TITLE

CONDITIONAL HANDOVER WITH A TARGET DUAL CONNECTIVITY CONFIGURATION

TECHNOLOGICAL FIELD

Examples of the disclosure relate to conditional handover. Some relate to conditional handover with dual connectivity configuration.

BACKGROUND

A wireless network comprises a plurality of network nodes including terminal nodes and access nodes. Communication between the terminal nodes and access nodes is wireless.

In some circumstances it may be desirable to improve or enhance conditional handover with a target dual connectivity configuration.

SUMMARY

In an aspect of the present disclosure, there is provided an apparatus comprising;

at least one processor; and

at least one memory including computer program code,

the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to:

establish a connection towards a user equipment, UE, via a source primary cell;

provide the UE a source primary cell measurement configuration;

determine a condition to access a target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node;

generate a measurement identity to be associated, in an updated source primary cell measurement configuration, with the condition to access the target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node;

including, in an updated source primary cell measurement configuration, the generated measurement identity and the condition to access the target primary cell of the secondary cell group;

transmit the updated source primary cell measurement configuration to the user equipment;

wherein determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information;

wherein the information is received from a target master node and comprises measurement related information;

wherein the measurement related information comprises parameters that are used in measurement events, and wherein the measurement related information comprises parameters Time to Trigger and/or hysteresis.

In some examples, determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information.

In some examples, the information is received from a target master node and comprises measurement related information.

In some examples, the measurement related information comprises measurement object information.

In some examples, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to generate a reporting configuration of the condition to access the target primary cell of the secondary cell group.

In some examples, the condition comprises a conditional PSCell addition and change, CPAC, condition.

In some examples, the updated source primary cell measurement configuration comprises the generated measurement identity and the measurement object information received from the target master node.

In some examples, the updated source primary cell measurement configuration comprises the generated reporting configuration.

evaluation of the condition to access the target primary cell of a secondary cell group that is associated with the generated measurement identity, for evaluation of the condition to access the target primary cell of a secondary cell group that is associated with the second measurement identity.

In another aspect of the present disclosure, there is provided a computer program comprising instructions for causing an apparatus to perform at least the following:

establishing a connection towards a user equipment, UE, via a source primary cell;

providing the UE a source primary cell measurement configuration;

determining a condition to access a target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node;

generating a measurement identity to be associated, in an updated source primary cell measurement configuration, with the condition to access the target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node;

including, in an updated source primary cell measurement configuration, the generated measurement identity and the condition to access the target primary cell of the secondary cell group;

transmitting the updated source primary cell measurement configuration to the user equipment,

wherein determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information;

wherein the information is received from a target master node and comprises measurement related information;

wherein the measurement related information comprises parameters that are used in measurement events, and wherein the measurement related information comprises parameters Time to Trigger and/or hysteresis.

In some examples, determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information.

In some examples, determining the condition to access the target primary cell of the secondary cell group comprises receiving the condition.

In some examples, the computer program comprising instructions for causing an apparatus to perform at least the following:

In yet another aspect of the present disclosure, there is provided an apparatus comprising:

at least one processor; and

at least one memory including computer program code,

the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to:

establish a connection towards a source master node;

receive, from the source master node, at least one measurement configuration containing a condition to access a target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node; and

create at least one measurement variable for the received at least one measurement configuration,

wherein determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information;

wherein the information is received from a target master node and comprises measurement related information;

wherein the measurement related information comprises parameters that are used in measurement events, and wherein the measurement related information comprises parameters Time to Trigger and/or hysteresis.

In some examples, the at least one measurement configuration is a source primary cell measurement configuration.

In some examples, creating at least one measurement variable for the received at least one measurement configuration comprises updating at least one measurement variable associated with a source primary cell to include a measurement identity associated with the condition to access a target primary cell of a secondary cell group.

In some examples, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to:

receive an indication to maintain, after application of a target primary cell measurement configuration, measurement information associated with the condition to access the target primary cell of a secondary cell group that is associated with the measurement identity, for evaluation of the condition to access the target primary cell of a secondary cell

group that is associated with a second measurement identity in the target primary cell measurement configuration.

In some examples, the indication comprises the second measurement identity.

CLAIMS

1. An apparatus comprising;

at least one processor; and

at least one memory including computer program code,

the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to:

establish a connection towards a user equipment, UE, via a source primary cell;

provide the UE a source primary cell measurement configuration;

determine a condition to access a target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node;

generate a measurement identity to be associated, in an updated source primary cell measurement configuration, with the condition to access the target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node;

including, in an updated source primary cell measurement configuration, the generated measurement identity and the condition to access the target primary cell of the secondary cell group;

transmit the updated source primary cell measurement configuration to the user equipment;

wherein determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information;

wherein the information is received from a target master node and comprises measurement related information;

wherein the measurement related information comprises parameters that are used in measurement events, and wherein the measurement related information comprises parameters Time to Trigger and/or hysteresis.

2. The apparatus as claimed in claim 1, wherein the measurement related information comprises measurement object information.

3. The apparatus as claimed in claim 1, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to generate a reporting configuration of the condition to access the target primary cell of the secondary cell group.

4. The apparatus as claimed in claim 1, wherein the condition comprises a conditional PSCell addition and change, CPAC, condition.

5. The apparatus as claimed in claim 2, wherein the updated source primary cell measurement configuration comprises the generated measurement identity and the measurement object information received from the target master node.

6. The apparatus as claimed in claim 3, wherein the updated source primary cell measurement configuration comprises the generated reporting configuration.

7. The apparatus as claimed in claim 1, wherein determining the condition to access the target primary cell of the secondary cell group comprises receiving the condition.

8. The apparatus as claimed in claim 7, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to receive a reporting configuration of the condition to access the target primary cell of the secondary cell group.

9. The apparatus as claimed in claim 1, wherein the updated source primary cell measurement configuration comprises a conditional handover, CHO, execution condition.

10. The apparatus as claimed in claim 9, wherein the updated source primary cell measurement configuration comprises a first CHO execution condition and a first condition to access a target primary cell of a secondary cell group associated with a first generated measurement identity and a second CHO execution condition and a second condition to access a target primary cell of a secondary cell group associated with a second generated measurement identity, wherein the first and second conditions to access a target primary cell of a secondary cell group comprise conditional PSCell addition and change, CPAC, conditions.

11. The apparatus as claimed in claim 1, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to:

receive an indication of a second measurement identity associated, in a target primary cell measurement configuration, with the condition to access the target primary cell of the secondary cell group; and

transmit, to the UE, an indication to maintain, after application of the target primary cell measurement configuration, measurement information associated with evaluation of the condition to access the target primary cell of a secondary cell group that is associated with the generated measurement identity, for evaluation of the condition to access the target primary cell of a secondary cell group that is associated with the second measurement identity.

12. The apparatus as claimed in claim 11, wherein the indication of the second measurement identity comprises the second measurement identity.

13. A computer program comprising instructions for causing an apparatus to perform at least the following:

establishing a connection towards a user equipment, UE, via a source primary cell;

providing the UE a source primary cell measurement configuration;

determining a condition to access a target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node;

generating a measurement identity to be associated, in an updated source primary cell measurement configuration, with the condition to access the target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node;

including, in an updated source primary cell measurement configuration, the generated measurement identity and the condition to access the target primary cell of the secondary cell group;

transmitting the updated source primary cell measurement configuration to the user equipment;

wherein determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information;

wherein the information is received from a target master node and comprises measurement related information;

wherein the measurement related information comprises parameters that are used in measurement events, and wherein the measurement related information comprises parameters Time to Trigger and/or hysteresis.

14. An apparatus comprising:

at least one processor; and

at least one memory including computer program code,

the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to:

establish a connection towards a source master node;

receive, from the source master node, at least one measurement configuration containing a condition to access a target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node; and

create at least one measurement variable for the received at least one measurement configuration;

wherein determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information;

wherein the information is received from a target master node and comprises measurement related information;

wherein the measurement related information comprises parameters that are used in measurement events, and wherein the measurement related information comprises parameters Time to Trigger and/or hysteresis.

15. The apparatus as claimed in claim 14, wherein the at least one measurement configuration is a source primary cell measurement configuration.

16. The apparatus as claimed in claim 15, wherein creating at least one measurement variable for the received at least one measurement configuration comprises updating at least one measurement variable associated with a source primary cell to include a measurement identity associated with the condition to access a target primary cell of a secondary cell group.

17. The apparatus as claimed in claim 16, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to:

receive an indication to maintain, after application of a target primary cell measurement configuration, measurement information associated with the condition to access the target primary cell of a secondary cell group that is associated with the measurement identity, for evaluation of the condition to access the target primary cell of a secondary cell group that is associated with a second measurement identity in the target primary cell measurement configuration.

18. The apparatus as claimed in claim 17, wherein the indication comprises the second measurement identity.

19. The apparatus as claimed in claim 17, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to use the maintained measurement information for evaluation of the condition to access the target primary cell of a secondary cell group that is associated with the second measurement identity in the target primary cell measurement configuration.

20. The apparatus as claimed in claim 14, wherein the at least one measurement configuration comprises a target primary cell measurement configuration.

21. The apparatus as claimed in claim 20, wherein creating the at least one measurement variable comprises creating at least one independent measurement variable for the target primary cell measurement configuration.

22. The apparatus as claimed in claim 20 or 21, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to:

receive an indication to maintain, after application of the target primary cell measurement configuration, measurement information for evaluation of the condition to access a target primary cell of a secondary cell group.

23. The apparatus as claimed in claim 22, wherein the indication comprises a flag.

24. The apparatus as claimed in claim 22, the at least one memory storing instructions that, when executed by the at least one processor, cause the apparatus at least to use the maintained measurement information for evaluation of the condition to access the target primary cell of a secondary cell group after application of the target primary cell measurement configuration.

25. A method comprising:

establishing a connection towards a source master node;

receiving, from the source master node, at least one measurement configuration containing a condition to access a target primary cell of a secondary cell group of a target secondary node associated with a conditional handover towards a target master node; and

creating at least one measurement variable for the received at least one measurement configuration;

wherein determining the condition to access the target primary cell of the secondary cell group comprises receiving information and determining the condition based, at least in part, on the received information;

wherein the information is received from a target master node and comprises measurement related information;

wherein the measurement related information comprises parameters that are used in measurement events, and

wherein the measurement related information comprises parameters Time to Trigger and/or hysteresis.

26. The method as claimed in claim 25, wherein the at least one measurement configuration is a source primary cell measurement configuration.

27. The method as claimed in claim 26, wherein creating at least one measurement variable for the received at least one measurement configuration comprises updating at least one measurement variable associated with a source primary cell to include a measurement identity associated with the condition to access a target primary cell of a secondary cell group.