[5] There is thus a need for communication apparatuses and methods that provide feasible technical solutions for RA-RNTI calculation for multi-PRACH transmissions in order to to decode the corresponding RAR of multi-PRACH transmissions successfully while providing an improvement of coverage performance of PRACH. Furthermore, other desirable features and characteristics will become apparent from the subsequent detailed description and the appended claims, taken in conjunction with the accompanying drawings and this background of the disclosure.

SUMMARY

[6] Non-limiting and exemplary embodiments facilitate providing communication apparatuses and methods for RA-RNTI calculation for multi-PRACH transmissions.

[7] According to a first example of the present disclosure, there is provided a communication apparatus comprising: a transmitter, which in operation, transmits a preamble in at least one of a plurality of Random Access Channel occasions (ROs) of a first RO group; and a receiver, which in operation, receives downlink control information (DCI) with cyclic redundancy check (CRC) scrambled by one or more random access radio network temporary identifier (RA-RNTI) candidates, the one or more RA-RNTI candidates being determined based on at least one of the plurality of ROs.

[8] According to a second example of the present disclosure, there is provided a base station comprising: a receiver, which in operation, receives a preamble in at least one of a plurality of ROs of a first RO group from a communication apparatus; circuitry, which in operation, determines one or more RA-RNTI candidates based on the at least one of a plurality of ROs of a first RO group, and generates a DCI with CRC scrambled by the one or more RA-RNTI candidates; and a transmitter, which in operation, transmits the DCI to the communication apparatus.

[8a] In an aspect, the present disclosure refers to a communication apparatus, comprising:

a transmitter, which in operation, performs a multiple physical random access channel (PRACH) transmission in a plurality of PRACH occasions (ROs); and

a receiver, which in operation, receives downlink control information (DCI) by using a random access radio network temporary identifier (RA-RNTI),

wherein the RA-RNTI is determined based on a last RO of the plurality of ROs.

[8b] In an aspect, the present disclosure refers to a communication method, comprising:

performing a multiple physical random access channel (PRACH) transmission in a plurality of PRACH occasions (ROs); and

receiving downlink control information (DCI) by using a random access radio network temporary identifier (RA-RNTI),

wherein the RA-RNTI is determined based on a last RO of the plurality of ROs.

[8c] In an aspect, the present disclosure refers to a base station, comprising:

a receiver, which in operation, performs a multiple physical random access channel (PRACH) reception in a plurality of PRACH occasions (ROs); and

a transmitter, which in operation, transmits downlink control information (DCI) by using a random access radio network temporary identifier (RA-RNTI),

wherein the RA-RNTI is determined based on a last RO of the plurality of ROs.

[8d] In an aspect, the present disclosure refers to a communication method, comprising:

performing a multiple physical random access channel (PRACH) reception in a plurality of PRACH occasions (ROs); and

transmitting downlink control information (DCI) by using a random access radio network temporary identifier (RA-RNTI),

wherein the RA-RNTI is determined based on a last RO of the plurality of ROs.

[8e] In an aspect, the present disclosure refers to an integrated circuit, comprising:

transmission circuitry, which in operation, controls performing a multiple physical random access channel (PRACH) transmission in a plurality of PRACH occasions (ROs); and

reception circuitry, which in operation, controls receiving downlink control information (DCI) by using a random access radio network temporary identifier (RA-RNTI),

wherein the RA-RNTI is determined based on a last RO of the plurality of ROs.

[8f] In an aspect, the present disclosure refers to an integrated circuit, comprising:

reception circuitry, which in operation, controls performing a multiple physical random access channel (PRACH) reception in a plurality of PRACH occasions (ROs); and

transmission circuitry, which in operation, controls transmitting downlink control information (DCI) by using a random access radio network temporary identifier (RA-RNTI),

wherein the RA-RNTI is determined based on a last RO of the plurality of ROs.

[9] 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.