

CLAIMS

1. A method at a user equipment, comprising:
determining a first cell to connect with;
5 determining capabilities of the user equipment in relation to carrier aggregation comprising a carrier of the first cell;
performing idle mode radio measurements of those carriers that the user equipment can, based on the determined capabilities, aggregate with the carrier of the first cell; and
10 reporting results of the idle mode radio measurements to a network node of the first cell upon connection establishment with the first cell.
2. The method of claim 1, further comprising: determining that the network node of the first cell supports reporting idle mode radio measurements during the connection establishment.
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3. The method of any of claims 1 to 2, wherein the reported results of the idle mode radio measurements cause triggering the carrier aggregation by the network node of the first cell, without the network node of the first cell asking for
20 connected mode radio measurements to be performed.
4. The method of any of claims 1 to 3, further comprising:
causing a reception, from the network node of the first cell, of an indication indicating that a carrier aggregation is to be triggered for the user equipment, wherein the carrier aggregation comprises receiving data over the carrier of
25 the first cell and over one or more of the carriers that were measured during the idle mode radio measurements.
5. The method of any of claims 1 to 4, further comprising:
30 causing a reception of a measurement indication identifying a plurality of carriers to be measured in idle mode, wherein the measurement indication comprises carriers that the user equipment can aggregate with the carrier of the first cell and carriers that the user equipment cannot aggregate with the carrier of the first cell; and
35 autonomously determining the carriers to be measured by filtering out those carriers from the measurement configuration which the user equipment cannot, based on the determined capabilities, aggregate with the carrier of the first

cell.

6. The method of any of claims 1 to 4, further comprising:
causing a reception of a measurement indication indicating to perform
5 idle mode radio measurements; and

autonomously determining the cells to be measured based on the determined capabilities such that only those carriers that the user equipment can aggregate with the carrier of the first cell are measured.

10 7. The method of any of claims 5 to 6, wherein the autonomous determination comprises utilizing information of at least one carrier aggregation configuration used by the user equipment within a past predetermined period of time.

8. The method of any of claims 1 to 4, further comprising:
15 causing a reception of a measurement indication identifying a plurality of carriers to be measured in idle mode, wherein the measurement indication comprises carriers that the user equipment can aggregate with the carrier of the first cell and carriers that the user equipment cannot aggregate with the carrier of the first cell;

20 performing the measurements according to the received measurement configuration; and

including in the results of the idle mode radio measurements an indication whether or not the user equipment can aggregate a given measured carrier with the carrier of the first cell.

25 9. The method of any of claims 1 to 8, wherein the measurement indication is received in a system information block.

10. The method of any of claims 1 to 9, wherein those carriers that the
30 user equipment can, based on the determined capabilities, aggregate with the carrier of the first cell are required to be associated with other cells than macro cells.

11. A method at a network node, comprising:
detecting a connection establishment of a user equipment to a first cell
35 served by the network node;

upon the connection establishment, cause a reception of results of idle mode radio measurements performed by the user equipment, wherein the results

comprise radio measurements results for those carriers which the user equipment can aggregate with the carrier of the first cell; and

utilizing the received results for carrier aggregation setup for the user equipment.

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12. The method of claim 11, further comprising:

causing a broadcast of measurement indication indicating that the network node supports receiving results of idle mode radio measurements during the connection establishment, without identifying the carriers to be measured in the broadcasted measurement indication.

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13. The method of claim 11, further comprising:

causing a broadcast of measurement indication identifying a plurality of carriers to be measured in the idle mode, wherein the measurement indication comprises carriers that the user equipment can aggregate with the carrier of the first cell and carriers that the user equipment cannot aggregate with the carrier of the first cell.

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14. An apparatus, comprising:

at least one processor and at least one memory including a computer program code, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause a user equipment to perform:

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determine a first cell to connect with;

determine capabilities of the user equipment in relation to carrier aggregation comprising a carrier of the first cell;

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perform idle mode radio measurements of those carriers that the user equipment can, based on the determined capabilities, aggregate with the carrier of the first cell; and

report results of the idle mode radio measurements to a network node of the first cell upon connection establishment with the first cell.

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15. The apparatus of claim 14, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the user equipment further to perform:

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determine that the network node of the first cell supports reporting idle mode radio measurements during the connection establishment.

16. The apparatus of any of claims 14 to 15, wherein the reported results of the idle mode radio measurements cause triggering the carrier aggregation by the network node of the first cell, without the network node of the first cell asking for connected mode radio measurements to be performed.

17. The apparatus of any of claims 14 to 16, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the user equipment further to perform:

cause a reception, from the network node of the first cell, of an indication indicating that a carrier aggregation is to be triggered for the user equipment, wherein the carrier aggregation comprises receiving data over the carrier of the first cell and over one or more of the carriers that were measured during the idle mode radio measurements.

18. The apparatus of any of claims 14 to 17, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the user equipment further to perform:

cause a reception of a measurement indication identifying a plurality of carriers to be measured in idle mode, wherein the measurement indication comprises carriers that the user equipment can aggregate with the carrier of the first cell and carriers that the user equipment cannot aggregate with the carrier of the first cell; and

autonomously determine the carriers to be measured by filtering out those carriers from the measurement configuration which the user equipment cannot, based on the determined capabilities, aggregate with the carrier of the first cell.

19. The apparatus of any of claims 14 to 17, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the user equipment further to perform:

receive a measurement indication indicating to perform idle mode radio measurements; and

autonomously determine the cells to be measured based on the determined capabilities such that only those carriers that the user equipment can aggregate with the carrier of the first cell are measured.

20. The apparatus of any of claims 18 to 19, wherein the autonomous determination comprises utilizing information of at least one carrier aggregation configuration used by the user equipment within a past predetermined period of time.

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21. The apparatus of any of claims 14 to 17, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the user equipment further to perform:

10 cause a reception of a measurement indication identifying a plurality of carriers to be measured in idle mode, wherein the measurement indication comprises carriers that the user equipment can aggregate with the carrier of the first cell and carriers that the user equipment cannot aggregate with the carrier of the first cell;

15 perform the measurements according to the received measurement configuration; and

include in the results of the idle mode radio measurements an indication whether or not the user equipment can aggregate a given measured carrier with the carrier of the first cell.

20 22. The apparatus of any of claims 14 to 21, wherein the measurement indication is received in a system information block.

23. The apparatus of any of claims 14 to 22, wherein those carriers that the user equipment can, based on the determined capabilities, aggregate with the carrier of the first cell are required to be associated with other cells than macro cells.

24. The apparatus of any of claims 14 to 23, wherein the apparatus is a user equipment and the apparatus is operating according to the long term evolution or according to the long term evolution advanced, or according to new radio , 5G.

25. An apparatus, comprising:
at least one processor and at least one memory including a computer
35 program code, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause a network node to perform:
detect a connection establishment of a user equipment to a first cell

served by the network node;

upon the connection establishment, cause a reception of results of idle mode radio measurements performed by the user equipment, wherein the results comprise radio measurements results for those carriers which the user equipment can aggregate with the carrier of the first cell; and

utilize the received results for carrier aggregation setup for the user equipment.

26. The apparatus of claim 25, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the network node further to perform:

cause broadcast of measurement indication indicating that the network node supports receiving results of idle mode radio measurements during the connection establishment, without identifying the carriers to be measured in the broadcasted measurement indication.

27. The apparatus of claim 25, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the network node further to perform:

causing a broadcast of measurement indication identifying a plurality of carriers to be measured in the idle mode, wherein the measurement indication comprises carriers that the user equipment can aggregate with the carrier of the first cell and carriers that the user equipment cannot aggregate with the carrier of the first cell.

28. A computer program product embodied on a distribution medium readable by a computer and comprising program instructions which, when loaded into an apparatus, execute the method according to any of claims 1 to 10 or 11 to 13.

29. A computer program product comprising program instructions which, when loaded into an apparatus, execute the method according to any of claims 1 to 10 or 11 to 13.

30. An apparatus, comprising means for performing the method according to any of claims 1 to 10 or 11 to 13.