_0 for non-unicast communications on the primary cell.

7. The method of claim 6, further comprising:

determining whether the secondary cell has been deactivated; and
monitoring a DCI from the primary cell in response to determining that the secondary cell has been deactivated.

8. The method of claim 1, further comprising:

monitoring a control channel of the secondary cell for the DCI that schedules communications on the primary cell,
wherein the determining whether DCI received from the secondary cell schedules communications on the primary cell includes:

determining whether the DCI received from the secondary cell schedules communications on a primary cell based on the monitoring of the control channel of the secondary cell for the DCI that schedules communications on the primary cell.

9. The method of claim 1, wherein the determining cross-carrier scheduling of communications on the primary cell based on the DCI received from the secondary cell comprises determining a schedule of unicast communications on the primary cell based on the DCI received from the secondary cell.

10. The method of claim 9, further comprising monitoring a Type 1 common search space (Type1-CSS) on the secondary cell.
11. The method of claim 9, further comprising configuring the wireless device not to monitor a DCI format of the primary cell with a CRC scrambled by a cell radio network temporary identifier (C-RNTI).
12. The method of claim 1, further comprising:
- determining whether a second DCI from the primary cell schedules a retransmission on the primary cell; and
 - receiving the retransmission on the primary cell in response to determining that a second DCI from the primary cell schedules a retransmission on the primary cell.
13. The method of claim 1, further comprising:
- determining whether a second DCI from the secondary cell schedules a retransmission on the primary cell; and
 - receiving the retransmission on the primary cell in response to determining that a second DCI from the primary cell schedules a retransmission on the primary cell.
14. A wireless device, comprising:
- a transceiver;
 - a memory; and
 - a processor coupled to the transceiver and the memory and configured with processor-executable instructions to perform operations comprising:
 - determining whether downlink control information (DCI) received from a secondary cell schedules communications on a primary cell; and
 - determining cross-carrier scheduling of communications on the primary cell in response to determining that the DCI received from the secondary cell schedules communications on the primary cell.

15. The wireless device of claim 14, wherein the processor is configured with processor-executable instructions to perform operations further comprising determining that the DCI received from the secondary cell schedules communications on the primary cell in response to determining that the DCI from the secondary cell comprises a DCI format configured to schedule communications on the primary cell.

16. The wireless device of claim 14, wherein the processor is configured with processor-executable instructions to perform operations further comprising determining that the DCI received from the secondary cell schedules communications on the primary cell in response to determining that the DCI from the secondary cell comprises a Carrier Indication Field (CIF) configured to schedule communications on the primary cell.

17. The wireless device of claim 14, wherein the processor is configured with processor-executable instructions to perform operations further comprising determining that the DCI provides scheduling information for communications on the primary cell in response to determining that the DCI provides scheduling information for communications on one of a physical downlink shared channel (PDSCH) or a physical uplink shared channel (PUSCH) of the primary cell.

18. The wireless device of claim 17, wherein the processor is configured with processor-executable instructions to perform operations further comprising:

monitoring one or more of DCI formats 0_1, 0_2, 1_1, and 1_2 on the secondary cell; and

determining that the DCI received from the secondary cell comprises the CIF configured to schedule communications on the primary cell based on the information in the monitored DCI formats.

19. The wireless device of claim 17, wherein the processor is configured with processor-executable instructions to perform operations further comprising:

monitoring one or more DCI formats on the secondary cell and monitoring common search spaces corresponding to DCI formats 0_0 and 1_0 for non-unicast communications on the primary cell.

20. The wireless device of claim 19, wherein the processor is configured with processor-executable instructions to perform operations further comprising:

determining whether the secondary cell has been deactivated; and
monitoring a DCI from the primary cell in response to determining that the secondary cell has been deactivated.

21. The wireless device of claim 14, wherein the processor is configured with processor-executable instructions to perform operations further comprising:

monitoring a control channel of the secondary cell for the DCI that schedules communications on the primary cell,

wherein the determining whether DCI received from the secondary cell schedules communications on the primary cell includes:

determining whether the DCI received from the secondary cell schedules communications on a primary cell based on the monitoring of the control channel of the secondary cell for the DCI that schedules communications on the primary cell.

22. The wireless device of claim 14, wherein the processor is configured with processor-executable instructions to perform operations such that the determining cross-carrier scheduling of communications on the primary cell based on the DCI received from the secondary cell comprises determining a schedule of unicast communications on the primary cell based on the DCI received from the secondary cell.

23. The wireless device of claim 22, wherein the processor is configured with processor-executable instructions to perform operations further comprising monitoring a Type 1 common search space (Type1-CSS) on the secondary cell.

24. The wireless device of claim 22, wherein the processor is configured with processor-executable instructions to perform operations further comprising configuring the wireless device not to monitor a DCI format of the primary cell with a CRC scrambled by a cell radio network temporary identifier (C-RNTI).

25. The wireless device of claim 14, wherein the processor is configured with processor-executable instructions to perform operations further comprising:
determining whether a second DCI from the primary cell schedules a retransmission on the primary cell; and
receiving the retransmission on the primary cell in response to determining that a second DCI from the primary cell schedules a retransmission on the primary cell.

26. The wireless device of claim 14, wherein the processor is configured with processor-executable instructions to perform operations further comprising:
determining whether a second DCI from the secondary cell schedules a retransmission on the primary cell; and
receiving the retransmission on the primary cell in response to determining that a second DCI from the primary cell schedules a retransmission on the primary cell.

27. A method of managing cross-carrier scheduling by a processor of a network device, comprising:
scheduling communications on a primary cell in downlink control information (DCI) of a secondary cell; and
performing cross-carrier scheduling of communications on the primary cell based on the DCI of the secondary cell.

28. The method of claim 27, wherein the scheduling communications on the primary cell in the DCI of the secondary cell comprises scheduling communications on the primary cell in a DCI format configured to schedule communications on the primary cell.

29. A network device, comprising:

a communication interface; and

a processor coupled to the communication interface and configured with processor-executable instructions to perform operations comprising:

scheduling communications on a primary cell in downlink control information (DCI) of a secondary cell; and
performing cross-carrier scheduling of communications on the primary cell based on the DCI of the secondary cell.

30. The network device of claim 14, wherein the processor is configured with processor-executable instructions to perform operations such that the scheduling communications on the primary cell in the DCI of the secondary cell comprises scheduling communications on the primary cell in a DCI format configured to schedule communications on the primary cell.