Claims

1. An apparatus comprising at least one processor, and at least one memory including a computer program code, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the apparatus to:

receive a first information element indicating two transmission configuration indicator states;

receive a configuration; and

determine an association between the two indicated transmission configuration indicator states and at least one physical uplink control channel resource group according to the configuration,

wherein the configuration causes the apparatus to determine the association between the two indicated transmission configuration indicator states and the at least one physical uplink control channel resource group to be one of the following:

both of the two indicated transmission configuration indicator states are applicable to the at least one physical uplink control channel resource group;

a first indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group; or

a second indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group.

2. An apparatus according to claim 1, wherein the first information element is comprised in a downlink control information.

3. An apparatus according to claim 1 or 2, wherein the apparatus is further caused to:

receive a second information element; and

derive the at least one physical uplink control channel resource group based on the second information element.

4. An apparatus according to claim 3, wherein the second information element indicates at least one physical uplink control channel resource indicator.

5. An apparatus according to claim 3 or 4, wherein the second information element is comprised in a downlink control information.

6. An apparatus according to any previous claim, wherein the configuration is received prior to receiving the first information element.

7. An apparatus according to any previous claim, wherein the apparatus is further caused to:

perform a physical uplink control channel transmission according to the determined association between the two indicated transmission configuration indicator states and the at least one physical uplink control channel resource group.

8. An apparatus comprising at least one processor, and at least one memory including a computer program code, wherein the at least one memory and the computer program code are configured, with the at least one processor, to cause the apparatus to:

transmit, to a terminal device, a first information element indicating two transmission configuration indicator states; and

transmit, to the terminal device, a configuration for determining an association between the two indicated transmission configuration indicator states and at least one physical uplink control channel resource group,

wherein the configuration causes the terminal device to determine the association between the two indicated transmission configuration indicator states and the at least one physical uplink control channel resource group to be one of the following:

both of the two indicated transmission configuration indicator states are applicable to the at least one physical uplink control channel resource group;

a first indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group; or

a second indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group.

9. An apparatus according to claim 8, wherein the first information element is transmitted using downlink control information.

10. An apparatus according to claim 8 or 9, wherein the apparatus is further caused to:

transmit, to the terminal device, a second information element for deriving the at least one physical uplink control channel resource group.

11. An apparatus according to claim 10, wherein the second information element indicates a physical uplink control channel resource indicator.

12. An apparatus according to claim 10 or 11, wherein the second information element is transmitted using downlink control information.

13. An apparatus according to any of claims 8 to 12, wherein the apparatus is further caused to:

transmit, to the terminal device, the configuration prior to transmitting the first information element.

14. A method comprising, by a terminal device:

receiving a first information element indicating two transmission configuration indicator states;

receiving a configuration; and

determining an association between the two indicated transmission configuration indicator states and at least one physical uplink control channel resource group according to the configuration,

wherein the configuration causes the terminal device to determine the association between the two indicated transmission configuration indicator states and the at least one physical uplink control channel resource group to be one of the following:

both of the two indicated transmission configuration indicator states are applicable to the at least one physical uplink control channel resource group;

a first indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group; or

a second indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group.

15. A method comprising, by a network device:

transmitting, to a terminal device, a first information element indicating two transmission configuration indicator states; and

transmitting, to the terminal device, a configuration for determining an association between the two indicated transmission configuration indicator states and at least one physical uplink control channel resource group,

wherein the configuration causes the terminal device to determine the association between the two indicated transmission configuration indicator states and the at least one physical uplink control channel resource group to be one of the following:

both of the two indicated transmission configuration indicator states are applicable to the at least one physical uplink control channel resource group;

a first indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group; or

a second indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group.

16. A computer program comprising instructions for causing an apparatus to perform at least the following:

receive a first information element indicating two transmission configuration indicator states;

receive a configuration; and

determine an association between the two indicated transmission configuration indicator states and at least one physical uplink control channel resource group according to the configuration,

wherein the configuration causes the apparatus to determine the association between the two indicated transmission configuration indicator states and the at least one physical uplink control channel resource group to be one of the following:

both of the two indicated transmission configuration indicator states are applicable to the at least one physical uplink control channel resource group;

a first indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group; or

a second indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group.

17. A computer program comprising instructions for causing an apparatus to perform at least the following:

transmit, to a terminal device, a first information element indicating two transmission configuration indicator states; and

transmit, to the terminal device, a configuration for determining an association between the two indicated transmission configuration indicator states and at least one physical uplink control channel resource group.,

wherein the configuration causes the terminal device to determine the association between the two indicated transmission configuration indicator states and the at least one physical uplink control channel resource group to be one of the following:

both of the two indicated transmission configuration indicator states are applicable to the at least one physical uplink control channel resource group;

a first indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group; or

a second indicated transmission configuration indicator state of the two indicated transmission configuration indicator states is applicable to the at least one physical uplink control channel resource group.