

Claims

1.

A base station device configured to communicate with a terminal device, the base station device comprising:

radio resource control (RRC) processing circuitry configured to configure RRC information related to Multiuser Superposition Transmission (MUST), and

transmission circuitry configured to transmit, to the terminal device, downlink control information (DCI) through a physical downlink control channel (PDCCH) and transmit, to the terminal device, first downlink data through a first physical downlink shared channel (PDSCH), wherein

in a case that the transmission circuitry is configured to transmit the DCI in a first transmission mode, the DCI includes first information indicating a modulation scheme, and an index indicating one of a plurality of power ratios,

the plurality of power ratios being different according to the modulation scheme, and

the transmission circuitry is configured to transmit the first downlink data through the first PDSCH by using the one of the plurality of power ratios determined by the index and the modulation scheme, and

in a case that the transmission circuitry is configured to transmit the DCI in a second transmission mode, the DCI includes the first information and second information indicating antenna port, scrambling identity, and number of layers without including the index and the transmission circuitry is configured to transmit the first downlink data through the first PDSCH by using at least one antenna port out of antenna ports 7 and 8 based on the second information.

2.

The base station device according to claim 1, wherein

the transmission circuitry is configured to transmit the first downlink data through the first PDSCH by using the first information indicating the modulation scheme and a

modulation mapping in which a modulation of quadrature phase shift keying is superposed.

3.

The base station device according to claim 1, wherein
the RRC processing circuitry is configured to configure the MUST in a primary cell or a secondary cell, and
the primary cell and the secondary cell are used for carrier aggregation.

4.

The base station device according to claim 1, wherein
the transmission circuitry is configured to transmit, to a plurality of terminal devices, the first downlink data through the first PDSCH and second downlink data through one or more second PDSCHs other than the first PDSCH in a same resource in time, and in a same resource in frequency, with a same precoding.

5.

A terminal device configured to communicate with a base station device, the terminal device comprising:

radio resource control (RRC) processing circuitry configured with RRC information related to Multiuser Superposition Transmission (MUST), and

reception circuitry configured to receive, from the base station device, downlink control information (DCI) through a physical downlink control channel (PDCCH) and receive, from the base station device, first downlink data through a first physical downlink shared channel (PDSCH), wherein

in a case that the reception circuitry is configured to receive the DCI in a first transmission mode, the DCI includes first information indicating a modulation scheme, and an index indicating one of a plurality of power ratios,

the plurality of power ratios being different according to the modulation scheme,

the reception circuitry is configured to receive the first downlink data through the first PDSCH by using the one of the plurality of power ratios determined by the index and the modulation scheme, and

in a case that the reception circuitry is configured to receive the DCI in a second transmission mode, the DCI includes the first information and second information indicating antenna port, scrambling identity, and number of layers without including the index and the reception circuitry is configured to receive the first downlink data through the first PDSCH by using at least one antenna port out of antenna ports 7 and 8 based on the second information.

6.

The terminal device according to claim 5, wherein

the reception circuitry is configured to receive the first downlink data through the first PDSCH by using the first information indicating the modulation scheme and a modulation mapping in which a modulation of quadrature phase shift keying is superposed.

7.

The terminal device according to claim 5, wherein

the RRC processing circuitry is configured with the MUST in a primary cell or a secondary cell, and

the primary cell and the secondary cell are used for carrier aggregation.

8.

The terminal device according to claim 5, wherein

the reception circuitry is configured to receive, from the base station device, the first downlink data through the first PDSCH and second downlink data through one or more second PDSCHs other than the first PDSCH in a same resource in time, and in a same resource in frequency, with a same precoding.

9.

A communication method for a base station device, the communication method comprising steps of:

configuring radio resource control (RRC) information related to Multiuser Superposition Transmission (MUST), and

transmitting, to a terminal device, downlink control information (DCI) through a physical downlink control channel (PDCCH) and transmitting, to the terminal device, downlink data through a physical downlink shared channel (PDSCH), wherein

in a case that the DCI is transmitted in a first transmission mode, the DCI includes information indicating a modulation scheme, and an index indicating one of a plurality of power ratios,

the plurality of power ratios being different according to the modulation scheme, further comprising a step of

transmitting the downlink data through the PDSCH by using the one of the plurality of power ratios determined by the index and the modulation scheme, and

in a case that the DCI is transmitted in a second transmission mode, the DCI includes the first information and second information indicating antenna port, scrambling identity, and number of layers without including the index and the first downlink data is transmitted through the first PDSCH by using at least one antenna port out of antenna ports 7 and 8 based on the second information.

10.

A communication method for a terminal device, the communication method comprising steps of:

being configured with radio resource control (RRC) information related to Multiuser Superposition Transmission (MUST), and

receiving, from a base station device, downlink control information (DCI) through a physical downlink control channel (PDCCH) and receiving, from the base station device, downlink data through a physical downlink shared channel (PDSCH), wherein

in a case that the DCI is received in a first transmission mode, the DCI includes information indicating a modulation scheme, and an index indicating one of a plurality of

power ratios, the plurality of power ratios being different according to the modulation scheme, further comprising a step of

receiving the downlink data through the PDSCH by using the one of the plurality of power ratios determined by the index and the modulation scheme, and

in a case that the DCI is received in a second transmission mode, the DCI includes the first information and second information indicating antenna port, scrambling identity, and number of layers without including the index and the first downlink data is received through the first PDSCH by using at least one antenna port out of antenna ports 7 and 8 based on the second information.