

CLAIMS

What is claimed is:

~~1. A data processing method, comprising:~~

~~allocating a coded bitstream of a first user to M resource units (resource unit, RU) or a first RU comprising M RUs, wherein the M RUs or the first RU is an RU allocated to the first user, and M is a positive integer greater than 1; and~~

~~reordering all bits in the coded bitstream by using a first interleaver or a first tone mapper.~~

~~21. A data processing method, comprising:~~

~~inputting all bits in a coded bitstream of a first user into a first interleaver or a first tone mapper, wherein M RUs or a first RU comprising M RUs is allocated to the first user, and M is a positive integer greater than 1; and~~

~~reordering all bits in the coded bitstream by using the first interleaver or the first tone mapper.~~

~~32. The method according to claim 1, wherein the allocating a coded bitstream of a first user to M RUs or a first RU comprising M RUs comprises:~~

~~sequentially and alternately allocating, in a bit sequence to the M RUs or the first RU comprising M RUs, the coded bitstream of the first user that is output by a stream parser.~~

~~4. A data processing method, comprising:~~

~~dividing a total bandwidth of a first user into N sub-bandwidths, wherein at least one of the N sub-bandwidths comprises a plurality of RUs;~~

~~allocating a coded bitstream of the first user to the N sub-bandwidths;~~

~~allocating a coded bitstream on a first sub-bandwidth to M RUs or a first RU comprising M RUs, wherein the first sub-bandwidth is any one of the at least one sub-bandwidth, and M is a positive integer greater than 1; and~~

~~reordering all bits in all coded bitstreams on the first sub-bandwidth by using a first tone mapper.~~

~~53. The method according to any one of claims 1 to 4 claim 1 or claim 2, wherein a value of a number of data subcarriers of the first interleaver or the first tone mapper is any positive integer in $[N_{SD_min}/Q, N_{SD_max}/Q]$, wherein~~

~~N_{SD_min} is a sum of data subcarriers comprised in all the RUs, N_{SD_max} is a sum of subcarriers comprised in all the RUs, and Q is a number of data subcarriers to which one data bit~~

is mapped.

64. The method according to claim 53, wherein a number N_{COL} of columns and a number N_{ROW} of rows of the first interleaver meet the following relationship:

$$(N_{COL} \times N_{ROW}) / N_{BPSCS} = N_{SD}, \text{ wherein}$$

N_{BPSCS} is a number of coded bits carried on each subcarrier of each spatial data stream.

75. The method according to claim 64, wherein if the coded bit stream comprises a plurality of spatial data streams, the method further comprises: determining a frequency rotation parameter N_{ROT} of the first interleaver in any one of the following manners:

manner 1: N_{ROT} is determined based on a formula $N_{ROT} = \text{floor}(\frac{N_{SD}}{4})$; and

manner 2: a positive integer that enables a packet error rate (packet error rate, PER) of a receive end to be minimum or a positive integer that enables a signal-to-noise ratio (signal-to-noise ratio, SNR) required when a PER of a receive end is a preset value to be minimum is selected from $[N_{ROT_min}, N_{ROT_max}]$ as N_{ROT} , wherein N_{ROT_min} is a frequency rotation parameter of a second interleaver corresponding to an RU in which a number of comprised data subcarriers is less than N_{SD} and is the closest to N_{SD} , and N_{ROT_max} is a frequency rotation parameter of a third interleaver corresponding to an RU in which a number of comprised data subcarriers is greater than N_{SD} and is the closest to N_{SD} .

86. The method according to claim 75, wherein the M RUs comprise one 26-tone resource unit (26-tone resource unit, 26-tone RU) and one 52-tone RU; and

when a dual-carrier modulation mode is not used, $N_{SD} = 72$, $N_{COL} = 18$, $N_{ROW} = 4 \times N_{BPSCS}$, and $N_{ROT} = 18$.

97. The method according to claim 75, wherein the M RUs comprise one 26-tone RU and one 106-tone RU; and

when a dual-carrier modulation mode is not used, N_{SD} is 126 or 128; or

when the dual-carrier modulation mode is used, N_{SD} is 63 or 64.

108. The method according to claim 97, wherein the M RUs comprise one 26-tone RU and one 106-tone RU; and

a value of N_{ROW} when the dual-carrier modulation mode is not used is twice a value of N_{ROW} when the dual-carrier modulation mode is used.

449. The method according to claim 97, wherein when the dual-carrier modulation mode is not used, $N_{ROT} = 31$.

5 4210. The method according to claim 53, wherein a tone mapping distance parameter D_{TM} of the first tone mapper is a common divisor of N_{SD} , and N_{SD} is a number of data subcarriers of the first tone mapper.

4311. The method according to claim 4210, wherein the method further comprises: determining D_{TM} in any one of the following manners:

10 manner 1: a positive integer is selected from $[D_{TM_min}, D_{TM_max}]$ as D_{TM} , wherein D_{TM_min} is a tone mapping distance parameter corresponding to a second tone mapper corresponding to an RU in which a number of comprised data subcarriers is less than N_{SD} and is the closest to N_{SD} , and D_{TM_max} is a tone mapping distance parameter corresponding to a third tone mapper corresponding to an RU in which a number of comprised data subcarriers is greater than N_{SD} and is the closest to N_{SD} ;

manner 2: a positive integer that enables a PER of the receive end to be minimum or a positive integer that enables an SNR required when a PER of the receive end is a preset value to be minimum is selected from $[D_{TM_min}, D_{TM_max}]$ as D_{TM} ; and

20 manner 3: a ratio N_{SD}/N_{COL} of N_{SD} to N_{COL} of a first interleaver with a same RU size as the first tone mapper is used as D_{TM} .

4412. The method according to claim 4210, wherein the M RUs comprise one 26-tone RU and one 52-tone RU; and

when a dual-carrier modulation mode is not used, $N_{SD} = 72$, and D_{TM} is 4 or 6; or

when the dual-carrier modulation mode is used, $N_{SD} = 36$, and D_{TM} is 2 or 3.

25 4513. The method according to claim 4210, wherein the M RUs comprise one 26-tone RU and one 106-tone RU; and

when a dual-carrier modulation mode is not used, N_{SD} is 126 or 128; or

when the dual-carrier modulation mode is used, N_{SD} is 63 or 64.

14. The method according to claim 10, wherein the M RUs are M 242-tone RUs; and

when M=2, N_{SD} is 468 and D_{TM} is 12 when a dual-carrier modulation mode is not used,

5 and N_{SD} is 234 and D_{TM} is 9 when the dual-carrier modulation mode is used;

when M=3, N_{SD} is 702 and D_{TM} is 13 or 18 when a dual-carrier modulation mode is not

used, and N_{SD} is 351 and D_{TM} is 9 or 13 when the dual-carrier modulation mode is used; or

when M=4, N_{SD} is 980 and D_{TM} is 20 when a dual-carrier modulation mode is not used,

and N_{SD} is 490 and D_{TM} is 14 when the dual-carrier modulation mode is used.

15 15. A data processing method, comprising:

obtaining a reordered bitstream of a first user from M RUs or a first RU comprising M RUs,
wherein the M RUs or the first RU is an RU allocated to the first user, and M is a positive integer
greater than 1; and

restoring a sequence of all bits in the reordered bitstream by using a first deinterleaver or a
15 first tone demapper.

16. The method according to claim 15, wherein a value of a number N_{SD} of data
subcarriers of the first deinterleaver or the first tone demapper is any positive integer in
[N_{SD_min} / Q , N_{SD_max} / Q], wherein

N_{SD_min} is a sum of data subcarriers comprised in all the RUs, N_{SD_max} is a sum of
20 subcarriers comprised in all the RUs, and Q is a number of data subcarriers to which one data bit
is mapped.

17. The method according to claim 16, wherein a number N_{COL} of columns and a
number N_{ROW} of rows of the first deinterleaver meet the following relationship:

$$(N_{COL} \times N_{ROW}) / N_{BPSCS} = N_{SD}, \text{ wherein}$$

25 N_{BPSCS} is a number of coded bits carried on each subcarrier of each spatial data stream.

18. The method according to claim 17, wherein if the coded bit stream comprises a

plurality of spatial data streams, the method further comprises: determining a frequency rotation parameter N_{ROT} of the first deinterleaver in any one of the following manners:

manner 1: N_{ROT} is determined based on a formula $N_{ROT} = \text{floor}(\frac{N_{SD}}{4})$; and

manner 2: a positive integer that enables a PER of a receive end to be minimum or a positive integer that enables an SNR required when a PER of a receive end is a preset value to be minimum is selected from $[N_{ROT_min}, N_{ROT_max}]$ as N_{ROT} , wherein N_{ROT_min} is a frequency rotation parameter of a second deinterleaver corresponding to an RU in which a number of comprised data subcarriers is less than N_{SD} and is the closest to N_{SD} , and N_{ROT_max} is a frequency rotation parameter of a third deinterleaver corresponding to an RU in which a number of comprised data subcarriers is greater than N_{SD} and is the closest to N_{SD} .

2419. The method according to claim 2018, wherein the M RUs comprise one 26-tone resource unit 26-tone RU and one 52-tone RU; and

when a dual-carrier modulation mode is not used, $N_{SD} = 72$, $N_{COL} = 18$, and $N_{ROW} = 4 \times N_{BPCS}$.

2220. The method according to claim 2019, wherein the M RUs comprise one 26-tone RU and one 106-tone RU; and

when a dual-carrier modulation mode is not used, N_{SD} is 126 or 128; or

when the dual-carrier modulation mode is used, N_{SD} is 63 or 64.

2321. The method according to claim 2220, wherein the M RUs comprise one 26-tone RU and one 106-tone RU; and

a value of N_{ROW} when the dual-carrier modulation mode is not used is twice a value of N_{ROW} when the dual-carrier modulation mode is used.

2422. The method according to claim 2220, wherein when the dual-carrier modulation mode is not used, $N_{ROT} = 31$.

2523. The method according to claim 1816, wherein a tone mapping distance parameter D_{TM} of the first tone demapper is a common divisor of N_{SD} , and N_{SD} is a number of data subcarriers

of the first tone demapper.

2624. The method according to claim 16, wherein the method further comprises:
determining D_{TM} in any one of the following manners:

manner 1: a positive integer is selected from $[D_{TM_min}, D_{TM_max}]$ as D_{TM} , wherein D_{TM_min}
5 is a tone mapping distance parameter corresponding to a second tone demapper corresponding to
an RU in which a number of comprised data subcarriers is less than N_{SD} and is the closest to
 N_{SD} , and D_{TM_max} is a tone mapping distance parameter corresponding to a third tone demapper
corresponding to an RU in which a number of comprised data subcarriers is greater than N_{SD} and
is the closest to N_{SD} ; and

10 manner 2: a positive integer that enables a PER of the receive end to be minimum or a positive
integer that enables an SNR required when a PER of the receive end is a preset value to be
minimum is selected from $[D_{TM_min}, D_{TM_max}]$ as D_{TM} ; and

manner 3: a ratio N_{SD}/N_{COL} of N_{SD} to N_{COL} of a first deinterleaver with a same RU size
as the first tone demapper is used as D_{TM} .

15 2725. The method according to claim 16, wherein the M RUs comprise one 26-tone RU
and one 52-tone RU; and

when a dual-carrier modulation mode is not used, $N_{SD} = 72$, and D_{TM} is 4 or 6.

when the dual-carrier modulation mode is used, $N_{SD} = 36$, and D_{TM} is 2 or 3.

20 2826. The method according to claim 16, wherein the M RUs comprise one 26-tone RU
and one 106-tone RU; and

when a dual-carrier modulation mode is not used, N_{SD} is 126 or 128; or

when the dual-carrier modulation mode is used, N_{SD} is 63 or 64.

2927. The method according to claim 16, wherein the M RUs are M 242-tone RUs; and

when M=2, N_{SD} is 468 and D_{TM} is 12 when a dual-carrier modulation mode is not used,
25 and N_{SD} is 234 and D_{TM} is 9 when the dual-carrier modulation mode is used;

when M=3, N_{SD} is 702 and D_{TM} is 13 or 18 when a dual-carrier modulation mode is not

used, and N_{SD} is 351 and D_{TM} is 9 or 13 when the dual-carrier modulation mode is used; or

when $M=4$, N_{SD} is 980 and D_{TM} is 20 when a dual-carrier modulation mode is not used,

and N_{SD} is 490 and D_{TM} is 14 when the dual-carrier modulation mode is used.;

28. A data processing apparatus, configured to perform a method as claimed in any one of claims 1 to 14.

29. A data processing apparatus, configured to perform a method as claimed in any one of claims 15 to 27.

30. A program which makes a computer to perform a method as claimed in any one of claims 1 to 14.

31. A program which makes a computer to perform a method as claimed in any one of claims 15 to 27.

32. A computer-readable recording medium on which a program is recorded, wherein the program, when executed, enables a computer to perform a method as claimed in any one of claims 1 to 14.

33. A computer-readable recording medium on which a program is recorded, wherein the program, when executed, enables a computer to perform a method as claimed in any one of claims 15 to 27.

30. ~~A data processing apparatus, comprising:~~

~~a sequential bit allocator, configured to allocate a coded bitstream of a first user to M RUs or a first RU comprising M RUs, wherein the M RUs or the first RU is an RU allocated to the first user, and M is a positive integer greater than 1; and~~

~~a first interleaver or a first tone mapper, configured to reorder all bits in the coded bitstream.~~

31. ~~A data processing apparatus, comprising:~~

~~a processor, configured to input all bits in a coded bitstream of a first user into a first interleaver or a first tone mapper, where M RUs or a first RU comprising M RUs is allocated to the first user, and M is a positive integer greater than 1; and~~

~~a first interleaver or a first tone mapper, configured to reorder all bits in the coded bitstream.~~

32. ~~A data processing apparatus, comprising:~~

a sequential bit allocator, configured to: divide a total bandwidth of a first user into N sub-bandwidths, wherein at least one of the N sub-bandwidths comprises a plurality of RUs; and allocate a coded bitstream of the first user to the N sub-bandwidths, and allocate a coded bitstream on a first sub-bandwidth to M RUs or a first RU comprising M RUs, wherein the first sub-bandwidth is any one of the at least one sub-bandwidth, and M is a positive integer greater than 1; and

a first tone mapper, configured to reorder all bits in all coded bitstreams on the first sub-bandwidth.

33. A data processing apparatus, comprising:

a processor, configured to obtain a reordered bitstream of a first user from M RUs or a first RU comprising M RUs, wherein the M RUs or the first RU is an RU allocated to the first user, and M is a positive integer greater than 1; and

a first deinterleaver or a first tone demapper, configured to restore a sequence of all bits in the reordered bitstream.

34. A data processing apparatus, comprising a processor and a memory, wherein the memory stores instructions that are executable by the processor, and the processor executes the instructions stored in the memory to perform the method according to any one of claims 1 to 16 or 17 to 29.

35. A computer readable storage medium, wherein the computer readable storage medium stores a computer program, and the computer program comprises program instructions; and when the program instructions are executed by a computer, the computer is enabled to perform the method according to any one of claims 1 to 16 or 17 to 29.

36. A computer program product, wherein the computer program product comprises instructions; and when the instructions are run on a computer, the computer is enabled to perform the method according to any one of claims 1 to 16 or 17 to 29.

37. A communication apparatus, comprising a processor and an interface circuit, wherein the interface circuit is configured to receive code instructions and transmit the code instructions to the processor, and the processor runs the code instructions to perform the method according to any one of claims 1 to 16 or 17 to 29.

38. A chip, wherein the chip is coupled to a memory, and is configured to read and execute program instructions stored in the memory, to implement the method according to any one of claims 1 to 16 or 17 to 29.

39. A communication system, comprising:

a transmit end, configured to perform the method according to any one of claims 1 to 16; and

a receive end, configured to perform the method according to any one of claims 17 to 29.