

CLAIMS

1. A method, comprising:
in a mobile wireless communication device,
detecting a first wireless cell in a wireless communication network associated
5 with the mobile wireless communication device fails at least one criterion in a set of
suitability criteria stored in the mobile wireless communication device;
searching for and locating a set of candidate wireless cells with which to
associate;
measuring at least one received signal metric for each candidate wireless cell
10 in the set of candidate wireless cells;
evaluating suitability of a candidate wireless cell in the set of candidate
wireless cells using one or more criteria in the stored set of suitability criteria for the
first wireless cell and the measured at least one received signal metric for the
candidate wireless cell when the candidate wireless cell is identically the first wireless
15 cell; and
associating the mobile wireless communication device with the candidate
wireless cell when the candidate wireless cell satisfies one or more criteria in the
stored set of suitability criteria.
2. The method as recited in claim 1, wherein searching for and locating the set of
20 candidate wireless cells includes receiving a radio frequency signal from a radio
network subsystem in each candidate wireless cell identifying the candidate wireless
cell.
3. The method as recited in claim 1 or 2, wherein the received signal metric used
to measure each candidate wireless cell is a measure of received signal code power or
25 is a chip energy.
4. The method as recited in any of claims 1 - 3, further comprising:
determining whether the candidate wireless cell is identically the first wireless
cell by estimating the candidate wireless cell's geographic location and the first
wireless cell's geographic location.
- 30 5. The method as recited in any of claims 1 - 3, further comprising:
determining whether the candidate wireless cell is identically the first wireless
cell by estimating changes in geographic position of the mobile wireless
communication device.

6. The method as recited in any of claims 1 - 3, further comprising:
when the candidate wireless cell is not identically the first wireless cell
receiving suitability criteria for the set of candidate wireless cells from at least
one radio network subsystem in the wireless communication network;
5 evaluating suitability of the set of candidate wireless cells using one or more
of the received suitability criteria; and
associating the mobile wireless communication device with a suitable cell in
the set of candidate wireless cells.
7. The method as recited in claim 6, wherein the at least one radio network
10 subsystem in the wireless communication network transmits the suitability criteria
using broadcast system information messages.
8. A mobile wireless communication device, the device comprising:
an application processor configured to generate and receive messages;
a transceiver connected to the application processor, the transceiver configured
15 to transmit radio frequency signals to and receive radio frequency signals from a
wireless communication network and configured to select a cell in the wireless
communication network with which to connect by:
detecting a loss of radio frequency connection between the transceiver in the
mobile wireless communication device and a first cell in the wireless communication
20 network;
locating a set of candidate cells in the wireless communication network with
which to connect;
determining a subset of located candidate cells that match to cell suitability
criteria stored in the mobile wireless communication device;
25 selecting a cell in the subset of located candidate cells based on measuring cell
suitability using the stored cell suitability criteria; and
associating the mobile wireless communication device with the selected cell;
wherein the cell suitability criteria are stored in the mobile wireless
communication device prior to detecting the loss of radio frequency connection.
- 30 9. The mobile wireless communication device as recited in claim 8, wherein the
selected cell with which the mobile wireless communication device associates is
identically the first cell.

10. The mobile wireless communication device as recited in claim 8, wherein the transceiver is further configured to select the cell in the wireless communication network with which to connect by:

5 when none of the cells in the subset of located candidate cells is identically the first cell,
receiving suitability criteria from a radio network subsystem in a located candidate cell in the subset of located candidate cells;
evaluating the located candidate cell's suitability using the received suitability criteria; and
10 associating with the located candidate cell when the located candidate cell satisfies the received suitability criteria.

11. The mobile wireless communication device as recited in claim 10, wherein locating the set of candidate cells in the wireless communication network with which to connect includes receiving a radio frequency signal from the radio network
15 subsystem in each candidate wireless cell identifying the candidate wireless cell.

12. The mobile wireless communication device as recited in claim 10, wherein evaluating the located candidate cell's suitability includes measuring a received signal quality of the located candidate cell.

13. The mobile wireless communication device as recited in claim 8, wherein the
20 application processor is configured to determine whether one of the candidate cells is identically the first cell by estimating the one of the candidate cells geographic location and the first cell's geographic location.

14. The mobile wireless communication device as recited in claim 8, wherein the application processor is configured to determine whether the selected cell is
25 identically the first cell using a measure of time elapsed after detecting the loss of radio frequency connection between the transceiver and the first cell.

15. The mobile wireless communication device as recited in claim 8, wherein the application processor is configured to determine whether the selected cell is
30 identically the first cell using a measure of a rate of displacement of the mobile wireless communication device.

16. A computer readable medium for storing non-transitory computer program code executable by a processor in a mobile wireless communication device for selecting a cell in a wireless network with which to associate comprising:

in the mobile wireless communication device,
non-transitory computer program code for detecting a first cell fails one or
more suitability criteria stored in the mobile wireless communication device;
non-transitory computer program code for searching for and locating a set of
5 candidate cells with which to associate the mobile wireless communication device;
non-transitory computer program code for determining if one of the candidate
cells in the set of candidate cells is identically the first cell;
non-transitory computer program code for evaluating suitability of the first
cell using the one or more stored suitability criteria when one of the candidate cells is
10 the first cell; and
non-transitory computer program code for associating with the first cell when
one of the candidate cells in the set of candidate cells is identically the first cell and
the first cell is suitable.

17. The computer readable medium as recited in claim 16 further comprising:

15 non-transitory computer program code for receiving suitability criteria for the
set of candidate cells from the wireless network when the first candidate cell is not the
first cell and for evaluating the set of candidate cells' suitability using the received
suitability criteria; and

non-transitory computer program code for associating with a suitable
20 candidate cell.

18. The computer readable medium as recited in claim 16, wherein non-transitory
computer program code for locating the set of candidate cells includes receiving a
radio frequency signal from the radio network subsystem in each candidate wireless
cell identifying the candidate wireless cell.

25 19. The computer readable medium as recited in claim 17, wherein non-transitory
computer program code for receiving suitability criteria for the set of candidate cells
from the wireless network includes receiving system information messages broadcast
by radio network subsystems in the candidate cells.

20. The computer readable medium as recited in claim 19, wherein non-transitory
30 computer program code for determining whether one if one of the candidate cells in
the set of candidate cells is identically the first cell includes receiving master
information messages broadcast by radio network subsystems in the candidate cells.

21. The computer readable medium as recited in claim 16, wherein non-transitory computer program code for determining whether the candidate wireless cell is identically the first wireless cell includes estimating changes in geographic position of the mobile wireless communication device.

5 22. The computer readable medium as recited in claim 16, wherein non-transitory computer program code for determining whether the candidate wireless cell is identically the first wireless cell includes measuring time elapsed after detecting the first cell fails one or more stored suitability criteria.

23. The computer readable medium as recited in claim 17, wherein non-transitory
10 computer program code for determining whether the candidate wireless cell is identically the first wireless cell includes estimating the candidate wireless cell's geographic location and the first wireless cell's geographic location.

Claims

1. A method for cell selection by a mobile wireless communication device, comprising:
 - determining that a first wireless cell in a wireless communication network fails at least one criterion in a set of suitability criteria stored in the mobile wireless communication device;
 - searching for and locating a set of candidate wireless cells with which to associate;
 - measuring at least one received signal metric for each candidate wireless cell in the set of candidate wireless cells;
 - determining whether a candidate wireless cell in the set of candidate wireless cells is the first wireless cell by estimating changes in a geographic position of the mobile wireless communication device based on an elapsed time from when the first wireless cell failure is determined and on an average velocity of the mobile wireless communication device;
 - evaluating whether the candidate wireless cell satisfies one or more criteria in the stored set of suitability criteria using the measured at least one received signal metric for the candidate wireless cell when the candidate wireless cell is the first wireless cell; and
 - associating the mobile wireless communication device with the candidate wireless cell when the candidate wireless cell is the first wireless cell and satisfies the one or more criteria in the stored set of suitability criteria.
2. The method as recited in claim 1, wherein searching for and locating the set of candidate wireless cells includes receiving a radio frequency signal from a radio network subsystem in each candidate wireless cell identifying the candidate wireless cell.
3. The method as recited in claim 1 or 2, wherein the received signal metric used to measure each candidate wireless cell is a measure of received signal code power or is a chip energy.
4. The method as recited in any of claims 1 - 3, wherein determining whether the candidate wireless cell is the first wireless cell further includes estimating the candidate wireless cell's geographic location and the first wireless cell's geographic location.
5. The method as recited in any of claims 1 - 3, further comprising:
 - when no candidate wireless cell in the set of candidate wireless cells is the first wireless cell:
 - receiving suitability criteria for the set of candidate wireless cells from at least one radio network subsystem in the wireless communication network;

evaluating whether a cell in the set of candidate wireless cells satisfies one or more of the received suitability criteria; and

associating the mobile wireless communication device with the cell in the set of candidate wireless cells, when the cell satisfies one or more of the received suitability criteria.

6. The method as recited in claim 5, wherein the at least one radio network subsystem in the wireless communication network transmits the suitability criteria using broadcast system information block (SIB) messages.

7. A mobile wireless communication device, the device comprising:

an application processor configured to generate and receive messages;

a transceiver connected to the application processor, the transceiver configured to transmit radio frequency signals to and receive radio frequency signals from a wireless communication network and configured to select a cell in the wireless communication network with which to connect by:

detecting a loss of radio frequency connection between the transceiver in the mobile wireless communication device and a first cell in the wireless communication network;

locating a set of candidate cells in the wireless communication network with which to connect;

determining a subset of located candidate cells that match to cell suitability criteria stored in the mobile wireless communication device;

estimating a change in geographic position of the mobile wireless communication device based on an elapsed time from when the loss of radio frequency connection is detected and on an average velocity of the mobile wireless communication device;

determining whether one of the cells in the subset of located candidate cells is the first cell to which the mobile wireless communication device was previously connected based on the estimated change in geographic position of the mobile wireless communication device; and

selecting the first cell to associate with the mobile wireless communication device when the first cell satisfies one or more of the stored cell suitability criteria;

wherein the cell suitability criteria are stored in the mobile wireless communication device prior to detecting the loss of radio frequency connection.

8. The mobile wireless communication device as recited in claim 7, wherein the transceiver is further configured to select the cell in the wireless communication network with which to connect by:

when none of the cells in the subset of located candidate cells is the first cell:

receiving suitability criteria from a radio network subsystem for a located candidate cell in the subset of located candidate cells;

determining whether the located candidate cell satisfies the received suitability criteria; and

associating the mobile wireless communication device with the located candidate cell when the located candidate cell satisfies the received suitability criteria.

9. The mobile wireless communication device as recited in claim 8, wherein locating the set of candidate cells in the wireless communication network with which to connect includes receiving a radio frequency signal from the radio network subsystem in each candidate wireless cell identifying the candidate wireless cell.

10. The mobile wireless communication device as recited in claim 8, wherein evaluating the located candidate cell's suitability includes measuring a received signal quality of the located candidate cell.

11. The mobile wireless communication device as recited in claim 7, wherein the application processor is further configured to determine whether one of the cells in the subset of located candidate cells is the first cell with which the mobile wireless communication device was previously connected additionally based on an estimation of a geographic location of the one of the candidate cells and on the first cell's geographic location.

12. A non-transitory computer readable medium configured to store computer program code, that when executed by a processor in a mobile wireless communication device, causes the mobile wireless communication device to select a cell in a wireless network with which to associate, the computer program code comprising:
computer program code for determining that a first cell fails one or more suitability criteria stored in the mobile wireless communication device;

computer program code for searching for and locating a set of candidate cells with which to associate the mobile wireless communication device;

computer program code for measuring at least one received signal metric for each candidate cell in the set of candidate cells;

computer program code for determining whether a candidate cell in the set of candidate cells is the first cell by estimating changes in a geographic position of the mobile wireless communication device based on an elapsed time from when the first cell failure is detected and on an average velocity of the mobile wireless communication device;

computer program code for evaluating whether the candidate cell satisfies one or more criteria in the stored set of suitability criteria using the measured at least one received signal metric for the candidate cell when the candidate cell is the first cell; and

computer program code for associating the mobile wireless communication device with the candidate cell when the candidate cell is the first cell and satisfies one or more criteria in the stored set of suitability criteria.

13. The non-transitory computer readable medium as recited in claim 12, the computer program code further comprising:

computer program code for receiving suitability criteria for the set of candidate cells from the wireless network when no candidate cell is the first cell and for evaluating whether a cell in the set of candidate cells satisfies one or more of the received suitability criteria; and

computer program code for associating with the candidate cell, when the candidate cell satisfies one or more of the suitability criteria.

14. The non-transitory computer readable medium as recited in claim 12, wherein computer program code for locating the set of candidate cells includes receiving a radio frequency signal from a radio network subsystem in each candidate wireless cell identifying the candidate wireless cell.

15. The non-transitory computer readable medium as recited in claim 13, wherein computer program code for receiving suitability criteria for the set of candidate cells from the wireless network includes receiving system information block (SIB) messages broadcast by radio network subsystems in the candidate cells.

16. The computer readable medium as recited in claim 12, wherein computer program code for determining whether the candidate wireless cell is the first wireless cell includes additionally estimating the candidate wireless cell's geographic location and the first wireless cell's geographic location.