

WHAT IS CLAIMED IS:

1. A method for reporting a beam failure of a Secondary Cell (SCell), comprising:
 - determining, by User Equipment (UE), that a first SCell has a beam failure;
 - determining a target serving cell for transmitting a report message to a base station, the report message being configured to notify the base station of that the first SCell has the beam failure; and
 - transmitting the report message in the target serving cell.
2. The method of claim 1, wherein determining the target serving cell for transmitting the report message to notify the base station of that the first SCell has the beam failure comprises:
 - taking a Primary Cell (PCell) of the UE as the target serving cell, the first SCell belonging to a Master Cell Group (MCG) controlled by a PCell base station; or,
 - taking a Primary Secondary Cell (PScell) of the UE as the target serving cell, the first SCell belonging to a Secondary Cell Group (SCG) controlled by a SCell base station; or,
 - taking a serving cell of the UE other than the first SCell, the Pcell and the PScell, which is configured with a Physical UPLINK Control Channel (PUCCH)/Physical Uplink Shared Channel (PUSCH)/Physical Random Access Channel (PRACH), as the target serving cell.
3. The method of claim 1, wherein
 - determining the target serving cell for transmitting the report message to notify the base station of that the first SCell has the beam failure comprises: determining the first SCell as the target serving cell; and
 - transmitting the report message in the target serving cell comprises: transmitting the report message on a PUCCH/PUSCH/PRACH resource of the first SCell.
4. The method of claim 3, wherein determining the first SCell as the target serving cell comprises:
 - determining whether the PUCCH/PUSCH/PRACH of the first SCell is available; and
 - taking the first SCell as the target serving cell when the PUCCH/PUSCH/PRACH of the

first SCell is available.

5. The method of claim 4, wherein determining whether the PUCCH/PUSCH/PRACH of the first SCell is available comprises:

receiving an indication message from the base station, and determining whether the PUCCH/PUSCH/PRACH of the first SCell is available based on the indication message; or,

determining whether a receiver and transmitter of the UE have a reciprocity, and determining that the PUCCH/PUSCH/PRACH of the first SCell is available when the receiver and transmitter of the UE do not have the reciprocity.

6. The method of claim 2, wherein transmitting the report message in the target serving cell comprises:

carrying the report message by a sequential value for transmitting L1-Reference Signal Received Power (L1-RSRP) on a PUCCH/PUSCH of the target serving cell, the report message comprising a cell identifier of the first SCell and indication information for indicating that the beam failure occurs.

7. The method of claim 6, wherein the indication information comprises an identifier(s) of one or more Reference Signals (RSs) of the first SCell and L1-RSRP of the one or more RSs, and indicates that the beam failure occurs when a bit value(s) of the L1-RSRP of the one or more RSs is/are all preset bit values.

8. The method of claim 2, wherein transmitting the report message in the target serving cell comprises:

carrying the report message by a sequential value for feeding back a Channel Quality Indicator (CQI) on a PUCCH/PUSCH of the target serving cell, the report message comprising a cell identifier of the first SCell and channel quality information of the first SCell, and indicating that the beam failure occurs when the first SCell has channel quality less than a preset threshold.

9. The method of claim 2, wherein transmitting the report message in the target serving cell

comprises:

carrying the report message by a resource for a Scheduling Request (SR) on a PUCCH/PUSCH of the target serving cell, the report message comprising a cell identifier of the first SCell and indication information for indicating that the beam failure occurs.

10. The method of claim 2, wherein transmitting the report message in the target serving cell comprises:

transmitting a report message of a predefined format on a PUCCH/PUSCH of the target serving cell, the predefined format specifying a bit for carrying the report message on the PUCCH/PUSCH, a bit value representing a cell identifier of the first SCell, and a bit value representing indication information for indicating that the beam failure occurs.

11. The method of claim 2, wherein transmitting the report message in the target serving cell comprises:

receiving a preset PRACH time-frequency code resource from the base station, the preset PRACH time-frequency resource being configured to transmit report information that the first SCell has the beam failure; and

transmitting a preset random access preamble on the preset PRACH time-frequency resource, so as to notify the base station of that the first SCell of the UE has the beam failure.

12. The method of any one of claims 3 to 5, wherein transmitting the report message on the PUCCH/PUSCH of the first SCell comprises:

carrying the report message by a sequential value for transmitting L1-RSRP of the PUCCH/PUSCH of the first SCell, the PUCCH/PUSCH on the first SCell being available.

13. The method of claim 12, wherein the report message comprises an identifier(s) of one or more RSs of the first SCell and L1-RSRP of the one or more RSs, and indicates that the first SCell has the beam failure when a bit value(s) of the L1-RSRP of the one or more RSs is/are all preset bit values.

14. The method of any one of claims 3 to 5, wherein transmitting the report message on the PUCCH/PUSCH of the first SCell comprises:

carrying the report message by a sequential value for feeding back a CQI on the PUCCH/PUSCH of the first SCell, wherein the report message comprises channel quality information of the first SCell and indicates that the first SCell has the beam failure when the first SCell has channel quality less than a preset threshold, wherein the PUCCH/PUSCH on the first SCell is available.

15. The method of any one of claims 3 to 5, wherein transmitting the report message on the PRACH resource of the first SCell comprises:

detecting on the first SCell whether an RS corresponding to a new candidate beam exists;
and

transmitting, in response to the UE detecting the RS corresponding to the new candidate beam, a corresponding random access preamble on a PRACH time-frequency resource of the first SCell corresponding to the RS of the new candidate beam, so as to notify the base station of that the first SCell of the UE has the beam failure, the PRACH on the first SCell being available.

16. The method of claim 1, wherein transmitting the report message in the target serving cell comprises:

receiving configuration signaling from the base station; and

transmitting a time-frequency code resource of the report message through a PUCCH/PUSCH/PRACH configured by the target serving cell based on the configuration signaling.

17. The method of any one of claims 1 to 11, further comprising:

receiving configuration information for beam measurement and report of the first SCell from the base station; and

performing the beam measurement based on the configuration information and reporting a candidate beam obtained by the measurement, the candidate beam being used by the base station for updating a beam configuration of the first SCell.

18. A device for reporting a beam failure of a Secondary Cell (SCell), comprising:

- a first determination module, configured to determine that a first SCell has a beam failure;
- a second determination module, configured to determine a target serving cell for transmitting a report message to a base station, the report message being configured to notify the base station of that the first SCell has the beam failure; and
- a transmitting module, configured to transmit the report message in the target serving cell.

~~19. The device of claim 18, wherein the second determination module comprises:~~

- ~~a first determination submodule, configured to take a Primary Cell (PCell) of User Equipment (UE) as the target serving cell, the first SCell belonging to a Master Cell Group (MCG) controlled by a PCell base station; or,~~
- ~~a second determination submodule, configured to take a Primary Secondary Cell (PScell) of the UE as the target serving cell, the first SCell belonging to a Secondary Cell Group (SCG) controlled by an SCell base station; or,~~
- ~~a third determination submodule, configured to take a serving cell of the UE other than the first Scell, the Pcell and the PScell, which is configured with a Physical UPLINK Control Channel (PUCCH)/Physical Uplink Shared Channel (PUSCH)/Physical Random Access Channel (PRACH), as the target serving cell.~~

~~20. The device of claim 18, wherein the second determination module comprises a fourth determination submodule, configured to determine the first SCell as the target serving cell; and~~

- ~~the transmitting module is configured to transmit the report message on a PUCCH/PUSCH/PRACH resource of the first SCell.~~

~~21. The device of claim 20, further comprising:~~

- ~~a determination module, configured to determine whether the PUCCH/PUSCH/PRACH of the first SCell is available;—~~
- ~~the fourth determination submodule is configured to take the first SCell as the target serving cell when the PUCCH/PUSCH/PRACH of the first SCell is available.~~

22. The device of claim 21, wherein

~~the determination comprises: a receiving submodule configured to receive an indication message from the base station; and a first availability determination submodule configured to determine whether the PUCCH/PUSCH/PRACH of the first SCell is available based on the indication message; or,~~

~~the determination module comprises: a determination submodule configured to determine whether a receiver and transmitter of the UE have a reciprocity; and a second availability determination submodule configured to determine that the PUCCH/PUSCH/PRACH of the first SCell is available when the receiver and transmitter of the UE do not have the reciprocity.~~

23. The device of claim 19, wherein the transmitting module comprises a first transmitting submodule configured to:

~~carry the report message by a sequential value for transmitting an L1-Reference Signal Received Power (L1-RSRP) on a PUCCH/PUSCH of the target serving cell, the report message comprising a cell identifier of the first SCell and indication information for indicating that the beam failure occurs.~~

24. The device of claim 23, wherein the indication information comprises an identifier(s) of one or more Reference Signals (RSs) of the first SCell and L1-RSRP of the one or more RSs, and indicates that the beam failure occurs when a bit value(s) of the L1-RSRP of the one or more RSs is/are all preset bit values.

25. The device of claim 19, wherein the transmitting module comprises a second transmitting submodule, configured to:

~~carry the report message by a sequential value for feeding back a Channel Quality Indicator (CQI) on a PUCCH/PUSCH of the target serving cell, the report message comprising a cell identifier of the first SCell and channel quality information of the first SCell, and indicating that the beam failure occurs when the first SCell has channel quality less than a preset threshold.~~

26. The device of claim 19, wherein the transmitting module comprises a third transmitting submodule, configured to:

carry the report message by a resource for a Scheduling Request (SR) on a PUCCH/PUSCH of the target serving cell, the report message comprising a cell identifier of the first SCell and indication information for indicating that the beam failure occurs.

27. The device of claim 19, wherein the transmitting module comprises a fourth transmitting submodule, configured to:

transmit a report message of a predefined format on a PUCCH/PUSCH of the target serving cell, the predefined format specifying a bit for carrying the report message on the PUCCH/PUSCH, a bit value representing a cell identifier of the first SCell, and a bit value representing indication information for indicating that the beam failure occurs.

28. The device of claim 19, wherein the transmitting module comprises:

a first receiving submodule, configured to receive a preset PRACH time-frequency code resource from the base station, the preset PRACH time-frequency resource being configured to transmit report information that the first SCell has the beam failure; and

a fifth transmitting submodule, configured to transmit a preset random access preamble on the preset PRACH time-frequency resource, so as to notify the base station of that the first SCell of the UE has the beam failure.

29. The device of any one of claims 20 to 22, wherein the transmitting module comprises a sixth transmitting submodule, configured to:

carry the report message by a sequential value for transmitting an L1-RSRP of the PUCCH/PUSCH of the first SCell, the PUCCH/PUSCH on the first SCell being available.

30. The device of claim 29, wherein the report message comprises an identifier(s) of one or more RSs of the first SCell and L1-RSRP of the one or more RSs, and indicates that the first SCell has the beam failure when a bit value(s) of the L1-RSRP of the one or more RSs is/are all preset bit values.

~~31. The device of any one of claims 20 to 22, wherein the transmitting module comprises a seventh transmitting submodule, configured to:~~

~~carry the report message by a sequential value for feeding back a CQI on the PUCCH/PUSCH of the first SCell, wherein the report message comprises channel quality information of the first SCell and indicates that the first SCell has the beam failure when the first SCell has channel quality less than a preset threshold, wherein the PUCCH/PUSCH on the first SCell is available.~~

~~32. The device of any one of claims 20 to 22, wherein the transmitting module comprises:~~

~~a detection submodule, configured to detect on the first SCell whether an RS corresponding to a new candidate beam exists; and~~

~~an eighth transmitting submodule, configured to transmit, in response to the detection submodule detects the RS corresponding to the new candidate beam, a corresponding random access preamble on a random access time-frequency resource corresponding to the RS of the new candidate beam in a PRACH resource of the first SCell, so as to notify the base station of that the first SCell of the UE has the beam failure, the PRACH of the first SCell being available.~~

~~33. The device of claim 18, wherein the transmitting module comprises:~~

~~a second receiving submodule, configured to receive configuration signaling from the base station; and~~

~~a ninth transmitting submodule, configured to transmit a time-frequency code resource of the report message through a PUCCH/PUSCH/PRACH configured by the target serving cell based on the configuration signaling.~~

~~34. The device of any one of claims 18 to 28, further comprising:~~

~~a receiving module, configured to receive configuration information for beam measurement and report of the first SCell from the base station; and~~

~~a beam measurement and report module, configured to perform the beam measurement based on the configuration information and report a candidate beam obtained by the~~

~~measurement, the candidate beam being used by the base station for updating a beam configuration of the first SCell.~~

3519. A computer-readable storage medium, storing a computer program that, when executed by a processor, implements operations of the method of any one of claims 1 to 17.

3620. User Equipment (UE), comprising:

a memory, configured to store a computer program; and

a processor, configured to execute the computer program in the memory to implement the operations of the method of any one of claims 1 to 17.