

What is claimed:

1. A method for mitigating interference between radio access technology (RAT) components in a wireless device, the method comprising:

detecting, at the wireless device, an in-device interference situation between a first RAT component and a second RAT component of the wireless device, wherein at least one of the first or second RAT component is a long term evolution (LTE) technology component;

determining, at the wireless device, that at least one of the first or second RAT component is a victim of the in-device interference situation at one or more frequencies;

sending, from the wireless device, a notification of the detected in-device interference situation to an LTE network, wherein the notification comprises information for assisting with the detected in-device interference situation, the information indicating which of the first and/or second RAT component is a victim of the in-device interference situation and indicating the one or more frequencies at which the victim is interfered, the information further comprising one or more suggested parameters associated with a time division multiplexing (TDM) scheme to assist with the detected in-device interference situation; and

receiving, at the wireless device, configuration information based on sending the notification of the detected in-device interference situation, wherein the configuration information comprises information associated with a pattern for transmission and/or reception at the wireless device or a change of a pattern for transmission and/or reception at the wireless device.

2. The method of claim 1, wherein the configuration information comprises at least an action or an indication thereof to be performed by the wireless device in response to the detected in-device interference situation to mitigate the detected in-device interference situation.

3. The method of claim 2, further comprising performing at least one of the following: a handover for at least one of the first RAT or second RAT component; a time coordination between transmission or reception on at least one of the first RAT or second RAT component; a redirection to another frequency; an activation of the first RAT or second RAT component; a delayed activation of the first RAT or second RAT component; turning off the first RAT or second RAT component; turning on the first RAT or second RAT component; a denial of transmissions for at least one of the first or second RAT component; a move to a reduced uplink (UL) mode; and power scaling on a frequency band associated with the first RAT or second RAT component.

4. The method of claim 2, further comprising performing at least one of the following in response to receiving the configuration information: applying a configuration for an in-device interfering event; processing information associated with a capability of a network; applying a scaling value; processing a new measurement configuration message; switching to a new frequency band; applying an activation delay for the first or second RAT component; starting the first or second RAT component; keeping the first RAT or second RAT component off; performing a handover; applying measurement control information; applying a reconfiguration; performing a discontinuous reception (DRX) operation; performing a frequency division multiplexing (FDM) operation; performing a TDM operation; performing a frequency division duplex (FDD) half duplex operation.

5. The method of claim 3, wherein the handover comprises an inter-frequency handover.

6. The method of claim 3, wherein the time coordination between transmission or reception on at least one of the first RAT or second RAT component comprises ensuring transmission of a radio signal on at least one of the first or second RAT components does not coincide with reception of another signal on at least one of the first or second RAT components.

7. The method of claim 3, wherein the denial of transmissions is performed during paging and measurement periods.

8. The method of claim 3, wherein the delayed activation of the first RAT or second RAT component is delayed based on at least one of the following: a service priority, an activity, or a procedure.

9. The method of claim 1, wherein the in-device interference situation is detected based on or in response to one or more triggers.

10. The method of claim 9, wherein the one or more triggers comprise at least one of the following: proactive triggers; reactive triggers; a handover being initiated; a change in a mode of operation; a change in a usage scenario change; a change in a service scenario change; an expiration of a timer; a generation of a predetermined load; and a size of a buffer.

11. The method of claim 10, wherein the notification comprises at least one of the following: an indication the first RAT or second RAT component needs to be activated or is activated; an indication the first RAT or second RAT com-

ponent needs to be turned or is turned on; information associated with the one or more triggers; information associated with technology types causing the in-device interference situation; an indication of a capability of the wireless device to handle the in-device interference situation; information associated with the first or second RAT component; usage scenario requested by the first RAT or second RAT component; service scenario requested by the first RAT or second RAT component; information associated with a timer; information associated with a mode of operation of the first RAT or second RAT component; an indication on when the first or second RAT should be turned on; measurements associated with the first RAT or second RAT component; a hopping frequency associated with the first RAT or second RAT component; a list of frequency supported by the first RAT or second RAT component; an indication of an urgency associated with turning on the first RAT or second RAT component; a request for assisted-global navigation satellite system (A-GNSS); information associated with a source cell; and information associated with a buffer size of the first RAT or second RAT component.

12. The method of claim **10**, wherein the reactive triggers are based on one or more events or one or more conditions.

13. The method of claim **12**, wherein the one or more events comprise an in-device knowledge that at least one of the first or second RAT components are active and causing interference.

14. The method of claim **12**, wherein the one or more conditions comprise at least one of the following: a reference signal received quality (RSRQ), a reference signal received power (RSRP), or a channel quality indicator (CQI).

15. The method of claim **10**, wherein, when the one or more triggers comprise the handover, the information for assisting with mitigation of the in-device interference situation is transferred to a target evolved NodeB (eNB) associated with the handover or the target eNB is made aware of the in-device interference situation.

16. The method of claim **10**, further comprising sending another notification after the handover takes place.

17. The method of claim **9**, wherein the one or more triggers comprise an interference scenario change.

18. The method of claim **17**, wherein the interference change scenario comprises the wireless device no longer experiencing the in-device interference situation.

19. The method of claim 1, wherein the notification is sent via at least one of the following: via a radio resource control (RRC) connection establishment procedure, via a new field in a RRC message; via a RRC connection request message, via a RRC connect setup complete message; via a routing area update message; and via a medium access control (MAC) control element.

20. The method of claim 1, wherein the first RAT component supports a first radio technology and the second RAT component supports a second radio technology, and wherein the first and second radio technologies are different.

21. The method of claim 1, wherein the one or more suggested parameters associated with the TDM scheme are associated with a discontinuous (DRX) pattern.

22. The method of claim 21, wherein the one or more suggested parameters comprise at least one of the following: a cycle, a periodicity, a cycle length, an offset, or an active time.

23. The method of claim 1, wherein the information comprises information associated with whether the first RAT component or the second RAT component is an aggressor of the in-device interference situation.

24. The method of claim 1, wherein the notification of the in-device interference situation is sent to the LTE network when the wireless device is not recovering from the in-device interference situation.

25. The method of claim 1, wherein the notification is sent when the in-device interference situation is not an interference situation capable of being mitigated by the wireless device.

26. The method of claim 1, further comprising sending, from the wireless device to the LTE network, a capability of the wireless device to handle the in-device interference situation.

27. The method of claim 1, further comprising receiving, from the LTE network, a configuration for reporting or monitoring the in-device interference situation.

28. The method of claim 27, wherein the notification is sent based on the configuration indicating the wireless device is capable or allowed to send the notification.

29. The method of claim 1, further comprising reporting to the LTE network when the wireless device no longer experiences the in-device interference situation.

30. The method of claim 1, wherein the information for assisting with the in-device interference situation further comprises at least one of the following: an indication on whether the interfering radio access technology is interfering with a downlink (DL) LTE reception; and indication on whether an uplink (UL) LTE transmission is interfering with another radio access technology; and an indication or information associated with whether the UL LTE transmission or DL LTE reception may be interfered with during transmission or reception.

31. A wireless transmit/receive unit (WTRU) for mitigating interference between co-existing radio access technology (RAT) components included therein, the WTRU comprising:

a processor configured to:

detect an in-device interference situation between at least a first RAT component and a second RAT component in the WTRU, wherein at least one of the first or second RAT component is a long term evolution (LTE) technology component;

determine that at least one of the first or second RAT component is a victim of the in-device interference situation at one or more frequencies;

send a notification of the detected in-device interference situation to an LTE network, wherein the notification comprises information for assisting with the detected in-device interference situation, the information indicating which of the first and/or second RAT component is a victim of the in-device interference situation and indicating the one or more frequencies at which the victim is interfered, the information further comprising one or more suggested parameters associated with a time division multiplexing (TDM) scheme to assist with the in-device interference situation; and

receive, from the LTE network, configuration information based on sending the notification of the detected in-device interference situation between the first and second RAT components in the WTRU, wherein the configuration information comprises information associated with a pattern for transmission and/or reception at the WTRU or a change of a pattern for transmission and/or reception at the WTRU.

32. The WTRU of claim 31, wherein the configuration information comprises at least an action or an indication

thereof to be performed by the WTRU in response to the detected in-device interference situation to mitigate the detected in-device interference situation and wherein the processor is further configured to perform at least one of the following: a handover for at least one of the first RAT or second RAT component; a time coordination between transmission or reception on at least one of the first RAT or second RAT component; a redirection to another frequency; an activation of the first RAT or second RAT component; a delayed activation of the first RAT or second RAT component; turning off the first RAT or second RAT component; turning on the first RAT or second RAT component; a denial of transmissions for at least one of the first or second RAT component; a move to a reduced uplink (UL) mode; and power scaling on a frequency band associated with the first RAT or second RAT component.

33. The WTRU of claim **32**, wherein the handover comprises an inter-frequency handover.

34. The WTRU of claim **32**, wherein the processor is configured to remove one or more cells to provide frequency separation between the first and second RAT components.

35. The WTRU of claim **32**, wherein the time coordination between transmission or reception on at least one of the first RAT or second RAT component comprises ensuring transmission of a radio signal on at least one of the first or second RAT components does not coincide with reception of another signal on at least one of the first or second RAT components.

36. The WTRU of claim **32**, wherein the denial of transmissions is performed during paging and measurement periods.

37. The WTRU of claim **32**, wherein the delayed activation of the first RAT or second RAT component is delayed based on at least one of the following: a service priority, an activity, or a procedure.

38. The WTRU of claim **31**, wherein the processor is configured to perform at least one of the following in response to receiving the configuration information: applying a configuration for an in-device interfering event; processing information associated with a capability of a network; applying a scaling value; processing a new measurement configuration message; switching to a new frequency band; applying an activation delay for the first or second RAT component; starting the first or second RAT component; keeping the first RAT or second RAT component off; performing a handover; applying measurement control information; applying a reconfiguration; performing a discontinuous reception (DRX) operation; performing a frequency division multiplexing (FDM) operation; performing a TDM operation; performing a frequency division duplex (FDD) half duplex operation.

39. The WTRU of claim **31**, wherein the in-device interference situation is detected based on or in response to one or more triggers.

40. The WTRU of claim **39**, wherein the one or more triggers comprise at least one of the following: proactive triggers; reactive triggers; a handover being initiated; a change in a mode of operation; a change in a usage scenario change; a change in a service scenario change; an expiration of a timer; a generation of a predetermined load; and a size of a buffer.

41. The WTRU of claim **40**, wherein the notification comprises at least one of the following: an indication the first RAT or second RAT component needs to be activated or is activated; an indication the first RAT or second RAT component needs to be turned on or is turned on; information associated with the one or more triggers; information associated with technology types causing the in-device interference situation; an indication of a capability of the WTRU to handle the in-device interference situation; information associated with the first or second RAT component; usage scenario requested by the first RAT or second RAT component; service scenario requested by the first RAT or second RAT component; information associated with a timer; information associated with a mode of operation of the first RAT or second RAT component; an indication on when the first or second RAT should be turned on; measurements associated with the first RAT or second RAT component; a hopping frequency associated with the first RAT or second RAT component; a list of frequency supported by the first RAT or second RAT component; an indication of an urgency associated with turning on the first RAT or second RAT component; a request for assisted-global navigation satellite system (A-GNSS); information associated with a source cell; and information associated with a buffer size of the first RAT or second RAT component.

42. The WTRU of claim **40**, wherein the reactive triggers are based on one or more events or one or more conditions.

43. The WTRU of claim **42**, wherein the one or more events comprise an in-device knowledge that at least one of the first or second RAT components is active and causing interference.

44. The WTRU of claim **42**, wherein the one or more conditions comprise at least one of the following: a reference signal received quality (RSRQ), a reference signal received power (RSRP), or a channel quality indicator (CQI).

45. The WTRU of claim **40**, wherein, when the one or more triggers comprise the handover, the information for assisting with mitigation of the in-device interference situation is transferred to a target evolved NodeB (eNB) associated with the handover or the target eNB is made aware of the in-device interference situation.

46. The WTRU of claim **40**, wherein the processor is further configured to send another notification after the handover takes place.

47. The WTRU of claim **39**, wherein the one or more triggers comprise an interference scenario change.

48. The WTRU of claim **47**, wherein the interference scenario change comprises the WTRU no longer experiencing the in-device interference situation.

49. The WTRU of claim **31**, wherein the notification is sent via at least one of the following: via a radio resource control (RRC) connection establishment procedure; via a new field in a RRC message; via a RRC connection request message; via a RRC connect setup complete message; via a routing area update message; and via a medium access control (MAC) control element.

50. The WTRU of claim **31**, wherein the first RAT component supports a first radio technology and the second RAT component supports a second radio technology, and wherein the first and second radio technologies are different.

51. The WTRU of claim **31**, wherein the one or more suggested parameters associated with the time division multiplexing (TDM) scheme are associated with a discontinuous (DRX) pattern.

52. The WTRU of claim **51**, wherein the one or more suggest parameters comprise at least one of the following: a cycle, a cycle length, an offset, or an active time.

53. The WTRU of claim **31**, wherein the information comprises an indication of whether the first RAT component or the second RAT component is an aggressor of the interference situation.

54. The WTRU of claim **31**, wherein the notification of the in-device interference situation is sent to the LTE network when the WTRU is not recovering from the in-device interference situation.

55. The WTRU of claim **31**, wherein the notification is sent when the in-device interference situation is not an interference situation capable of being mitigated by the WTRU.

56. The WTRU of claim **31**, wherein the processor is further configured to send, from the WTRU to the LTE network, a capability of the WTRU to handle the in-device interference situation.

57. The WTRU of claim **31**, wherein the processor is further configured to receive, from the LTE network, a configuration for reporting or monitoring the in-device interference situation.

58. The WTRU of claim **57**, wherein the notification is sent based on the configuration indicating the WTRU is capable or allowed to send the notification.

59. The WTRU of claim **31**, wherein the processor is further configured to report to the LTE network when the WTRU no longer experiences the in-device interference situation.

60. The WTRU of claim **31**, wherein the information for assisting with the in-device interference situation further comprises at least one of the following: an indication on whether the interfering radio access technology is interfering the downlink (DL) LTE reception; and indication on whether the uplink (UL) LTE is interfering with the other radio access technology; and an indication or information associated with whether the UL or DL may be interfered with during transmission or reception.

61. A method for mitigating interference between radio access technology (RAT) components in a wireless device, the method comprising:

- detecting an in-device interference situation between a first RAT component and a second RAT component in the wireless device, wherein at least one of the first or second RAT component is a long term evolution (LTE) technology component;

- determining that at least one of the first or second RAT component is a victim of the in-device interference situation at one or more frequencies;

- sending a notification of the detected in-device interference situation to an LTE network, wherein the notification comprises information for assisting with the detected in-device interference situation, the information indicating which of the first and/or second RAT component is a victim of the in-device interference situation and indicating the one or more frequencies at which the victim is interfered, the information further comprising one or more suggested parameters associated with a time division multiplexing (TDM) scheme to assist with the in-device interference situation;

- receiving, from the LTE network, an action or an indication thereof to be performed by the wireless device in response to the notification, wherein the action is associated with applying a pattern for transmission and/or reception at the wireless device or a change of a pattern for transmission and/or reception at the wireless device; and

- performing the action to mitigate the detected in-device interference situation.

62. The method of claim **61**, wherein the in-device interference situation is detected based on one or more triggers comprising at least one of the following: proactive triggers; reactive triggers; a handover being initiated; a change in a mode of operation; a change in a usage scenario change; a change in a service scenario change; an expiration of a timer; a generation of a predetermined load; and a size of a buffer.

63. The method of claim **62**, wherein, when the one or more triggers comprise the handover, the information for assisting with mitigation of the in-device interference situation is transferred to a target evolved NodeB (eNB) associated with the handover or the target eNB is made aware of the interference situation.

64. The method of claim **62**, further comprising sending another notification after the handover takes place.

65. The method of claim **61**, wherein the first RAT component supports a first radio technology and the second RAT component supports a second radio technology, and wherein the first and second radio technologies are different.