CLAIMS

1. A method implemented by a base station, comprising:

determining that a mobile terminal served by the base station has extended cell search capability;

transmitting an extended cell search message to the mobile terminal to enable extended cell searching by the mobile terminal;

transmitting a measurement map to the mobile terminal relating cell identities of candidate cells and corresponding subframes for performing measurements.

2. The method of claim 1 wherein the measurement map is transmitted in the extended cell search message.

3. The method of claim 1 wherein the measurement map is transmitted separately from the extended cell search message.

4. The method of claim 1 wherein transmitting an extended cell search message to the mobile terminal comprises transmitting the extended cell search message in one of a radio resource control signaling message and a layer 1 signaling message.

5. The method of claim 1 wherein the extended cell search message includes an indication that there are candidate cells that the mobile terminal could select as a serving cell.

6. The base station comprising:

a transceiver for communicating with mobile terminals;

a control circuit to control operation of the transceiver, said control circuit configured to:

determine that a mobile terminal served by the base station has extend cell search capability;

transmit an extended cell search message to the mobile terminal to enable extended cell searching by the mobile terminal;

transmit a measurement map to the mobile terminal relating cell identities of candidate cells and corresponding subframes for performing measurements.

7. The base station of claim 6 wherein the control circuit is configured to transmit the measurement map in the extended cell search message.

8. The base station of claim 6 wherein the control circuit is configured to transmit the measurement map separately from the extended cell search message.

9. The base station of claim 6 wherein the control circuit is configured to transmit the extended cell search message in one of a radio resource control signaling message and layer 1 signaling message.

10. The base station of claim 7 wherein the control circuit is configured to include, in the extended cell search message, an indication that there are candidate cells that the mobile terminal could select as a serving cell.

11. A method of cell searching implemented by a mobile terminal, said method comprising:

receiving an extended cell search message;

receiving a measurement map relating cell identities of candidate cells and corresponding subframes for performing measurements; and

performing an extended cell search responsive to the extended cell search message based on the received measurement map.

12. The method of claim 11 wherein receiving an extended cell search message comprises receiving the extended cell search message from a serving base station.

13. The method of claim 12 wherein receiving an extended cell search message to the mobile terminal comprises receiving the extended cell search message in one of a radio resource control signaling message and layer 1 signaling message.

14. The method of claim 12 wherein the measurement map is received in the extended cell search message.

15. The method of claim 12 wherein the measurement map is received separately from the extended cell search message.

16. The method of claim 11 wherein receiving an extended cell search message comprises receiving the extended cell search message on a broadcast channel.

17. The method of claim 11 wherein the extended cell search message includes an indication that there are candidate cells that the mobile terminal could select as a serving cell.

18. The method of claim 11 wherein performing an extended cell search comprises:

receiving synchronization signals from one or more candidate cells; and

averaging information contained in said synchronization signals over an extended period.

19. The method of claim 11 wherein performing an extended cell search comprises receiving synchronization signals from one or more candidate cells on an expanded set of receive antennas.

20. The method of claim 11 wherein performing an extended cell search comprises receiving and detecting an expanded set of synchronization signals from one or more candidate cells.

21. The method of claim 11 further comprising performing signal strength measurements for one or more of the candidate cells identified in the measurement map.

22. The mobile terminal comprising:

a transceiver for communicating with a base station;

a control circuit to control operation of the transceiver, said control circuit configured to:

receive an extended cell search message;

receive a measurement map relating cell identities of candidate cells and corresponding subframes for performing measurements; and

perform an extended cell search responsive to the extended cell search message based on the received measurement map.

23. The mobile terminal of claim 22 wherein the control circuit is configured to receive the extended cell search message from a serving base station.

24. The mobile terminal of claim 23 wherein the control circuit is configured to receive the extended cell search message in one of a radio resource control signaling message and layer 1 signaling message.

25. The mobile terminal of claim 22 wherein the control circuit is configured to receive the measurement map in the extended cell search message.

26. The mobile terminal of claim 22 wherein the control circuit is configured to receive the measurement map separately from the extended cell search message.

27. The mobile terminal of claim 22 wherein the control circuit is configured to receive the extended cell search message on a broadcast channel.

28. The mobile terminal of claim 22 wherein the extended cell search message includes an indication that there are candidate cells that the mobile terminal could select as a serving cell.

29. The mobile terminal of claim 22 wherein the control circuit is configured to perform an extended cell search by:

receiving synchronization signals from one or more candidate cells; and

averaging said synchronization signals over an extended period.

30. The mobile terminal of claim 22 wherein the control circuit is configured to perform an extended cell search by receiving synchronization signals from one or more candidate cells on an expanded set of receive antennas.

31. The mobile terminal of claim 22 wherein the control circuit is configured to perform an extended cell search by receiving an expanded set of synchronization signals from one or more candidate cells.

32. The mobile terminal of claim 22 wherein the control circuit is further configured to perform signal strength measurements for one or more of the candidate cells identified in the measurement map.

What is claimed is:

1. A method implemented by a base station, comprising:

determining that a mobile terminal served by the base station has extended cell search capability, wherein the extended cell search capability enables detecting signals transmitted from one or more weaker cells that have signal to noise ratios below the reporting requirement of legacy mobile terminals;

transmitting an extended cell search message to the mobile terminal to enable extended cell searching by the mobile terminal, wherein the extended search message indicates that one or more of said weaker cells are present in vicinity of the mobile terminal;

transmitting a measurement map to the mobile terminal relating cell identities of candidate cells and corresponding subframes for performing measurements.

2. The method of claim 1 wherein the measurement map is transmitted in the extended cell search message.

3. The method of claim 1 wherein the measurement map is transmitted separately from the extended cell search message.

4. The method of claim 1 wherein transmitting an extended cell search message to the mobile terminal comprises transmitting the extended cell search message in one of a radio resource control signaling message and a layer 1 signaling message.

5. The method of claim 1 wherein the extended cell search message includes an indication that there are candidate cells that the mobile terminal could select as a serving cell.

6. A base station comprising:

a transceiver for communicating with mobile terminals;

a control circuit to control operation of the transceiver, said control circuit configured to:

determine that a mobile terminal served by the base station has extended cell search capability, wherein the extended cell search capability enables detecting signals transmitted from one or more weaker cells that have signal to noise ratios below the reporting requirement of legacy mobile terminals;

transmit an extended cell search message to the mobile terminal to enable extended cell searching by the mobile terminal, wherein the extended search

message indicates that one or more of said weaker cells are present in vicinity of the mobile terminal;

transmit a measurement map to the mobile terminal relating cell identities of candidate cells and corresponding subframes for performing measurements.

7. The base station of claim 6 wherein the control circuit is configured to transmit the measurement map in the extended cell search message.

8. The base station of claim 6 wherein the control circuit is configured to transmit the measurement map separately from the extended cell search message.

9. The base station of claim 6 wherein the control circuit is configured to transmit the extended cell search message in one of a radio resource control signaling message and layer 1 signaling message.

10. The base station of claim 7 wherein the control circuit is configured to include, in the extended cell search message, an indication that there are candidate cells that the mobile terminal could select as a serving cell.

11. A method of cell searching implemented by a mobile terminal, said method comprising:

receiving an extended cell search message, wherein the extended search message indicates that one or more weaker cells are present in vicinity of the mobile terminal, wherein signals transmitted from said weaker cells have signal to noise ratios below the reporting requirement of legacy mobile terminals;

receiving a measurement map relating cell identities of candidate cells and corresponding subframes for performing measurements; and

performing an extended cell search responsive to the extended cell search message based on the received measurement map, wherein the extended cell search enables detecting signals transmitted from one or more of said weaker cells.

12. The method of claim 11 wherein receiving an extended cell search message comprises receiving the extended cell search message from a serving base station.

13. The method of claim 12 wherein receiving an extended cell search message to the mobile terminal comprises receiving the extended cell search message in one of a radio resource control signaling message and layer 1 signaling message.

14. The method of claim 12 wherein the measurement map is received in the extended cell search message.

15. The method of claim 12 wherein the measurement map is received separately from the extended cell search message.

16. The method of claim 11 wherein receiving an extended cell search message comprises receiving the extended cell search message on a broadcast channel.

17. The method of claim 11 wherein the extended cell search message includes an indication that there are candidate cells that the mobile terminal could select as a serving cell.

18. The method of claim 11 wherein performing an extended cell search comprises: receiving synchronization signals from one or more candidate cells; and averaging information contained in said synchronization signals over an extended period.

19. The method of claim 11 wherein performing an extended cell search comprises receiving synchronization signals from one or more candidate cells on an expanded set of receive antennas.

20. The method of claim 11 wherein performing an extended cell search comprises receiving and detecting an expanded set of synchronization signals from one or more candidate cells.

21. The method of claim 11 further comprising performing signal strength measurements for one or more of the candidate cells identified in the measurement map.

22. A mobile terminal comprising:

a transceiver for communicating with a base station;

a control circuit to control operation of the transceiver, said control circuit configured to:

receive an extended cell search message wherein the extended search message indicates that one or more weaker cells are present in vicinity of the mobile terminal, wherein signals transmitted from said weaker cells have signal to noise ratios below the reporting requirement of legacy mobile terminals;

receive a measurement map relating cell identities of candidate cells and corresponding subframes for performing measurements; and

perform an extended cell search responsive to the extended cell search message based on the received measurement map, wherein the extended cell search enables detecting signals transmitted from one or more of said weaker cells.

23. The mobile terminal of claim 22 wherein the control circuit is configured to receive the extended cell search message from a serving base station.

24. The mobile terminal of claim 23 wherein the control circuit is configured to receive the extended cell search message in one of a radio resource control signaling message and layer 1 signaling message.

25. The mobile terminal of claim 22 wherein the control circuit is configured to receive the measurement map in the extended cell search message.

26. The mobile terminal of claim 22 wherein the control circuit is configured to receive the measurement map separately from the extended cell search message.

27. The mobile terminal of claim 22 wherein the control circuit is configured to receive the extended cell search message on a broadcast channel.

28. The mobile terminal of claim 22 wherein the extended cell search message includes an indication that there are candidate cells that the mobile terminal could select as a serving cell.

29. The mobile terminal of claim 22 wherein the control circuit is configured to perform an extended cell search by: receiving synchronization signals from one or more candidate cells; and averaging said synchronization signals over an extended period.

30. The mobile terminal of claim 22 wherein the control circuit is configured to perform an extended cell search by receiving synchronization signals from one or more candidate cells on an expanded set of receive antennas.

31. The mobile terminal of claim 22 wherein the control circuit is configured to perform an extended cell search by receiving an expanded set of synchronization

signals from one or more candidate cells.

32. The mobile terminal of claim 22 wherein the control circuit is further configured to perform signal strength measurements for one or more of the candidate cells identified in the measurement map.

33. The method of claim 1 wherein the legacy mobile terminals comprise mobile terminals for Third Generation Partnership Project standard Long Term Evolution Release 8.

34. The base station of claim 6 wherein the legacy mobile terminals comprise mobile terminals for Third Generation Partnership Project standard Long Term Evolution Release 8.

35. The method of claim 11 wherein the legacy mobile terminals comprise mobile terminals for Third Generation Partnership Project standard Long Term Evolution Release 8.

36. The mobile terminal of claim 22 wherein the legacy mobile terminals comprise mobile terminals for Third Generation Partnership Project standard Long Term Evolution Release 8.