CLAIMS

What is claimed is:

1. A beam failure recovery method, performed by~~applied to~~ a terminal and comprising:

measuring a beam failure detection reference signal BFD RS, wherein the BFD RS corresponds to a plurality of pieces of first object information, and the first object information comprises at least one of the following: a transmission and reception point TRP identifier, CORESETPoolIndex information, a group identifier, a cell identity, and a physical cell identifier PCI;

determining a target event based on a measurement result of the BFD RS; and

sending beam failure recovery request BFRQ information.

2. The method according to claim 1, wherein the target event is that measurement results of all BFD RSs corresponding to a primary cell satisfy a first preset condition, and the sending BFRQ information comprises:

sending the BFRQ information by using a contention-free random access RACH resource~~;~~, or

sending the BFRQ information by using a contention-based RACH resource~~.~~;

wherein the target event is that measurement results of all BFD RSs corresponding to a secondary cell satisfy a second preset condition, and the sending BFRQ information comprises:

when there is an available uplink grant, sending the BFRQ information by using the uplink grant, or

when there is no available uplink grant, sending the BFRQ information by using an uplink grant requested from a network;

wherein the target event is that measurement results of part of BFD RSs satisfy a third preset condition, and the sending BFRQ information comprises any one of the following:

sending the BFRQ information based on preset object information;

sending the BFRQ information by using a preset resource; and

sending the BFRQ information by using a preset resource based on preset object information.

3. The method according to claim 2, wherein the sending the BFRQ information by using a contention-free RACH resource comprises:

determining a target RACH resource~~;~~ , and

determining, based on a correspondence between RACH resources and first object information, target object information corresponding to the target RACH resource, and sending the BFRQ information based on the target object information;or,

determining a target RACH resource, and

determining, based on a correspondence between RACH resources and first object information, target object information corresponding to the target RACH resource, and sending the BFRQ information based on the target object information.

~~4. The method according to claim 3, wherein the determining a target RACH resource comprises:~~

~~measuring candidate beam reference signals RSs, and determining a target RS based on measurement results of the candidate beam RSs; and~~

~~determining, based on a correspondence between candidate beam RSs and RACH resources, the target RACH resource corresponding to the target RS;~~

~~or,~~

~~selecting the target RACH resource based on the target RS, wherein the target RS and the target RACH resource correspond to same first object information.~~

~~5. The method according to claim 4, wherein configuration information of the candidate beam RSs comprises: a correspondence between candidate beam RSs and first object information; and/or~~

~~RACH resource configuration information of the terminal comprises: a correspondence between RACH resources and first object information.~~

~~6. The method according to claim 4, wherein after the sending the BFRQ information by using a contention-free RACH resource, the method further comprises:~~

~~if one control resource set CORESET for beam failure recovery BFR is configured,~~

~~monitoring beam failure recovery response BFRR information on the CORESET;~~

~~or,~~

~~if a plurality of CORESETs for BFR are configured, monitoring BFRR information on a CORESET that corresponds to same target object information as the target RACH resource, or monitoring BFRR information on a CORESET that corresponds to same target object information as the target RS.~~

~~7. The method according to claim 4, further comprising:~~

~~determining, based on beam information of the target RACH resource, beam information of a physical uplink control channel PUCCH corresponding to the target object information or second object information;~~

~~or,~~

~~based on the target RS, determining beam information of a physical downlink control channel PDCCH corresponding to the target object information or second object information, and/or determining beam information of a physical downlink shared channel PDSCH corresponding to the target object information or second object information; wherein~~

~~the second object information comprises at least one of the following: all cell identities, all PCIs, all TRP identifiers, all CORESETPoolIndex information, and all group identifiers.~~

~~8. The method according to claim 7, wherein the determined beam information starts at a time after an offset with a preset quantity of symbols from the BFRR information reception; and~~

~~the determined beam information ends at a time of reception of reconfiguration information, activation information, or indication information of the determined beam information.~~

~~9. The method according to claim 2, wherein the sending the BFRQ information by using a contention-based RACH resource comprises:~~

~~determining a target RACH resource; and~~

~~determining, based on a correspondence between RACH resources and first object information, target object information corresponding to the target RACH resource, and sending the BFRQ information based on the target object information.~~

~~10. The method according to claim 9, wherein the determining a target RACH resource comprises:~~

~~determining a target synchronization signal block SSB based on terminal measurement; and~~

~~determining, based on a correspondence between SSBs and RACH resources, the target RACH resource corresponding to the target SSB;~~

~~or,~~

~~selecting the target RACH resource based on the target SSB, wherein the target SSB and the target RACH resource correspond to same first object information.~~

~~11. The method according to claim 10, wherein resource configuration information of the terminal comprises at least one of the following:~~

~~a correspondence between SSBs and first object information; and~~

~~a correspondence between RACH resources and first object information.~~

~~12. The method according to claim 9, wherein after the sending the BFRQ information by using a contention-based RACH resource, the method further comprises:~~

~~monitoring BFRR information on CORESET#0.~~

~~13. The method according to claim 10, wherein after the determining a target SSB, the method further comprises:~~

~~based on the target SSB, determining beam information of a channel corresponding to the target object information or second object information, and/or determining beam information of an RS corresponding to the target object information or second object information.~~

~~14. The method according to claim 5 or 11, wherein, when the first object information is one of a TRP identifier, CORESETPoolIndex information, and a group identifier, the plurality of pieces of first object information is any one of the following cases:~~

~~belonging to a plurality of cells or a same cell; and~~

~~belonging to a plurality of physical cells or a same physical cell.~~

~~15. The method according to claim 1, wherein the target event is that measurement results of all BFD RSs corresponding to a secondary cell satisfy a second preset~~

~~condition, and the sending BFRQ information comprises:~~

~~when there is an available uplink grant, sending the BFRQ information by using the uplink grant; or~~

~~when there is no available uplink grant, sending the BFRQ information by using an uplink grant requested from a network.~~

~~16~~4. The method according to claim ~~15~~2, wherein when there is an available uplink grant, the uplink grant corresponds to any one of the first object information.

~~17~~5. The method according to claim ~~15~~2, wherein the sending the BFRQ information by using an uplink grant requested from a network comprises:

sending a scheduling request SR; and

receiving a response sent by the network, and sending the BFRQ information by using an uplink grant indicated by the response, wherein the SR and the response correspond to same or different first object information.

~~18~~6. The method according to claim ~~17~~5, wherein the sending an SR comprises any one of the following:

determining third object information based on a first correspondence, and sending the SR based on the third object information;

sending the SR based on any one of the first object information; and

sending the SR simultaneously or in turn based on the plurality of pieces of first object information; wherein

the first correspondence comprises any one of the following:

a correspondence between first object information and SR configuration information;

a correspondence between first object information and PUCCH resources for BFR in SR configuration information; and

a correspondence between first object information and spatial relation information of PUCCH resources for BFR in SR configuration information.

~~19~~7. The method according to claim ~~15~~2, wherein if no SR is configured or the number of times of sending a configured SR reaches a preset threshold, the sending the BFRQ information by using an uplink grant requested from a network comprises:

requesting the uplink grant from the network by using a contention-based RACH resource on a primary cell, and sending the BFRQ information by using the uplink grant.

~~20. The method according to claim 19, wherein the contention-based RACH resource is determined based on a correspondence between SSBs and contention-based RACH resources after the terminal determines the target SSB through terminal measurement.~~

~~21. The method according to claim 20, wherein the contention-based RACH resource and the target SSB correspond to same first object information.~~

~~22. The method according to claim 15, wherein after the sending BFRQ information, the method further comprises:~~

~~based on new beam RS information reported in the BFRQ information, determining beam information of a channel corresponding to target object information or second object information.~~

~~23. The method according to claim 15, wherein after the sending BFRQ information, the method further comprises:~~

~~receiving BFRR information, wherein the BFRQ information and the BFRR information correspond to same or different first object information.~~

~~24. The method according to claim 1, wherein the target event is that measurement results of part of BFD RSs satisfy a third preset condition, and the sending BFRQ information comprises any one of the following:~~

~~sending the BFRQ information based on preset object information;~~

~~sending the BFRQ information by using a preset resource; and~~

~~sending the BFRQ information by using a preset resource based on preset object information.~~

~~25~~8. The method according to claim ~~24~~2, wherein the preset object information is any one of the following:

first object information corresponding to the part of BFD RSs;

first object information other than the first object information corresponding to the part of BFD RSs; and

any one of the first object information corresponding to the measured BFD RSs.

~~26~~9. The method according to claim ~~24~~2, wherein the preset resource is any one of the following:

a RACH resource; and

an uplink resource for transmitting a medium access control control element MAC CE.

~~27. The method according to claim 26, wherein when the preset resource is a RACH resource, the RACH resource is determined based on at least one of the following:~~

~~a correspondence between RACH resources and first object information;~~

~~new beam RS information; and~~

~~target SSB information.~~

~~28~~10. The method according to claim ~~26~~9, wherein when the preset resource is an uplink resource for transmitting the MAC CE, the sending the BFRQ information by using a preset resource comprises:

when there is an available uplink grant, sending the BFRQ information by using the uplink grant; or

when there is no available uplink grant, sending the BFRQ information by using an uplink grant requested from a network.

~~29~~11. The method according to claim ~~28~~10, wherein when there is an available uplink grant, a priority of a first uplink grant is higher than a priority of a second uplink grant, the first uplink grant corresponds to first object information corresponding to the part of BFD RSs, and the second uplink grant corresponds to first object information other than the first object information corresponding to the part of BFD RSs.

~~30~~12. The method according to claim ~~28~~10, wherein the sending the BFRQ information by using an uplink grant requested from a network comprises:

if a PUCCH resource for BFR is configured, sending the SR by using the PUCCH resource for BFR; and

receiving a response sent by the network, and sending the BFRQ information by using an uplink grant indicated by the response, wherein the PUCCH resource and the response correspond to same or different first object information.

~~31~~13. The method according to claim ~~30~~12, wherein the sending the BFRQ information by using an uplink grant requested from a network further comprises:

if no PUCCH resource for BFR is configured, requesting an uplink grant from the network by using a contention-based RACH resource, and sending the BFRQ information by using the requested uplink grant.

~~32~~14. The method according to claim ~~30~~12, wherein the sending the SR by using the PUCCH resource for BFR comprises:

determining fourth object information based on a second correspondence, and sending the SR by using the PUCCH resource based on the fourth object information;

the second correspondence comprises any one of the following:

a correspondence between first object information and SR configuration information;

a correspondence between first object information and PUCCH resources for BFR in SR configuration information; and

a correspondence between first object information and spatial relation information of PUCCH resources for BFR in SR configuration information.

~~33~~15. The method according to claim ~~24~~2, wherein after the sending BFRQ information, the method further comprises:

receiving BFRR information based on first object information corresponding to the part of BFD RSs; or

receiving BFRR information based on any one piece of first object information corresponding to the measured BFD RSs.

~~34~~16. The method according to claim ~~24~~2, wherein after the sending BFRQ information, the method further comprises:

based on new beam RS information reported in the BFRQ information, determining beam information of a channel corresponding to same first object information as the part of BFD RSs, and/or determining beam information of a channel corresponding to second object information.

~~35~~17. The method according to claim ~~24~~2, wherein the BFRQ information comprises at least one of the following:

first object information corresponding to the part of BFD RSs, and new beam RS information.

~~36~~18. The method according to claim 1, wherein after the determining a target event, the method further comprises at least one of the following:

monitoring CORESET#0 based on target object information;

changing an anchor (anchor) object based on the target object information; and

based on CORESETPoolIndex information corresponding to the target object information, updating CORESETPoolIndex information corresponding to a CORESET that has been configured.

~~37. A beam failure recovery method, applied to a network device and comprising:~~

~~receiving BFRQ information sent by a terminal; wherein~~

~~the BFRQ information is sent after the terminal determines a target event based on measurement results of BFD RSs, the BFD RS corresponds to a plurality of pieces of first object information, and the first object information comprises at least one of the following: a TRP identifier, CORESETPoolIndex information, a group identifier, a cell identity, and a PCI.~~

~~38. The method according to claim 37, wherein the target event is that measurement results of all BFD RSs corresponding to a primary cell satisfy a first preset condition, and the receiving BFRQ information sent by a terminal comprises:~~

~~receiving the BFRQ information that is sent by the terminal by using a contention-free RACH resource; or~~

~~receiving the BFRQ information that is sent by the terminal by using a contention-based RACH resource.~~

~~39. The method according to claim 38, wherein the receiving the BFRQ information that is sent by the terminal by using a contention-free RACH resource comprises:~~

~~receiving the BFRQ information that is sent by the terminal based on target object information; wherein~~

~~the target object information is determined by the terminal based on a target RACH resource and a correspondence between RACH resources and first object information.~~

~~40. The method according to claim 39, wherein the target RACH resource corresponds to a target RS, or the target RACH resource and the target RS correspond to same first object information; and the target RS is determined based on measurement results of candidate beam RSs.~~

~~41. The method according to claim 40, further comprising:~~

~~sending configuration information of the candidate beam RSs to the terminal, and/or sending RACH resource configuration information to the terminal; wherein~~

~~the configuration information of the candidate beam RSs comprises a correspondence between candidate beam RSs and first object information; and the RACH resource configuration information comprises a correspondence between RACH resources and first object information.~~

~~42. The method according to claim 40, wherein after the receiving the BFRQ information that is sent by the terminal by using a contention-free RACH resource, the method further comprises:~~

~~if one CORESET for BFR is configured for the terminal, sending BFRR information to the terminal on the CORESET;~~

~~or,~~

~~if a plurality of CORESETs for BFR are configured for the terminal, sending BFRR information on a CORESET that corresponds to same target object information as the target RACH resource, or sending BFRR information on a CORESET that corresponds to same target object information as the target RS.~~

~~43. The method according to claim 40, further comprising:~~

~~determining, based on beam information of the target RACH resource, beam information of a PUCCH corresponding to the target object information or second object information;~~

~~or,~~

~~based on the target RS, determining beam information of a PDCCH corresponding to the target object information or second object information, and/or determining beam information of a PDSCH corresponding to the target object information or second object information; wherein~~

~~the second object information comprises at least one of the following: all cell identities, all PCIs, all TRP identifiers, all CORESETPoolIndex information, and all group identifiers.~~

~~44. The method according to claim 38, wherein the receiving the BFRQ information that is sent by the terminal by using a contention-based RACH resource comprises:~~

~~receiving the BFRQ information that is sent by the terminal based on target object information; wherein~~

~~the target object information is determined by the terminal based on a target RACH resource and a correspondence between RACH resources and first object information; the target RACH resource corresponds to a target SSB, or the target RACH resource and the target SSB correspond to same first object information; and the target SSB is determined based on terminal measurement.~~

~~45. The method according to claim 44, further comprising:~~

~~sending resource configuration information to the terminal; wherein~~

~~the resource configuration information comprises at least one of the following:~~

~~a correspondence between SSBs and first object information; and~~

~~the correspondence between RACH resources and first object information.~~

~~46. The method according to claim 44, wherein after the receiving the BFRQ information that is sent by the terminal by using a contention-based RACH resource, the method further comprises:~~

~~sending BFRR information on CORESET#0.~~

~~47. The method according to claim 44, further comprising:~~

~~based on the target SSB, determining beam information of a channel corresponding to the target object information or second object information, and/or determining beam information of an RS corresponding to the target object information or second object information.~~

~~48. The method according to claim 41 or 45, wherein, when the first object information is one of a TRP identifier, CORESETPoolIndex information, and a group identifier, the plurality of pieces of first object information is any one of the following~~

~~cases:~~

~~belonging to a plurality of cells or a same cell; and~~

~~belonging to a plurality of physical cells or a same physical cell.~~

~~49. The method according to claim 37, wherein the target event is that measurement results of all BFD RSs corresponding to a secondary cell satisfy a second preset condition, and the receiving BFRQ information sent by a terminal comprises:~~

~~receiving the BFRQ information that is sent by the terminal by using an uplink grant.~~

~~50. The method according to claim 49, wherein when there is an available uplink grant, the uplink grant corresponds to any one of the first object information.~~

~~51. The method according to claim 49, wherein when the uplink grant is absent, the method further comprises:~~

~~receiving an SR; and~~

~~sending a response to the terminal, wherein the response indicates the uplink grant, and the SR and the response correspond to same or different first object information.~~

~~52. The method according to claim 51, wherein the receiving an SR comprises any one of the following:~~

~~receiving the SR that is sent by the terminal based on third object information, wherein the third object information is determined based on a first correspondence;~~

~~receiving the SR that is sent by the terminal based on any one of the first object information; and~~

~~receiving the SR that is sent by the terminal simultaneously or in turn based on the plurality of pieces of first object information; wherein~~

~~the first correspondence comprises any one of the following:~~

~~a correspondence between first object information and SR configuration information;~~

~~a correspondence between first object information and PUCCH resources for BFR in SR configuration information; and~~

~~a correspondence between first object information and spatial relation information of PUCCH resources for BFR in SR configuration information.~~

~~53. The method according to claim 49, wherein when no SR is configured for the terminal or the number of times of sending a configured SR reaches a preset threshold, the method further comprises:~~

~~receiving a request that is sent by the terminal on a contention-based RACH resource in a primary cell; and~~

~~sending a response to the terminal, wherein the response indicates the uplink grant.~~

~~54. The method according to claim 53, wherein the contention-based RACH resource is determined based on a correspondence between SSBs and contention-based RACH resources after the terminal determines the target SSB through terminal measurement.~~

~~55. The method according to claim 54, wherein the contention-based RACH resource and the target SSB correspond to same first object information.~~

~~56. The method according to claim 49, wherein after the receiving the BFRQ information that is sent by the terminal by using an uplink grant, the method further comprises:~~

~~based on new beam RS information reported in the BFRQ information, determining beam information of a channel corresponding to target object information or second object information.~~

~~57. The method according to claim 49, wherein after the receiving the BFRQ information that is sent by the terminal by using an uplink grant, the method further comprises:~~

~~sending BFRR information to the terminal, wherein the BFRQ information and the BFRR information correspond to same or different first object information.~~

~~58. The method according to claim 37, wherein the target event is that measurement results of part of BFD RSs satisfy a third preset condition, and the receiving BFRQ information sent by a terminal comprises any one of the following:~~

~~receiving the BFRQ information that is sent by the terminal based on preset object information;~~

~~receiving the BFRQ information that is sent by the terminal by using a preset resource; and~~

~~receiving the BFRQ information that is sent by the terminal by using a preset resource based on preset object information.~~

~~59. The method according to claim 58, wherein the preset object information is any one of the following:~~

~~first object information corresponding to the part of BFD RSs;~~

~~first object information other than the first object information corresponding to the part of BFD RSs; and~~

~~any one of the first object information corresponding to the measured BFD RSs.~~

~~60. The method according to claim 58, wherein the preset resource is any one of the following:~~

~~a RACH resource; and~~

~~an uplink resource for transmitting a MAC CE.~~

~~61. The method according to claim 60, wherein when the preset resource is a RACH resource, the RACH resource is determined based on at least one of the following:~~

~~a correspondence between RACH resources and first object information;~~

~~new beam RS information; and~~

~~target SSB information.~~

~~62. The method according to claim 60, wherein when the preset resource is an uplink resource for transmitting the MAC CE, the receiving the BFRQ information that is sent by the terminal by using a preset resource comprises:~~

~~receiving the BFRQ information that is sent by the terminal by using an uplink grant.~~

~~63. The method according to claim 62, wherein when there is an available uplink grant, a priority of a first uplink grant is higher than a priority of a second uplink grant, the first uplink grant corresponds to first object information corresponding to the part of BFD RSs, and the second uplink grant corresponds to first object information other than the first object information corresponding to the part of BFD RSs.~~

~~64. The method according to claim 62, wherein when the uplink grant is absent, the method further comprises:~~

~~receiving an SR that is sent by the terminal based on a configured PUCCH resource for BFR; and~~

~~sending a response to the terminal, wherein the response indicates the uplink grant, and the SR and the response correspond to same or different first object information.~~

~~65. The method according to claim 64, wherein when no PUCCH resource for BFR is configured for the terminal, the method further comprises:~~

~~receiving a request that is sent by the terminal using a contention-based RACH resource; and~~

~~sending a response to the terminal, wherein the response indicates the uplink grant.~~

~~66. The method according to claim 64, wherein the receiving an SR that is sent by the terminal based on a configured PUCCH resource for BFR comprises:~~

~~receiving the SR that is sent by the terminal based on fourth object information, wherein the fourth object information is determined based on a second correspondence;~~

~~the second correspondence comprises any one of the following:~~

~~a correspondence between first object information and SR configuration information;~~

~~a correspondence between first object information and PUCCH resources for BFR in SR configuration information; and~~

~~a correspondence between first object information and spatial relation information of PUCCH resources for BFR in SR configuration information.~~

~~67. The method according to claim 58, wherein after the receiving BFRQ information sent by a terminal, the method further comprises:~~

~~sending BFRR information based on first object information corresponding to the part of BFD RSs; or~~

~~sending BFRR information based on any one piece of first object information corresponding to the measured BFD RSs.~~

~~68. The method according to claim 58, wherein after the receiving BFRQ information sent by a terminal, the method further comprises:~~

~~based on new beam RS information reported in the BFRQ information, determining beam information of a channel corresponding to same first object~~

~~information as the part of BFD RSs, and/or determining beam information of a channel corresponding to second object information.~~

~~69~~19. A terminal, comprising:

a measurement module, configured to measure a BFD RS, wherein the BFD RS corresponds to a plurality of pieces of first object information, and the first object information comprises at least one of the following: a transmission and reception point TRP identifier, CORESETPoolIndex information, a group identifier, a cell identity, and a PCI;

a first determining module, configured to determine a target event based on a measurement result of the BFD RS; and

a first sending module, configured to send BFRQ information.

~~70~~20. A network device, comprising:

a third receiving module, configured to receive BFRQ information sent by a terminal; wherein

the BFRQ information is sent after the terminal determines a target event based on measurement results of BFD RSs, the BFD RS corresponds to a plurality of pieces of first object information, and the first object information comprises at least one of the following: a TRP identifier, CORESETPoolIndex information, a group identifier, a cell identity, and a PCI.

~~71. A communications device, comprising a memory, a processor, and a computer program stored in the memory and capable of running on the processor, wherein when the computer program is executed by the processor, the steps of the beam failure recovery method according to any one of claims 1 to 36 are implemented, or the steps of the beam failure recovery method according to any one of claims 37 to 68 are implemented.~~

~~72. A computer-readable storage medium, wherein a computer program is stored in the computer-readable storage medium, and when the computer program is executed by a processor, the steps of the beam failure recovery method according to any one of claims 1 to 36 are implemented, or the steps of the beam failure recovery method according to any one of claims 37 to 68 are implemented.~~

~~73. A computer software product, wherein the computer software product is stored in a non-volatile storage medium, and the software product is configured to implement the steps of the beam failure recovery method according to any one of claims 1 to 36, or implement the steps of the beam failure recovery method according to any one of claims 37 to 68.~~

~~74. A communications device, wherein the communications device is configured to perform the steps of the beam failure recovery method according to any one of claims 1 to 36, or perform the steps of the beam failure recovery method according to any one of claims 37 to 68.~~