

CLAIMS

1. A wireless communication method for use in a wireless terminal, the wireless communication method comprising:

transmitting, to a wireless network node, a random access preamble selected from a plurality of predetermined preambles for a random access; and

receiving, from the wireless network node, a configuration associated to the plurality of predetermined preambles,

wherein the configuration comprises at least one of disabling information for disabling at least one symbol group or at least one resource occasion of a plurality of reference preambles, a subcarrier spacing of the plurality of predetermined preambles, at least one scaling factor for adjusting the subcarrier spacing of the plurality of predetermined preambles, or a sequence of the at least one scaling factor.

2. The wireless communication method of claim 1, wherein the plurality of predetermined preambles is determined by disabling at least one symbol group of a plurality of reference preambles,

wherein the plurality of predetermined preambles has a hopping between symbol groups for each of the plurality of predetermined preambles and the hopping is greater than 1 subcarrier spacing,

wherein the hopping is 6 subcarrier spacings.

3. The wireless communication method of claim 1 or 2, wherein a length of a cyclic prefix in the plurality of predetermined preambles is adjusted based on a maximum time offset related to the wireless terminal,

wherein a subcarrier spacing of the plurality of predetermined preambles is greater than

twice the maximum frequency offset,

wherein a subcarrier spacing of the plurality of predetermined preambles is smaller than a reciprocal of the maximum time offset,

wherein a subcarrier spacing of the plurality of predetermined preambles is adjusted by at least one scaling factor,

wherein the subcarrier spacing of the plurality of predetermined preambles is adjusted by different scaling factors in different frames.

4. The wireless communication method of claim 1 or claim 3 insofar dependent on claim 1, wherein the plurality of predetermined preambles is determined by disabling at least one resource occasion in a plurality of reference preambles,

wherein the plurality of predetermined preambles has resource occasion gaps between every two symbol groups contiguous in frequency domain,

wherein the resource occasion gaps have different numbers of subcarrier spacings.

5. The wireless communication method of any of the preceding claims, wherein symbols in each symbol group for the plurality of predetermined preambles form one of a Zadoff–Chu sequence or a pseudo-noise sequence,

wherein a cyclic prefix in the plurality of predetermined preambles comprises at least one symbol in a tail of a symbol group of the cyclic prefix.

6. A wireless communication method for use in a wireless network node, the wireless communication method comprising:

receiving, from a wireless terminal, a random access preamble selected from a plurality of predetermined preambles for a random access; and

transmitting, to the wireless terminal, a configuration associated to the plurality of predetermined preambles,

wherein the configuration comprises at least one of disabling information for disabling at least one symbol group or at least one resource occasion of a plurality of reference preambles, a subcarrier spacing of the plurality of predetermined preambles, at least one scaling factor for adjusting the subcarrier spacing of the plurality of predetermined preambles, or a sequence of the at least one scaling factor.

7. The wireless communication method of claim 6, wherein the plurality of predetermined preambles is determined by disabling at least one symbol group of a plurality of reference preambles,

wherein the plurality of predetermined preambles has a hopping between symbol groups for each of the plurality of predetermined preambles and the hopping is greater than 1 subcarrier spacing,

wherein the hopping is 6 subcarrier spacings.

8. The wireless communication method of claim 6 or 7, wherein a length of a cyclic prefix in the plurality of predetermined preambles is adjusted based on the maximum time offset related to the wireless terminal,

wherein a subcarrier spacing of the plurality of predetermined preambles is greater than twice the maximum frequency offset,

wherein a subcarrier spacing of the plurality of predetermined preambles is smaller than a reciprocal of the maximum time offset,

wherein a subcarrier spacing of the plurality of predetermined preambles is adjusted by at least one scaling factor,

wherein the subcarrier spacing of the plurality of predetermined preambles is adjusted by

different scaling factors in different frames.

9. The wireless communication method of any one of claims 6 to 8, wherein the plurality of predetermined preambles is acquired by disabling at least one resource occasion in a plurality of reference preambles,

wherein the plurality of predetermined preambles has resource occasion gaps between every two symbol groups contiguous in frequency domain,

wherein the resource occasion gaps have different numbers of subcarrier spacings.

10. The wireless communication method of any one of claims 6 to 9, wherein symbols in each symbol group for the plurality of predetermined preambles form one of a Zadoff–Chu sequence or a pseudo-noise sequence,

wherein a cyclic prefix in the plurality of predetermined preambles comprises at least one symbol in a tail of a symbol group of the cyclic prefix.

11. A wireless terminal, comprising:

a communication unit, configured to:

transmit, to a wireless network node, a random access preamble selected from a plurality of predetermined preambles for a random access; and

receive, from the wireless network node, a configuration associated to the plurality of predetermined preambles,

wherein the configuration comprises at least one of disabling information for disabling at least one symbol group or at least one resource occasion of a plurality of reference preambles, a subcarrier spacing of the plurality of predetermined preambles, at least one scaling factor for adjusting the subcarrier spacing of the plurality of

predetermined preambles, or a sequence of the at least one scaling factor.

12. The wireless terminal of claim 11, further comprising a processor configured to perform a wireless communication method of any of claims 2 to 5.

13. A wireless network node, comprising:

a communication unit, configured to:

receive, from a wireless terminal, a random access preamble selected from a plurality of predetermined preambles for a random access; and

transmit, to the wireless terminal, a configuration associated to the plurality of predetermined preambles,

wherein the configuration comprises at least one of disabling information for disabling at least one symbol group or at least one resource occasion of a plurality of reference preambles, a subcarrier spacing of the plurality of predetermined preambles, at least one scaling factor for adjusting the subcarrier spacing of the plurality of predetermined preambles, or a sequence of the at least one scaling factor.

14. The wireless network node of claim 13, further comprising a processor configured to perform a wireless communication method of any of claims 7 to 10.1. ~~A wireless communication method for use in a wireless terminal, the wireless communication method comprising:~~

~~transmitting, to a wireless network node, a random access preamble selected from a plurality of predetermined preambles for a random access.~~

~~2. The wireless communication method of claim 1, wherein the plurality of predetermined~~

~~preambles is determined by disabling at least one symbol group of a plurality of reference preambles.~~

~~3. The wireless communication method of claim 1 or 2, wherein the plurality of predetermined preambles has a hopping between symbol groups for each of the plurality of predetermined preambles and the hopping is greater than 1 subcarrier spacing.~~

~~4. The wireless communication method of claim 3, wherein the hopping is 6 subcarrier spacings.~~

~~5. The wireless communication method of any of claims 1 to 4, wherein a length of a cyclic prefix in the plurality of predetermined preambles is adjusted based on the maximum time offset related to the wireless terminal.~~

~~6. The wireless communication method of any of claims 1 to 5, wherein a subcarrier spacing of the plurality of predetermined preambles is greater than twice the maximum frequency offset.~~

~~7. The wireless communication method of any of claims 1 to 6, wherein a subcarrier spacing of the plurality of predetermined preambles is smaller than a reciprocal of the maximum time offset.~~

~~8. The wireless communication method of any of claims 1 to 7, wherein a subcarrier spacing of the plurality of predetermined preambles is adjusted by at least one scaling factor.~~

- ~~9. The wireless communication method of claim 8, wherein the subcarrier spacing of the plurality of predetermined preambles is adjusted by different scaling factors in different frames.~~
- ~~10. The wireless communication method of any of claims 1 to 9, wherein the plurality of predetermined preambles is determined by disabling at least one resource occasion in a plurality of reference preambles.~~
- ~~11. The wireless communication method of claim 10, wherein the plurality of predetermined preambles has resource occasion gaps between every two symbol groups contiguous in frequency domain.~~
- ~~12. The wireless communication method of claim 11, wherein the resource occasion gaps have different numbers of subcarrier spacings.~~
- ~~13. The wireless communication method of any of claims 1 to 12, wherein symbols in each symbol group for the plurality of predetermined preambles form one of a Zadoff-Chu sequence or a pseudo-noise sequence.~~
- ~~14. The wireless communication method of any of claims 1 to 13, wherein a cyclic prefix in the plurality of predetermined preambles comprises at least one symbol in a tail of a symbol group of the cyclic prefix.~~
- ~~15. The wireless communication method of any of claims 1 to 14, further comprising:
receiving, from the wireless network node, a configuration associated to the plurality of~~

~~predetermined preambles.~~

~~16. The wireless communication method of claim 15, wherein the configuration comprises at least one of disabling information for disabling at least one symbol group or at least one resource occasion of a plurality of reference preambles, a subcarrier spacing of the plurality of predetermined preambles, at least one scaling factor for adjusting the subcarrier spacing of the plurality of predetermined preambles, or a sequence of the at least one scaling factor.~~

~~17. A wireless communication method for use in a wireless network node, the wireless communication method comprising:~~

~~receiving, from a wireless terminal, a random access preamble selected from a plurality of predetermined preambles for a random access.~~

~~18. The wireless communication method of claim 17, wherein the plurality of predetermined preambles is determined by disabling at least one symbol group of a plurality of reference preambles.~~

~~19. The wireless communication method of claim 17 or 18, wherein the plurality of predetermined preambles has a hopping between symbol groups for each of the plurality of predetermined preambles and the hopping is greater than 1 subcarrier spacing.~~

~~20. The wireless communication method of claim 19, wherein the hopping is 6 subcarrier spacings.~~

- ~~21. The wireless communication method of any of claims 17 to 20, wherein a length of a cyclic prefix in the plurality of predetermined preambles is adjusted based on the maximum time offset related to the wireless terminal.~~
- ~~22. The wireless communication method of any of claims 17 to 21, wherein a subcarrier spacing of the plurality of predetermined preambles is greater than twice the maximum frequency offset.~~
- ~~23. The wireless communication method of any of claims 17 to 22, wherein a subcarrier spacing of the plurality of predetermined preambles is smaller than a reciprocal of the maximum time offset.~~
- ~~24. The wireless communication method of any of claims 17 to 23, wherein a subcarrier spacing of the plurality of predetermined preambles is adjusted by at least one scaling factor.~~
- ~~25. The wireless communication method of claim 24, wherein the subcarrier spacing of the plurality of predetermined preambles is adjusted by different scaling factors in different frames.~~
- ~~26. The wireless communication method of any of claims 17 to 25, wherein the plurality of predetermined preambles is acquired by disabling at least one resource occasion in a plurality of reference preambles.~~
- ~~27. The wireless communication method of claim 26, wherein the plurality of predetermined~~

~~preambles has resource occasion gaps between every two symbol groups contiguous in frequency domain.~~

~~28. The wireless communication method of claim 27, wherein the resource occasion gaps have different numbers of subcarrier spacings.~~

~~29. The wireless communication method of any of claims 17 to 28, wherein symbols in each symbol group for the plurality of predetermined preambles form one of a Zadoff-Chu sequence or a pseudo-noise sequence.~~

~~30. The wireless communication method of any of claims 17 to 29, wherein a cyclic prefix in the plurality of predetermined preambles comprises at least one symbol in a tail of a symbol group of the cyclic prefix.~~

~~31. The wireless communication method of any of claims 17 to 30, further comprising:
transmitting, to the wireless terminal, a configuration associated to the plurality of predetermined preambles.~~

~~32. The wireless communication method of claim 31, wherein the configuration comprises at least one of disabling information for disabling at least one symbol group or at least one resource occasion of a plurality of reference preambles, a subcarrier spacing of the plurality of predetermined preambles, at least one scaling factor for adjusting the subcarrier spacing of the plurality of predetermined preambles, or a sequence of the at least one scaling factor.~~

~~33. A wireless terminal, comprising:~~

~~a communication unit, configured to transmit, to a wireless network node, a random access preamble selected from a plurality of predetermined preambles for a random access.~~

~~34. The wireless terminal of claim 33, further comprising a processor configured to perform a wireless communication method of any of claims 2 to 16.~~

~~35. A wireless network node, comprising:~~

~~a communication unit, configured to receive, from a wireless terminal, a random access preamble selected from a plurality of predetermined preambles for a random access.~~

~~36. The wireless network node of claim 35, further comprising a processor configured to perform a wireless communication method of any of claims 18 to 32.~~

~~37. A computer program product comprising a computer readable program medium code stored thereupon, the code, when executed by a processor, causing the processor to implement a wireless communication method recited in any of claims 1 to 32.~~