

CLAIMS

1. A method of receiving a physical downlink control channel ~~at~~(PDCCH) ~~by~~ a user equipment (UE) in a wireless communication system, the method comprising:

—receiving, from a base station, ~~(BS)~~, first information related to a resource element group (REG) bundle size, and second information related to an interleaver size for interleaving REG bundles; and

—receiving, ~~based on the first information and the second information, from the BS,~~ the ~~downlink control channel~~PDCCH over a control resource set (CORESET) that comprises a plurality of REGs that are bundled into a plurality of REG bundles based on the ~~REG bundle size, first information, based on the first information and the second information,~~

—wherein ~~the~~an interleaver is determined based on the second information and a number of the plurality of REG bundles included in the CORESET,

wherein the plurality of REG bundles are interleaved within the CORESET based on the interleaver size, ~~and~~

wherein, based on a value of the second information being equal to a number of REG bundles included in a control channel element (CCE) of the CORESET, the REG bundles of the CCE are mapped to physical resources at a regular interval.

2. The method of claim 1, wherein a duration of the CORESET is configured to be 1, 2, or 3 Orthogonal Frequency Division Multiplexed (OFDM) symbols, and

wherein the REG bundle size is related to the duration of the CORESET, ~~;~~

~~wherein an interleaving matrix is determined based on (i) the second information and (ii) a~~

3. The method of claim 1, wherein the number of the plurality of REG bundles included in the CORESET, ~~and~~

wherein is obtained by dividing a total number of the plurality of REGs ~~configure at least one control channel element (CCE), and~~included in the CORESET by the REG bundle size.

4. The method of claim 1, wherein, based on a ~~value of the second information being equal to a number of REG bundles included in each of the at least one CCE,~~ the REG bundles of each CCE are ~~mapped to physical resources at a regular interval.~~

~~2. The method of claim 1, wherein the second information relates to one of a number of rows or a number of columns of an interleaving matrix, and~~

~~wherein the other of the number of rows or the number of columns of the interleaving matrix is determined based on (i) the one of the number of rows or the number of columns of the interleaving matrix and (ii) the number of REG bundles included in the CORESET.~~

~~3. The method of claim 1,—~~

~~wherein, based on the number of REGs included in each of the at least one CCE corresponding to a product of at the value of the second information and a value of the first information, the REG bundles of the CCE are mapped to the physical resources at at the regular interval.~~

~~4. The method of claim 1, wherein the first information is related to a number of symbols of the CORESET.~~

~~5. The method of claim 1, wherein the number of REG bundles included in the CORESET is obtained by dividing a total number of REGs included in the CORESET by the REG bundle size.~~

~~6. A user equipment (UE) configured to receivefor receiving a physical downlink control channel (PDCCH) in a wireless communication system, the UE comprising:~~

~~at least one transceiver;~~

~~at least one processor; and~~

~~at least one computer memory operably connectable to the at least one processor and storing instructions that, when executed, cause the at least one processor to perform operations comprising:~~

~~receiving, via from a base station (BS) through the at least one transceiver ~~from a base station~~, first information related to a resource element group (REG) bundle size, and second information related to an interleaver size for interleaving REG bundles; and~~

~~—receiving, via from the BS through the at least one transceiver, based on the first information and the second information, the downlink control channelthe PDCCH over a control resource set (CORESET) that comprises a plurality of REGs that are bundled into a plurality of REG bundles based on the REG bundle size, first information, based on the first information and the second information,~~

~~—wherein the an interleaver is determined based on the second information and a number of the plurality of REG bundles included in the CORESET,~~

wherein the plurality of REG bundles are interleaved within the CORESET based on the interleaver size, and

wherein, based on a value of the second information being equal to a number of REG bundles included in a control channel element (CCE) of the CORESET, the REG bundles of the CCE are mapped to physical resources at a regular interval.

6. The UE of claim 5, wherein a duration of the CORESET is configured to be 1, 2, or 3 Orthogonal Frequency Division Multiplexed (OFDM) symbols, and
wherein the REG bundle size is related to the duration of the CORESET;

7. The UE of claim 5, wherein ~~an interleaving matrix is determined based on (i) the second information and (ii) a number of~~ the plurality of REG bundles included in the CORESET, ~~and~~

~~wherein is obtained by dividing a total number of~~ the plurality of REGs ~~configure at least one control channel element (CCE), and~~ included in the CORESET by the REG bundle size.

~~wherein, based on a value of the second information being equal to a number of REG bundles included in each of the at least one CCE, the REG bundles of each CCE are mapped to physical resources at a regular interval.~~

~~7. The UE of claim 6, wherein the second information relates to one of a number of rows or a number of columns of an interleaving matrix, and~~

~~wherein the other of the number of rows or the number of columns of the interleaving matrix is determined based on (i) the one of the number of rows or the number of columns of the interleaving matrix and (ii) the number of REG bundles included in the CORESET.~~

8. The UE of claim 6,

5, wherein, based on the number of REGs included in ~~each of the at least one~~ CCE corresponding to a product of athe value of the second information and a value of the first information, the REG bundles of the CCE are mapped to the physical resources at athe regular interval.

~~9. The UE of claim 6, wherein the first information is related to a number of symbols of the CORESET.~~

~~10. The UE of claim 6, wherein the number of REG bundles included in the CORESET is obtained by dividing a total number of REGs included in the CORESET by the REG bundle size.~~

~~11.9. A computer readable storage medium storing at least one computer program comprising instructions that, when executed by at least one processor, cause the at least one processor to perform operations, the operations comprising:~~

~~receiving, from a base station, (BS), first information related to a resource element group (REG) bundle size; and second information related to an interleaver size for interleaving REG bundles; and~~

~~—receiving, based on the first information and the second information, the from the BS, a physical downlink control channel (PDCCH) over a control resource set (CORESET) that comprises a plurality of REGs that are bundled into a plurality of REG bundles based on the REG bundle size, first information, based on the first information and the second information,~~

~~—wherein the REG bundles are interleaved within the CORESET based on the interleaver size, wherein a duration of the CORESET is configured to be 1, 2, or 3 Orthogonal Frequency Division Multiplexed (OFDM) symbols,~~

~~wherein the REG bundle size is related to the duration of the CORESET,~~

~~wherein an interleaving matrix interleaver is determined based on (i) the second information and (ii) a number of the plurality of REG bundles included in the CORESET, and~~

~~wherein the plurality of REGs configure at least one REG bundles are interleaved within the CORESET based on the interleaver, and~~

~~wherein, based on a value of the second information being equal to a number of REG bundles included in a control channel element (CCE), of the CORESET, the REG bundles of the CCE are mapped to physical resources at a regular interval.~~

10. A method of transmitting a physical downlink control channel (PDCCH) by a base station (BS) in a wireless communication system, the method comprising:

transmitting, to a user equipment, UE, first information related to a resource element group (REG) bundle size and second information related to an interleaver size for interleaving REG bundles; and

transmitting, based on the first information and the second information, the PDCCH over a control resource set (CORESET) that comprises a plurality of REGs that are bundled into a plurality of REG bundles based on the first information,

wherein an interleaver is determined based on the second information and a number of the plurality of REG bundles included in the CORESET,

wherein the plurality of REG bundles are interleaved within the CORESET based on the interleaver,
and

wherein, based on a value of the second information being equal to a number of REG bundles included in each a control channel element (CCE) of the at least one CCE CORESET, the REG bundles of each the CCE are mapped to physical resources at a regular interval.

12. A11. The method of transmitting a downlink control channel by a base station (BS) in a wireless communication system, the method comprising:

—transmitting, to a user equipment (UE), first information related to a resource element group (REG) bundle size, and second information related to an interleaver size for interleaving REG bundles;
and

—transmitting, based on the first information and the second information, the downlink control channel over a control resource set (CORESET) that comprises a plurality of REGs that are bundled into REG bundles based on the REG bundle size,

—wherein the REG bundles are interleaved within the CORESET based on the interleaver size,
claim 10, wherein a duration of the CORESET is configured to be 1, 2, or 3 Orthogonal Frequency Division Multiplexed (OFDM) symbols, and

wherein the REG bundle size is related to the duration of the CORESET;

wherein an interleaving matrix is determined based on (i) the second information and (ii) a

12. The method of claim 10, wherein the number of the plurality of REG bundles included in the CORESET, and

wherein is obtained by dividing a total number of the plurality of REGs configure at least one control channel element (CCE), and included in the CORESET by the REG bundle size.

13. The method of claim 10, wherein, based on a number of REGs included in the CCE corresponding to a product of the value of the second information being equal to and a number of REG bundles included in each value of the at least one CCE first information, the REG bundles of each the CCE are mapped to the physical resources at a the regular interval.

~~1314.~~ A base station (BS) ~~configured to transmit~~for transmitting a physical downlink control channel (PDCCH) in a wireless communication system, the BS comprising:

at least one transceiver;

at least one processor; and

at least one computer memory operably connectable to the at least one processor and storing instructions that, when executed, cause the at least one processor to perform operations comprising:

transmitting, ~~via~~to a user equipment, UE, through the at least one transceiver ~~to a user equipment (UE)~~, first information related to a resource element group (REG) bundle size; and second information related to an interleaver size for interleaving REG bundles; and

—transmitting, ~~via the at least one transceiver~~, based on the first information and the second information, the ~~downlink control channel~~PDCCH over a control resource set (CORESET) that comprises a plurality of REGs that are bundled into a plurality of REG bundles based on the ~~REG bundle size, first information, through the at least one transceiver,~~

~~—wherein the REG bundles are interleaved within the CORESET based on the interleaver size, wherein a duration of the CORESET is configured to be 1, 2, or 3 Orthogonal Frequency Division Multiplexed (OFDM) symbols,~~

~~wherein the REG bundle size is related to the duration of the CORESET,~~

wherein an interleaving matrix interleaver is determined based on (i) the second information and (ii) a number of the plurality of REG bundles included in the CORESET, ~~and~~

wherein the plurality of ~~REGs configure at least one control channel element (CCE),~~REG bundles are interleaved within the CORESET based on the interleaver, and

wherein, based on a value of the second information being equal to a number of REG bundles included in ~~each~~a control channel element (CCE) of the ~~at least one CCE~~CORESET, the REG bundles of ~~each~~the CCE are mapped to physical resources at a regular interval.

15. The BS of claim 14, wherein a duration of the CORESET is configured to be 1, 2, or 3 Orthogonal Frequency Division Multiplexed (OFDM) symbols, and

wherein the REG bundle size is related to the duration of the CORESET.

16. The BS of claim 14, wherein the number of the plurality of REG bundles included in the CORESET is obtained by dividing a total number of the plurality of REGs included in the CORESET by the REG bundle size.

17. The BS of claim 14, wherein, based on the number of REGs included in the CCE corresponding to a product of the value of the second information and a value of the first information, the REG bundles of the CCE are mapped to the physical resources at the regular interval.