CLAIMS

1. A method of managing cross-carrier scheduling by a processor of a wireless device, comprising: receiving downlink control information (DCI) from a secondary cell that schedules communications on a primary cell; implementing cross-carrier scheduling of communications on the primary cell; receiving a second DCI from the secondary cell that schedules a retransmission on the primary cell; and receiving the retransmission on the primary cell associated with receiving the second DCI from the secondary cell that schedules the retransmission on the primary cell.

2. The method of claim 1, wherein: the DCI from the secondary cell comprises a DCI format configured to schedule communications on the primary cell; and implementing cross-carrier scheduling of communications on the primary cell is associated with receiving the DCI comprising the DCI format configured to schedule communications on the primary cell.

3. The method of claim 1, wherein: the DCI from the secondary cell comprises a Carrier Indicator Field (CIF) configured to schedule communications on the primary cell; and implementing cross-carrier scheduling of communications on the primary cell is associated with receiving the DCI comprising the CIF configured to schedule communications on the primary cell.

4. The method of claim 3, wherein: the CIF configured to schedule communications on the primary cell comprises one or more of DCI formats 0_1, 0_2, 1_1, and 1_2 on the secondary cell; and implementing cross-carrier scheduling of communications on the primary cell is associated with receiving the CIF configured to schedule communications on the primary cell comprising the one or more of DCI formats 0_1, 0_2, 1_1, and 1_2 on the secondary cell.

5. The method of claim 1, wherein: 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; and implementing cross-carrier scheduling of communications on the primary cell is associated with receiving the DCI comprising the scheduling information for communications on one of a PDSCH or a PUSCH of the primary cell.

6. The method of claim 1, wherein receiving the DCI from the secondary cell that schedules communications on the primary cell comprises: monitoring a control channel of the secondary cell for the DCI that schedules communications on the primary cell; and receiving the DCI from a secondary cell that schedules communications on the primary cell.

7. The method of claim 1, further comprising: receiving DCI from the primary cell that schedules communications on the primary cell; and performing scheduling of communications on the primary cell associated with receiving the DCI from the primary cell that schedules communications on the primary cell.

8. The method of claim 7, further comprising: monitoring a DCI format of the primary cell with a CRC scrambled by a cell radio network temporary identifier (C-RNTI) at a first time; and monitoring a DCI format of the secondary cell with a CRC scrambled by a C-RNTI at a second time, wherein receiving DCI from the primary cell that schedules communications on the primary

cell is associated with the monitoring of the DCI format of the primary cell with the CRC scrambled by the C-RNTI at the first time, and wherein receiving DCI from a secondary cell that schedules communications on a primary cell is associated with the monitoring of the DCI format of the secondary cell with the CRC scrambled by the C-RNTI at the second time.

9. The method of claim 1, wherein implementing cross-carrier scheduling of communications on the primary cell comprises receiving unicast communications on the primary cell associated with receiving the DCI from the secondary cell that schedules communications on the primary cell.

10. The method of claim 9, wherein receiving the DCI from the secondary cell that schedules communications on the primary cell comprises monitoring a Type 1 common search space (Type1-CSS) on the secondary cell.

11. The method of claim 1, further comprising: monitoring a DCI in a Type3-CSS or a wireless device-specific search space (USS) on the primary cell; and receiving unicast communications on the primary cell associated with monitoring the DCI in the Type3-CSS or the USS on the primary cell.

12. The method of claim 11, wherein: monitoring a DCI in a Type3-CSS or a wireless device-specific search space (USS) on the primary cell comprises receiving a second DCI comprising a DCI format 0_0 or a DCI format 1_0 with the CRC scrambled by the C-RNTI in the Type3-CSS or the USS on the primary cell, and receiving unicast communications on the primary cell associated with monitoring the DCI format 0_0 or the DCI format 1_0 with the CRC scrambled by a C-RNTI in the Type3-CSS or the USS on the primary cell comprises receiving a retransmission on the primary cell associated with receiving the second DCI comprising the DCI format 0_0 or the DCI format 1_0 with the CRC scrambled by the C-RNTI in the Type3-CSS or the USS on the primary cell.

13. The method of claim 1, 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.

14. The method of claim 1, further comprising: receiving DCI from the secondary cell indicating that the secondary cell has been deactivated; and monitoring a DCI from the primary cell associated with receiving the DCI from the secondary cell indicating that the secondary cell has been deactivated.

15. 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: receiving downlink control information (DCI) from a secondary cell that schedules communications on a primary cell; implementing cross-carrier scheduling of communications on the primary cell; receiving a second DCI from the secondary cell that schedules a retransmission on the primary cell; and receiving the retransmission on the primary cell associated with receiving the second DCI from the secondary cell that schedules the retransmission on the primary cell.

16. The wireless device of claim 15, wherein: the DCI from the secondary cell comprises a DCI format configured to schedule communications on the primary cell; and the processor is configured with processor-executable instructions to perform operations such that implementing cross-carrier scheduling of communications on the primary cell is associated with receiving the DCI comprising the DCI format configured to schedule communications on the primary cell.

17. The wireless device of claim 15, wherein: the DCI from the secondary cell comprises a Carrier Indicator Field (CIF) configured to schedule communications on the primary cell; and the processor is configured with processor-executable instructions to perform operations such that implementing cross-carrier scheduling of communications on the primary cell is associated with receiving the DCI comprising the CIF configured to schedule communications on the primary cell.

18. The wireless device of claim 17, wherein: the CIF configured to schedule communications on the primary cell comprises one or more of DCI formats 0_1, 0_2, 1_1, and 1_2 on the secondary cell; and the processor is configured with processor-executable instructions to perform operations such that implementing cross-carrier scheduling of communications on the primary cell is associated with receiving the CIF configured to schedule communications on the primary cell comprising the one or more of DCI formats 0_1, 0_2, 1_1, and 1_2 on the secondary cell.

19. The wireless device of claim 15, wherein: 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; and the processor is configured with processor-executable instructions to perform operations such that implementing cross-carrier scheduling of communications on the primary cell is associated with receiving the DCI comprising the scheduling information for communications on one of a PDSCH or a PUSCH of the primary cell.

20. The wireless device of claim 15, wherein the processor is configured with processor-executable instructions to perform operations such that receiving the DCI from the secondary cell that schedules communications on the primary cell comprises: monitoring a control channel of the secondary cell for the DCI that schedules communications on the primary cell; and receiving the DCI from a secondary cell that schedules communications on the primary cell.

21. The wireless device of claim 15, wherein the processor is configured with processor-executable instructions to perform operations further comprising: receiving DCI from the primary cell that schedules communications on the primary cell; and performing scheduling of communications on the primary cell associated with receiving the DCI from the primary cell that schedules communications on the primary cell.

22. The wireless device of claim 21, wherein the processor is configured with processor-executable instructions to perform operations further comprising: monitoring a DCI format of the primary cell with a CRC scrambled by a cell radio network temporary identifier (C-RNTI) at a first time; and monitoring a DCI format of the secondary cell with a CRC scrambled by a C-RNTI at a second time, wherein receiving DCI from the primary cell that schedules communications on the primary cell is associated with the monitoring of the DCI format of the primary cell with the CRC scrambled by the C-RNTI at the first time, and wherein receiving DCI from a secondary cell that schedules communications on a primary cell is associated with the

monitoring of the DCI format of the secondary cell with the CRC scrambled by the C-RNTI at the second time.

23. The wireless device of claim 15, wherein the processor is configured with processor-executable instructions to perform operations such that implementing cross-carrier scheduling of communications on the primary cell comprises receiving unicast communications on the primary cell associated with receiving the DCI from the secondary cell that schedules communications on the primary cell.

24. The wireless device of claim 23, wherein the processor is configured with processor-executable instructions to perform operations such that receiving the DCI from the secondary cell that schedules communications on the primary cell comprises monitoring a Type 1 common search space (Type1-CSS) on the secondary cell.

25. The wireless device of claim 15, wherein the processor is configured with processor-executable instructions to perform operations further comprising: monitoring a DCI in a Type3-CSS or a wireless device-specific search space (USS) on the primary cell; and receiving unicast communications on the primary cell associated with monitoring the DCI in the Type3-CSS or the USS on the primary cell.

26. The wireless device of claim 25, wherein the processor is configured with processor-executable instructions to perform operations such that: monitoring a DCI in a Type3-CSS or a wireless device-specific search space (USS) on the primary cell comprises receiving a second DCI comprising a DCI format 0_0 or a DCI format 1_0 with the CRC scrambled by the C-RNTI in the Type3-CSS or the USS on the primary cell, and receiving unicast communications on the primary cell associated with monitoring the DCI format 0_0 or the DCI format 1_0 with the CRC scrambled by a C-RNTI in the Type3-CSS or the USS on the primary cell comprises receiving a retransmission on the primary cell associated with receiving the second DCI comprising the DCI format 0_0 or the DCI format 1_0 with the CRC scrambled by the C-RNTI in the Type3-CSS or the USS on the primary cell.

27. The wireless device of claim 15, 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.

28. The wireless device of claim 15, wherein the processor is configured with processor-executable instructions to perform operations further comprising: receiving DCI from the secondary cell indicating that the secondary cell has been deactivated; and monitoring a DCI from the primary cell associated with receiving the DCI from the secondary cell indicating that the secondary cell has been deactivated.