

CLAIMS

1. An information reporting method, related to a bandwidth part, BWP, with a random access problem, being applicable to performed by user equipment, UE, and comprising:

determining that a random access problem occurs; and

reporting, to a base station, a bandwidth part, BWP, on which the random access problem occurs.

2. The method according to claim 1, wherein

determining that the random access problem occurs comprises:

in response to that random access is initiated on a primary cell, PCell, of a master cell group, MCG, and a number of random access preamble transmissions reaches a maximum number of transmissions, sending first indication information from an MCG media access control, MAC, layer to a radio resource control, RRC, layer, wherein the first indication information indicates that the random access problem occurs; and

reporting, to the base station, the BWP on which the random access problem occurs comprises:

receiving, by the RRC layer, the first indication information; and

storing, by the RRC layer, MCG radio link failure, RLF, related information according to the first indication information, wherein the MCG RLF related information comprises an indication to the BWP on which the random access problem occurs.

3. The method according to claim 2, wherein reporting, to the base station, the BWP on which the random access problem occurs further comprises:

upon a next connection operation being to be initiated, sending second indication information to the base station, wherein the second indication information indicates that the UE stores the MCG RLF related information, and the next connection operation comprises connection establishment, connection restoration or connection reestablishment;

receiving, from the base station, a request for acquiring the MCG RLF related information; and

reporting, in response to the request, the MCG RLF related information to the base station.

4. The method according to claim 1, wherein

determining that the random access problem occurs comprises:

5 in response to that random access is initiated on a primary secondary cell, PSCell, of a secondary cell group, SCG, and a number of random access preamble transmissions reaches a maximum number of transmissions, sending third indication information from an SCG MAC layer to an RRC layer, wherein the third indication information indicates that the random access problem occurs; and

10 reporting, to the base station, the BWP on which the random access problem occurs comprises:

receiving, by the RRC layer, the third indication information; and

reporting, by the RRC layer, SCG failure information according to the third indication information, wherein the SCG failure information comprises fourth indication information, and
15 the fourth indication information indicates the BWP on which the random access problem occurs.

5. The method according to claim 1, wherein reporting, to the base station, the BWP on which the random access problem occurs comprises:

20 in response to that there is a random access resource on a currently activated BWP and the BWP on which the random access problem occurs is not the currently activated BWP, reporting, to the base station, the BWP on which the random access problem occurs; or

in response to that there is no random access resource on the currently activated BWP and the BWP on which the random access problem occurs is not an initial BWP, reporting, to the
25 base station, the BWP on which the random access problem occurs.

6. The method according to any one of claims 2 to 5, wherein the BWP on which the random access problem occurs comprises at least one of:

an uplink BWP on which the random access problem occurs; or

a downlink BWP on which the random access problem occurs.

~~7. The method according to claim 6, wherein~~

~~in response to that the UE is in a time division duplex, TDD, mode, the BWP on which the random access problem occurs comprises the uplink or downlink BWP on which the random access problem occurs; and~~

~~in response to that the UE is in a frequency division duplex, FDD, mode, the BWP on which the random access problem occurs comprises the uplink or downlink BWP on which the random access problem occurs.~~

~~8. A bandwidth part, BWP, based operating method, being applicable to performed by a base station, and comprising:~~

~~receiving, from UE, an indication to a BWP on which a random access problem occurs; and~~

~~reconfiguring, for the UE, a random access parameter of the BWP on which the random access problem occurs, or reporting the random access problem to another data collection entity for determining a cause of the random access problem.~~

~~9. The method according to claim 8, wherein receiving, from the UE, the BWP on which the random access problem occurs comprises:~~

~~receiving, from the UE, second indication information which indicates that the UE stores MCG RLF related information, wherein the MCG RLF related information comprises the BWP on which the random access problem occurs;~~

~~sending a request for acquiring the MCG RLF related information to the UE; and~~

~~receiving the MCG RLF related information reported by the UE in response to the request.~~

~~10. The method according to claim 8, wherein receiving, from the UE, the BWP on which the random access problem occurs comprises:~~

receiving, from the UE, SCG failure information which comprises fourth indication information, wherein the fourth indication information indicates the BWP on which the random access problem occurs.

5 ~~11. The method according to any one of claims 8 to 10, further comprising:~~

in response to that no report concerning the BWP on which the random access problem occurs is received from the UE and there is a random access resource on a currently activated BWP, determining that the currently activated BWP is the BWP on which the random access problem occurs; or

10 ~~in response to that no report concerning the BWP on which the random access problem occurs is received from the UE and there is no random access resource on the currently activated BWP, determining that an initial BWP is the BWP on which the random access problem occurs.~~

15 128. An information reporting apparatus, related to a bandwidth part, BWP, with a random access problem, the apparatus being applicable to UE, and comprising:

a determining module configured to determine that a random access problem occurs; and

a reporting module configured to report, to a base station, a BWP on which the random access problem determined by the determining module occurs.

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~~139. The apparatus according to claim 128, wherein~~

the determining module comprises:

a first determining submodule configured to, in response to that random access is initiated on a PCell of an MCG and a number of random access preamble transmissions reaches a maximum number of transmissions, send first indication information to an RRC layer, wherein the first indication information indicates that the random access problem occurs; and

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the reporting module comprises:

a receiving and storing submodule configured to receive the first indication information and store MCG RLF related information according to the first indication

information, wherein the MCG RLF related information comprises an indication to the BWP on which the random access problem occurs.

~~1410~~. The apparatus according to claim ~~139~~, wherein the reporting module further comprises:

a first sending submodule configured to, upon a next connection operation being to be initiated, send second indication information to the base station, wherein the second indication information indicates that the UE stores the MCG RLF related information, and the next connection operation comprises connection establishment, connection restoration or connection reestablishment;

a first receiving submodule configured to receive, from the base station, a request for acquiring the MCG RLF related information; and

a first reporting submodule configured to report, in response to the request received by the first receiving submodule, the MCG RLF related information to the base station.

~~1511~~. The apparatus according to claim ~~128~~, wherein

the determining module comprises:

a second determining submodule configured to, in response to that random access is initiated on a PSCell of an SCG and a number of random access preamble transmissions reaches a maximum number of transmissions, send third indication information to an RRC layer, wherein the third indication information indicates that the random access problem occurs; and

the reporting module comprises:

a second reporting submodule configured to receive the third indication information and report SCG failure information according to the third indication information, wherein the SCG failure information comprises fourth indication information, and the fourth indication information indicates the BWP on which the random access problem occurs.

~~1612~~. The apparatus according to claim ~~128~~, wherein the reporting module comprises:

a third reporting submodule configured to, in response to that there is a random access

resource on a currently activated BWP and the BWP on which the random access problem occurs is not the currently activated BWP, report, to the base station, the BWP on which the random access problem occurs; or

a fourth reporting submodule configured to, in response to that there is no random access resource on the currently activated BWP and the BWP on which the random access problem occurs is not an initial BWP, report, to the base station, the BWP on which the random access problem occurs.

~~1713. The apparatus according to any of claims 13-9 to 1612, wherein the BWP on which the random access problem occurs comprises at least one of:~~

~~an uplink BWP on which the random access problem occurs; or~~

~~a downlink BWP on which the random access problem occurs.~~

~~18. The apparatus according to claim 17, wherein~~
~~in response to that the UE is in a TDD mode, the BWP on which the random access problem occurs comprises the uplink or downlink BWP on which the random access problem occurs;~~
~~and~~

~~in response to that the UE is in an FDD mode, the BWP on which the random access problem occurs comprises the uplink or downlink BWP on which the random access problem occurs.~~

~~1914. A bandwidth part, BWP, based operating apparatus, being applicable to a base station, and comprising:~~

a receiving module configured to receive, from UE, an indication to a BWP on which a random access problem occurs; and

an operating module configured to reconfigure, for the UE, a random access parameter of the BWP on which the random access problem occurs received by the receiving module, or report, to another data collection entity, the random access problem corresponding to the BWP received by the receiving module for determining a cause of the random access problem.

20. The apparatus according to claim 19, wherein the receiving module comprises:

a first receiving submodule configured to receive, from the UE, second indication information which indicates that the UE stores MCG RLF related information, wherein the MCG RLF related information comprises the BWP on which the random access problem occurs;

a first sending submodule configured to send a request for acquiring the MCG RLF related information to the UE; and

a second receiving submodule configured to receive the MCG RLF related information which is reported by the UE in response to the request sent by the first sending submodule.

21. The apparatus according to claim 19, wherein the receiving module comprises:

a third receiving submodule configured to receive, from the UE, SCG failure information which comprises fourth indication information, wherein the fourth indication information indicates the BWP on which the random access problem occurs.

22. The apparatus according to any of claims 19 to 21,

further comprising:

a first determining module configured to, in response to that no report concerning the BWP on which the random access problem occurs is received from the UE and there is a random access resource on a currently activated BWP, determine that the currently activated BWP is the BWP on which the random access problem occurs;

wherein the operation module is further configured to reconfigure, for the UE, the random access parameter of the BWP on which the random access problem occurs determined by the first determining module, or report, to the another data collection entity, the random access problem corresponding to the BWP determined by the first determining module for determining the cause of the random access problem; or

further comprising:

a second determining module configured to, in response to that no report concerning

~~the BWP on which the random access problem occurs is received from the UE and there is no random access resource on the currently activated BWP, determine that an initial BWP is the BWP on which the random access problem occurs,~~

~~wherein the operation module is further configured to reconfigure, for the UE, the random access parameter of the BWP on which the random access problem occurs determined by the second determining module, or report, to the another data collection entity, the random access problem corresponding to the BWP determined by the second determining module for determining the cause of the random access problem.~~

~~23~~15. User equipment, comprising:

a processor; and

a memory for storing instructions executable by the processor,

wherein the processor is configured to:

determine that a random access problem occurs; and

report, to a base station, a BWP on which the random access problem occurs.

~~24~~16. A base station, comprising:

a processor; and

a memory for storing instructions executable by the processor,

wherein the processor is configured to:

receive, from UE, a BWP on which a random access problem occurs; and

reconfigure, for the UE, a random access parameter of the BWP on which the random access problem occurs, or report the random access problem to another data collection entity for determining a cause of the random access problem.

~~25~~17. A computer readable storage medium storing computer instructions, wherein the instructions are executed by a processor to perform the information reporting method according to any of claims 1 to ~~7~~6.

2618. A computer readable storage medium storing computer instructions, wherein the instructions are executed by a processor to perform the BWP based operating method according to ~~any one of claims 8 to 11~~ claim 8.