[0005] According to an aspect, there is provided a communication apparatus comprising a receiver, which, in operation, receives group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and a transmitter, which, in operation, transmits reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells. According to an aspect, there is a communication method comprising receiving group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and transmitting reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells. According to an aspect, there is a communication apparatus comprising a transmitte~~r~~r, which, in operation, transmits group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and a receiver, which, in operation, receives reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells. According to an aspect, there is a communication method comprising transmitting group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and receiving reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells. According to an aspect, there is an integrated circuit comprising reception circuitry, which, in operation, controls:
receiving group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and transmission circuitry, which, in operation, controls:transmitting reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells. According to an aspect, there is an integrated circuit transmission circuitry, which, in operation, controls transmitting group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and reception circuitry, which, in operation, controls: receiving reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells.
According to the present disclosure, there is provided a communication apparatus comprising a receiver, which, in operation, receives configuration information for beam failure recovery (BFR) of a plurality of SCells operating in a network, and circuitry, which, in operation, performs beam failure detection (BFD) and report based on the configuration information.

[0006] It should be noted that general or specific embodiments may be implemented as a system, a method, an integrated circuit, a computer program, a storage medium, or any selective combination thereof.

[0007] Additional benefits and advantages of the disclosed embodiments will become apparent from the specification and drawings. The benefits and/or advantages may be individually obtained by the various embodiments and features of the specification and drawings, which need not all be provided in order to obtain one or more of such benefits and/or advantages.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The accompanying figures, where like reference numerals refer to identical or functionally similar elements throughout the separate views and which together with the detailed description below are incorporated in and form part of the specification, serve to illustrate various embodiments and to explain various principles and advantages in accordance with present embodiments.

[0009] Figure 1 shows an exemplary architecture for a 3GPP New Radio (NR) system.

[0010] Figure 2 is a schematic drawing which shows functional split between next generation - radio access network (NG-RAN) and 5G core network (5GC).

Claims

1. A communication apparatus comprising:

a receiver, which, in operation, receives group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and

a transmitter, which, in operation, transmits reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells.

2. The communication apparatus of claim 1, wherein the reporting information includes indices of each of failed SCells, which are identified as failed in the BFD.

3. The communication apparatus of claim 2, wherein the reporting information includes the new beam information for each of the failed SCells, which are identified as failed in the BFD.

4. The communication apparatus of claim 1, wherein the reporting information is transmitted in a case a number of a beam failure instance (BFI) of any SCell of the group of the SCells is equal to or larger than a first threshold being indicated by a base station.

5. The communication apparatus of claim 1, wherein the reporting information is transmitted in a case a number of SCells of the group of the SCells, which is identified as failed in the BFD, is equal to or larger than one.

6. The communication apparatus of claim 1, wherein the reporting information is transmitted in a case a number of SCells of the group of the SCells, which is identified as failed in the BFD, is equal to or larger than a second threshold being indicated by a base station.

7. The communication apparatus of claim 1, wherein the configuration information indicates to perform the BFR of multiple SCells included in the group of SCells~~reporting configuration of the BFD~~.

8. A communication method comprising:

receiving group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells) , the group information indicating one or more component carriers included in the group of SCells; and

transmitting reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells.

9. The communication method of claim 8, wherein the reporting information includes indices of each of failed SCells, which are identified as failed in the BFD.

10. The communication method of claim 9, wherein the reporting information includes the new beam information for each of the failed SCells, which are identified as failed in the BFD.

11. The communication method of claim 8, wherein the reporting information is transmitted in a case a number of a beam failure instance (BFI) of any SCell of the group of the SCells is equal to or larger than a first threshold being indicated by a base station.

12. The communication method of claim 8, wherein the reporting information is transmitted in a case a number of SCells of the group of the SCells, which is identified as failed in the BFD, is equal to or larger than one.

13. The communication method of claim 8, wherein the reporting information is transmitted in a case a number of SCells of the group of the SCells, which is identified as failed in the BFD, is equal to or larger than a second threshold being indicated by a base station.

14. The communication method of claim 8, wherein the configuration information indicates to perform the BFR of multiple SCells included in the group of SCells~~reporting configuration of the BFD~~.

15. A communication apparatus comprising:

a transmitterr, which, in operation, transmits group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and

a receiver, which, in operation, receives reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells.

16. The communication apparatus of claim 15, wherein the reporting information includes indices of each of failed SCells, which are identified as failed in the BFD.

17. The communication apparatus of claim 16, wherein the reporting information includes the new beam information for each of the failed SCells, which are identified as failed in the BFD.

18. The communication apparatus of claim 15, wherein the reporting information is transmitted in a case a number of a beam failure instance (BFI) of any SCell of the group of the SCells is equal to or larger than a first threshold being indicated by a base station.

19. The communication apparatus of claim 15, wherein the reporting information is transmitted in a case a number of SCells of the group of the SCells, which is identified as failed in the BFD, is equal to or larger than one.

20. The communication apparatus of claim 15, wherein the reporting information is transmitted in a case a number of SCells of the group of the SCells, which is identified as failed in the BFD, is equal to or larger than a second threshold being indicated by a base station.

21. The communication apparatus of claim 15, wherein the configuration information indicates to perform the BFR of multiple SCells included in the group of SCells~~reporting configuration of the BFD~~.

22. A communication method comprising:

transmitting group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and

receiving reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells.

23. The communication method of claim 22, wherein the reporting information includes indices of each of failed SCells, which are identified as failed in the BFD.

24. The communication method of claim 23, wherein the reporting information includes the new beam information for each of the failed SCells, which are identified as failed in the BFD.

25. The communication method of claim 22, wherein the reporting information is transmitted in a case a number of a beam failure instance (BFI) of any SCell of the group of the SCells is equal to or larger than a first threshold being indicated by a base station.

26. The communication method of claim 22, wherein the reporting information is transmitted in a case a number of SCells of the group of the SCells, which is identified as failed in the BFD, is equal to or larger than one.

27. The communication method of claim 22, wherein the reporting information is transmitted in a case a number of SCells of the group of the SCells, which is identified as failed in the BFD, is equal to or larger than a second threshold being indicated by a base station.

28. The communication method of claim 22, wherein the configuration information indicates to perform the BFR of multiple SCells included in the group of SCells~~reporting configuration of the BFD~~.

29. An integrated circuit comprising:

reception circuitry, which, in operation, controls:

receiving group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and

transmission circuitry, which, in operation, controls:

transmitting reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells.

30. An integrated circuit comprising:

transmission circuitry, which, in operation, controls:

transmitting group information and beam failure recovery (BFR) configuration information ~~for a beam failure recovery (BFR)~~ of a group of secondary cells (SCells), the group information indicating one or more component carriers included in the group of SCells; and

reception circuitry, which, in operation, controls:

receiving reporting information based on the BFR configuration information, the reporting information including at least one of a result of beam failure detection (BFD) of the group of SCells and new beam information of the group of SCells.

31. The communication apparatus of claim 1, wherein the BFR configuration information is indicated by a UE specific signaling.

32. The communication apparatus of claim 1, wherein a detection of a beam failure is performed for each of SCells within the group of SCells.

33. The communication apparatus of claim 15, wherein the BFR configuration information is indicated by a UE specific signaling.

34. The communication apparatus of claim 15, wherein a detection of a beam failure is performed for each of SCells within the group of SCells.