Claims

1. A mobile terminal (110) for performing system information acquisition in a wireless communication system comprising at least one base station configured with a serving cell, the system information including minimum system information and other system information, wherein the mobile terminal comprises:

a processor (120) and a transceiver (130) which in operation

determines a condition for requesting on-demand a transmission of other system information;

performs a random access procedure including: transmitting a random access preamble signal (msg1), receiving a random access response message (msg2), transmitting a system information request message (msg3) for the other system information, and receiving a contention resolution message (msg4); and

receives via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message (msg3) includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message (msg4) includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

2. The mobile terminal according to claim 1,

wherein the information element is the first information element in the system information request message (msg3),

and/or

wherein the information element is the only information element in the system information request message (msg3),

and/or

wherein the information element is not mobile terminal identity information element and/or not a random value information element,

and/or

the information element with a bit-pattern conforming to the specific format comprises at least 8 bits.

3. The mobile terminal according to claims 1 or 2,

wherein the specific format defines, for the part of the bit-pattern of the information element, a correspondence with requests for different types of system information messages,

and

wherein the part of the bit-pattern of the information element is 8 bits, and each of the 8 bits corresponds to a request for a different type of a system information message,

and further

wherein the specific format prescribes that the part of the bit-pattern, the 8 bits, are located at the start or at the end in the bit pattern,

and even further,

wherein the specific format prescribes that all remaining bits in the bit pattern of the information element, except those of the part of the bit-pattern, have a zero value.

4. The mobile terminal according to claims 1 to 3,

wherein the mobile terminal begins receiving the system information message including the on-demand requested other system information depending on the bit-pattern in the contention resolution message (msg4).

5. A mobile terminal (110) for performing system information acquisition in a wireless communication system comprising at least one base station configured with a serving cell, the system information including minimum system information and other system information, wherein the mobile terminal comprises:

a processor (120) and a transceiver (130) which in operation

determines a condition for requesting on-demand a transmission of other system information;

performs a random access procedure including: transmitting a random access preamble signal (msg1), receiving a random access response message (msg2), transmitting a system information request message (msg3) for the other system information, and receiving a contention resolution message (msg4); and

receives via broadcast a system information message including the on-demand requested other system information;

wherein, in case of an unsuccessful reception of the contention resolution message (msg4), performing a random access procedure includes:

- suspending the re-transmission of the random access preamble signal (msg1) until the next time instance of the minimum system information,
- receiving, at the next time instance, the minimum system information, and
- determining, based on the received minimum system information, if the requested other system information is scheduled for transmission via broadcast independent of the re-transmission thereof.

6. The mobile terminal according to claims 1 to 5,

wherein the successful/unsuccessful reception of the contention resolution message (msg4) is determined by at least one of:

- checking whether the contention resolution message (msg4) includes only a same bit-pattern as transmitted with the information element included in the system information request message (msg3) conforming to the specific format for requesting the other system information,

and

- checking whether the contention resolution message (msg4) is a special version of the contention resolution message used to acknowledge the on-demand request for other system information, and whether the msg4 includes only the same part of the bit-pattern as transmitted with the information element included in the system information request message (msg3),

and

- checking whether part of the contention resolution message (msg4) includes a same bit-pattern as transmitted with the information element included in the system information request message (msg3) conforming to a specific format for requesting the other system information,

and

- checking whether the contention resolution message (msg4) is a special version of the contention resolution message used to acknowledge the on-demand request for other system information, and whether the msg4 includes a same bit-pattern as transmitted with an information element included in the system information request message (msg3) conforming to the specific format for requesting the other system information.

7. The mobile terminal according to claims 1 to 6,

wherein the system information request message (msg3) is a radio resource control, RRC, message with the information element having a total size of 40 bits,

and/or

wherein the contention resolution message (msg4) is a medium access control, MAC, control element, CE, having a total size of 48 bits,

and/or

wherein for performing the system information acquisition, the mobile terminal is in one of the RRC_CONNECTED, RRC_IDLE, and RRC_INACTIVE state.

8. The mobile terminal according to claims 1 to 7:

wherein the condition for requesting on-demand the transmission of the other system information includes at least one of:

- detecting a power-up event in or a cell selection/reselection event to the serving cell,
- recovering from a loss of coverage event for the serving cell,
- determining that a validity timer for the other system information has expired.

9. A base station (170) in a wireless communication system enabling a mobile terminal to perform system information acquisition with the base station configured with a serving cell, the system information including minimum system information and other system information, wherein the base station comprises:

a processor (170) and a transceiver (180) which in operation

performs a random access procedure including: receiving a random access preamble signal (msg1), transmitting a random access response message (msg2), receiving a system information request message (msg3) for other system information, and transmitting a contention resolution message (msg4); and

transmits via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message (msg3) includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message (msg4) includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

10. The base station according to claim 9,

wherein the information element is the first information element in the system information request message (msg3),

and/or

wherein the information element is the only information element in the system information request message (msg3),

and/or

wherein the information element is not mobile terminal identity information element and/or not a random value information element,

and/or

the information element with a bit-pattern confirming with the specific format comprises at least 8 bits.

11. The base station according to claims 9 or 10,

wherein the specific format defines, for a subset of bits in the bit-pattern of the information element, a correspondence with requests for different types of system information messages,

and

wherein the subset of bits in the bit-pattern of the information element is 8 bits, and each of the 8 bits corresponds to a request for a different type of a system information message,

and further

wherein the specific format prescribes that the subset of bits are located at the start or at the end in the bit pattern,

and even further,

wherein the specific format prescribes that all remaining bits in the bit pattern of the information element, except those of the subset of bits, have a zero value.

12. The base station according to claims 9 to 11,

wherein the base station begins transmitting the system information message including the on-demand requested other system information depending on the bit-pattern in the contention resolution message (msg4).

13. A method for performing system information acquisition by a mobile terminal in a wireless communication system comprising at least one base station configured with a serving cell, the system information including minimum system information and other system information, wherein the method comprises the steps of:

determining (S01) a condition for requesting on-demand a transmission of other system information;

performing (S02) a random access procedure including: transmitting a random access preamble signal (msg1), receiving a random access response message (msg2), transmitting a system information request message (msg3) for the other system information, and receiving a contention resolution message (msg4); and

receiving (S03) via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message (msg3) includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message (msg4) includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

14. A method for performing system information acquisition by a mobile terminal in a wireless communication system comprising at least one base station configured with a serving cell, the system information including minimum system information and other system information, wherein the method comprises the steps of:

determining (S01) a condition for requesting on-demand a transmission of other system information;

performing (S02) a random access procedure including: transmitting a random access preamble signal (msg1), receiving a random access response message (msg2), transmitting a system information request message (msg3) for the other system information, and receiving a contention resolution message (msg4); and

receiving (S03) via broadcast a system information message including the on-demand requested other system information;

wherein, in case of an unsuccessful reception of the contention resolution message (msg4), the step of performing a random access procedure further includes:

- suspending the re-transmission of the random access preamble signal (msg1) until the next time instance of the minimum system information,
- receiving, at the next time instance, the minimum system information, and
- determining (S02'), based on the received minimum system information, if the requested other system information is scheduled for transmission via broadcast independent of the re-transmission thereof.

15. A method for a base station to enable a mobile terminal to perform system information acquisition in a wireless communication system with the base station configured with a serving cell, the system information including minimum system information and other system information, wherein the method comprises the steps of:

performing a random access procedure including: receiving a random access preamble signal (msg1), transmitting a random access response message (msg2), receiving a system information request message (msg3) for other system information, and transmitting a contention resolution message (msg4); and

transmitting via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message (msg3) includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message (msg4) includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

16. An integrated circuit which, in operation, controls a process of a mobile terminal for performing system information acquisition by the mobile terminal in a wireless communication system comprising at least one base station configured with a serving cell, the system information including minimum system information and other system information, wherein the process comprises:

determining (S01) a condition for requesting on-demand a transmission of other system information;

performing (S02) a random access procedure including: transmitting a random access preamble signal (msg1), receiving a random access response message (msg2), transmitting

a system information request message (msg3) for the other system information, and receiving a contention resolution message (msg4); and

receiving (S03) via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message (msg3) includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message (msg4) includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

17. An integrated circuit which, in operation, controls a process of a base station to enable a mobile terminal to perform system information acquisition in a wireless communication system with the base station configured with a serving cell, the system information including minimum system information and other system information, wherein the process comprises:

performing a random access procedure including: receiving a random access preamble signal (msg1), transmitting a random access response message (msg2), receiving a system information request message (msg3) for other system information, and transmitting a contention resolution message (msg4); and

transmitting via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message (msg3) includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message (msg4) includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

1. A mobile terminal for performing system information acquisition in a wireless communication system comprising at least one base station configured with a serving cell, the system information including minimum system information and other system information, wherein the mobile terminal comprises:

a processor and a transceiver which in operation

determines a condition for requesting on-demand a transmission of other system information;

performs a random access procedure including: transmitting a random access preamble signal, receiving a random access response message, transmitting a system information request message for the other system information, and receiving a contention resolution message; and

receives via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

2. The mobile terminal according to claim 1,

wherein the information element is the first information element in the system information request message, and/or

wherein the information element is the only information element in the system information request message, and/or

wherein the information element is not mobile terminal identity information element and/or not a random value information element, and/or

the information element with a bit-pattern conforming to the specific format comprises at least 8 bits.

3 The mobile terminal according to claim 1,

wherein the specific format defines, for the part of the bit-pattern of the information element, a correspondence with requests for different types of system information messages, and

wherein the part of the bit-pattern of the information element is 8 bits, and each of the 8 bits corresponds to a request for a different type of a system information message,
and further

wherein the specific format prescribes that the part of the bit-pattern, the 8 bits, are

located at the start or at the end in the bit pattern,

and even further,

wherein the specific format prescribes that all remaining bits in the bit pattern of the information element, except those of the part of the bit-pattern, have a zero value.

4 The mobile terminal according to claim 1, wherein the mobile terminal begins receiving the system information message including the on-demand requested other system information depending on the bit-pattern in the contention resolution message.

5 The mobile terminal according to claim 1,

wherein the successful/unsuccessful reception of the contention resolution message is determined by at least one of:

checking whether the contention resolution message includes only a same bit-pattern as transmitted with the information element included in the system information request message conforming to the specific format for requesting the other system information, and

checking whether the contention resolution message is a special version of the contention resolution message used to acknowledge the on-demand request for other system information, and whether the contention resolution message includes only the same part of the bit-pattern as transmitted with the information element included in the system information request message, and

checking whether part of the contention resolution message includes a same bit-pattern as transmitted with the information element included in the system information request message conforming to a specific format for requesting the other system information, and

checking whether the contention resolution message is a special version of the contention resolution message used to acknowledge the on-demand request for other system information, and whether the contention resolution message includes a same bit-pattern as transmitted with an information element included in the system information request message conforming to the specific format for requesting the other system information.

6 The mobile terminal according to claim 1,

wherein the system information request message is a radio resource control, RRC, message with the information element having a total size of 40 bits, and/or

wherein the contention resolution message is a medium access control, MAC, control element, CE, having a total size of 48 bits, and/or

wherein for performing the system information acquisition, the mobile terminal is in one of the RRC_CONNECTED, RRC_IDLE, and RRC_INACTIVE state.

7 The mobile terminal according to claim 1:

wherein the condition for requesting on-demand the transmission of the other system information includes at least one of:

detecting a power-up event in or a cell selection/reselection event to the serving cell,

recovering from a loss of coverage event for the serving cell,

determining that a validity timer for the other system information has expired.

8 A mobile terminal for performing system information acquisition in a wireless communication system comprising at least one base station configured with a serving cell, the system information including minimum system information and other system information, wherein the mobile terminal comprises:

a processor and a transceiver which in operation

determines a condition for requesting on-demand a transmission of other system information;

performs a random access procedure including: transmitting a random access preamble signal, receiving a random access response message, transmitting a system information request message for the other system information, and receiving a contention resolution message; and

receives via broadcast a system information message including the on-demand requested other system information;

wherein, in case of an unsuccessful reception of the contention resolution message, performing a random access procedure includes:

suspending the re-transmission of the random access preamble signal until the next time instance of the minimum system information,

receiving, at the next time instance, the minimum system information, and

determining, based on the received minimum system information, if the requested other system information is scheduled for transmission via broadcast independent of the re-transmission thereof.

9 A base station in a wireless communication system enabling a mobile terminal to perform system information acquisition with the base station configured with a serving cell, the system information including minimum system information and other system information, wherein the base station comprises:

a processor and a transceiver which in operation

performs a random access procedure including: receiving a random access preamble signal, transmitting a random access response message, receiving a system information request message for other system information, and transmitting a contention resolution

message; and

transmits via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

10 The base station according to claim 9,

wherein the information element is the first information element in the system information request message, and/or

wherein the information element is the only information element in the system information request message, and/or

wherein the information element is not mobile terminal identity information element and/or not a random value information element, and/or

the information element with a bit-pattern confirming with the specific format comprises at least 8 bits.

11 The base station according to claim 9,

wherein the specific format defines, for a subset of bits in the bit-pattern of the information element, a correspondence with requests for different types of system information messages, and

wherein the subset of bits in the bit-pattern of the information element is 8 bits, and each of the 8 bits corresponds to a request for a different type of a system information message, and further

wherein the specific format prescribes that the subset of bits are located at the start or at the end in the bit pattern, and even further,

wherein the specific format prescribes that all remaining bits in the bit pattern of the information element, except those of the subset of bits, have a zero value.

12 The base station according to claim 9, wherein the base station begins transmitting the system information message including the on-demand requested other system information depending on the bit-pattern in the contention resolution message.

13 A method for performing system information acquisition by a mobile terminal in a wireless communication system comprising at least one base station configured with a serving

cell, the system information including minimum system information and other system information, wherein the method comprises the steps of:

determining a condition for requesting on-demand a transmission of other system information;

performing a random access procedure including: transmitting a random access preamble signal, receiving a random access response message, transmitting a system information request message for the other system information, and receiving a contention resolution message; and

receiving via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedure.

14 A method for performing system information acquisition by a mobile terminal in a wireless communication system comprising at least one base station configured with a serving cell, the system information including minimum system information and other system information, wherein the method comprises the steps of:

determining a condition for requesting on-demand a transmission of other system information;

performing a random access procedure including: transmitting a random access preamble signal, receiving a random access response message, transmitting a system information request message for the other system information, and receiving a contention resolution message; and

receiving via broadcast a system information message including the on-demand requested other system information;

wherein, in case of an unsuccessful reception of the contention resolution message, the step of performing a random access procedure further includes:

suspending the re-transmission of the random access preamble signal until the next time instance of the minimum system information,

receiving, at the next time instance, the minimum system information, and

determining, based on the received minimum system information, if the requested other system information is scheduled for transmission via broadcast independent of the re-transmission thereof.

15 A method for a base station to enable a mobile terminal to perform system information acquisition in a wireless communication system with the base station configured with a serving cell, the system information including minimum system information and other system information, wherein the method comprises the steps of:

performing a random access procedure including: receiving a random access preamble signal, transmitting a random access response message, receiving a system information request message for other system information, and transmitting a contention resolution message; and

transmitting via broadcast a system information message including the on-demand requested other system information;

wherein the system information request message includes an information element with a bit-pattern conforming to a specific format with at least a part of the bit-pattern for requesting the other system information, and wherein the contention resolution message includes the same, or the same part of the bit-pattern for detecting collisions during the random access procedures.