

Access (E-UTRA); Multiplexing and channel coding (Release 13)," September 2016.

NPL 3: 3GPP TS 36.213 V13.3.0, "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures (Release 13)," September 2016.

NPL 4: R1-165173, NTT DOCOMO, INC., "Comparison of candidate waveforms," May 2016

NPL 5: R1-164629, Ericsson, "On OFDM in NR," May 2016

NPL 6: R1-081791, Panasonic "Technical proposals and considerations for LTE advanced," May 2008

NPL 7: R1-164619, Orange, "Flexible configured OFDM (FC-OFDM) waveform," May 2016

NPL 8: R1-1609567, Nokia, Alcatel-Lucent Shanghai, "On UL Waveforms below 40 GHz," October 2016

Summary

[0011]

In NR, there is a possibility that a plurality of terminals different in maximum transmission power are defined depending on various use cases of 5G. However, in NR, sufficient study has not been made on a signal waveform generation method that allows it to efficiently switch, in uplink, between OFDM and DFT-s-OFDM for terminals with different maximum transmission power.

[0012]

In view of the above, in an embodiment, the present disclosure provides a terminal, a base station, and a communication method, capable of efficiently switching between OFDM and DFT-s-OFDM in generating a signal waveform.

[0013]

In a first aspect, the present disclosure provides a terminal comprising: a generator that generates a signal waveform for multicarrier transmission or single carrier transmission in uplink, wherein a restriction is imposed on the number of resource blocks for which the signal waveform for the single carrier transmission is allowed to be generated; and a transmitter that transmits a signal with the generated signal waveform using a resource block allocated to the terminal, wherein a maximum value of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated is set by a base station and notified to the terminal.

[0014]

In a second aspect, the present disclosure provides a base station comprising a controller that allocates an uplink resource block to a terminal; a receiver that

receives a signal with a signal waveform for multicarrier transmission or a single carrier transmission mapped in the resource block, wherein a restriction is imposed on the number of resource blocks for which the terminal is allowed to generate the signal waveform for the single carrier transmission; and a demodulator that demodulates the received signal, wherein a maximum value of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated is set by the base station and notified to the terminal.

[0014a]

In a third aspect, the present disclosure provides a communication method implemented by a terminal, the communication method comprising: generating a signal waveform for multicarrier transmission or single carrier transmission in uplink wherein a restriction is imposed on a number of resource blocks for which the signal waveform for the single carrier transmission is allowed to be generated; and transmitting a signal with the generated signal waveform using the resource block allocated to a terminal, wherein a maximum value of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated is set by a base station and notified to the terminal.

[0014b]

In a fourth aspect, the present disclosure provides a communication method implemented by a base station, the communication method comprising: allocating an uplink resource block to a terminal; receiving a signal with a signal waveform for multicarrier transmission or single carrier transmission mapped in the resource block, wherein a restriction is imposed on a number of resource blocks for which the terminal is allowed to generate the signal waveform for the single carrier transmission; and demodulating the received signal, wherein a maximum value of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated is set by the base station and notified to the terminal:

[0015]

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 of a system, an apparatus, a method, an integrated circuit, a computer program, and a storage medium.

[0016]

The terminal, the base station, and the communication method according to the present disclosure are capable of efficiently switching between OFDM and DFT-s-OFDM in the signal waveform generation.

[0017]

Additional benefits and advantages of the disclosed embodiments will become apparent from the specification and drawings. The benefits and/or effects may be individually obtained by the various embodiments and features of the specification and drawings, which need not all be provided in order to obtain one or more of such benefits and/or advantages.

Brief Description of Drawings

[0018]

[Fig. 1] Fig. 1 is a diagram illustrating an example of a configuration of FC-OFDM.

[Fig. 2] Fig. 2 is a block diagram illustrating a configuration of a main part of a base station according to a first embodiment.

[Fig. 3] Fig. 3 is a block diagram illustrating a configuration of a main part of a terminal according to the first embodiment.

[Fig. 4] Fig. 4 is a block diagram illustrating a configuration of a base station according to the first embodiment.

[Fig. 5] Fig. 5 is a block diagram illustrating a configuration of a terminal according to the first embodiment.

Description of Embodiments

[0019]

Claims

[Claim 1]

A terminal comprising:

a generator that generates a signal waveform for multicarrier transmission or single carrier transmission in uplink, wherein a restriction is imposed on a number of resource blocks for which the signal waveform for the single carrier transmission is allowed to be generated; and

a transmitter that transmits a signal with the generated signal waveform using a resource block allocated to the terminal,

wherein a maximum value of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated is set by a base station and notified to the terminal.

[Claim 2]

The terminal according to Claim 1, wherein

one value is defined as a maximum value of the number of resource blocks for which the signal waveform for the single carrier transmission is allowed to be generated.

[Claim 3]

The terminal according to Claim 1, wherein

a plurality of values are defined as maximum values of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated.

[Claim 4]

The terminal according to Claim 3, wherein

the plurality of maximum values are respectively defined in association with maximum transmission power of the terminal such that the greater the maximum transmission power, the greater the maximum value associated with the maximum transmission power.

[Claim 5]

A base station comprising:

a controller that allocates an uplink resource block to a terminal;

a receiver that receives a signal with a signal waveform for multicarrier

transmission or single carrier transmission mapped in the resource block, wherein a restriction is imposed on a number of resource blocks for which the terminal is allowed to generate the signal waveform for the single carrier transmission; and

a demodulator that demodulates the received signal,

wherein a maximum value of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated is set by the base station and notified to the terminal.

[Claim 6]

A communication method implemented by a terminal, the communication method comprising:

generating a signal waveform for multicarrier transmission or single carrier transmission in uplink wherein a restriction is imposed on a number of resource blocks for which the signal waveform for the single carrier transmission is allowed to be generated; and

transmitting a signal with the generated signal waveform using the resource block allocated to a terminal,

wherein a maximum value of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated is set by a base station and notified to the terminal.

[Claim 7]

A communication method implemented by a base station, the communication method comprising:

allocating an uplink resource block to a terminal;

receiving a signal with a signal waveform for multicarrier transmission or single carrier transmission mapped in the resource block, wherein a restriction is imposed on a number of resource blocks for which the terminal is allowed to generate the signal waveform for the single carrier transmission; and

demodulating the received signal,

wherein a maximum value of the number of resource blocks in which the signal waveform for the single carrier transmission is allowed to be generated is set by the base station and notified to the terminal.