CLAIMS

1. A wireless communication method, comprising:

determining, by a base station, a transmission setting for a group of data transmission configuration in M groups of data transmission configurations, M being a positive integer, wherein the transmission setting comprises a transmission scheme of a data channel corresponding to multiple control information sets on a control channel; and

transmitting, by the base station, the multiple control information sets to a mobile station on the control channel based on the transmission setting, wherein each of the multiple control information sets comprises a transmission unit field indicating a transmission unit associated with the corresponding control information set, and wherein a length of the transmission unit field is determined based on a number of the multiple control information sets.

2. The method of claim 1, wherein the number of the multiple control information sets is represented as N, and wherein the length of the transmission unit field is indicated in a number of bits, the number of bits being equal to ceiling[log2 (N)].

3. The method of claim 1, wherein time-frequency resources for the multiple control information sets are overlapping or non-overlapping in time and frequency domain.

4. The method of claim 1, further comprising:

dynamically signaling, by the base station in part based on the transmission unit field, resource allocation information to the mobile station for data scheduled by the transmission setting, wherein the signaling indicates one or more data sub-regions that are mapped to the transmission unit in both time and frequency domain.

5. The method of claim 4, wherein the signaling comprises a bitmap that indicates mapping of the data sub-regions to the transmission unit, wherein a length of the bitmap corresponds to a total number of the data sub-regions, and wherein each data sub-region has a corresponding bit location in the bitmap with a value indicating whether the data sub-region includes scheduled data.

6. A wireless communication method, comprising:

receiving, by a mobile station, multiple control information sets on a control channel from a base station based on a transmission setting for a group of data transmission configuration in M groups of data transmission configurations, M being a positive integer,

wherein the transmission setting comprises a transmission scheme of a data channel corresponding to the multiple control information sets on the control channel,

wherein each of the multiple control information sets comprises a transmission unit field indicating a transmission unit associated with the corresponding control information set, and

wherein a length of the transmission unit field is determined based on a number of the multiple control information sets.

7. The method of claim 6, wherein the number of the multiple control information sets is represented as N, and wherein the length of the transmission unit field is indicated in a number of bits, the number of bits being equal to ceiling[log2 (N)].

8. The method of claim 6, wherein time-frequency resources for the multiple control information sets are overlapping or non-overlapping in time and frequency domain.

9. The method of claim 6, further comprising:

receiving, by the mobile station, a dynamic signaling from the base station in part based on the transmission unit field, wherein the dynamic signaling comprises resource allocation information for data scheduled by the transmission setting, and wherein the dynamic signaling indicates one or more data sub-regions that are mapped to the transmission unit in both time and frequency domain.

10. The method of claim 9, wherein the dynamic signaling comprises a bitmap that indicates mapping of the data sub-regions to the transmission unit, wherein a length of the bitmap corresponds to a total number of the data sub-regions, and wherein each data sub-region has a corresponding bit location in the bitmap with a value indicating whether the data sub-region includes scheduled data.

11. An apparatus for wireless communication, comprising a processor that is configured to:

determine a transmission setting for a group of data transmission configuration in M groups of data transmission configurations, M being a positive integer, wherein the transmission setting comprises a transmission scheme of a data channel corresponding to multiple control information sets on a control channel; and

transmit the multiple control information sets to a mobile station on the control channel based on the transmission setting, wherein each of the multiple control information sets comprises a transmission unit field indicating a transmission unit associated with the corresponding control information set, and wherein a length of the transmission unit field is determined based on a number of the multiple control information sets.

12. The apparatus of claim 11, wherein the number of the multiple control information sets is represented as N, and wherein the length of the transmission unit field is indicated in a number of bits, the number of bits being equal to ceiling[log2 (N)].

13. The apparatus of claim 11, wherein time-frequency resources for the multiple control information sets are overlapping or non-overlapping in time and frequency domain.

14. The apparatus of claim 11, wherein the processor is configured to:

transmit, in part based on the transmission unit field, resource allocation information in a dynamic signaling to the mobile station for data scheduled by the transmission setting, wherein dynamic signaling indicates one or more data sub-regions that are mapped to the transmission unit in both time and frequency domain.

15. The apparatus of claim 14, wherein the dynamic signaling comprises a bitmap that indicates mapping of the data sub-regions to the transmission unit, wherein a length of the bitmap corresponds to a total number of the data sub-regions, and wherein each data sub-region has a corresponding bit location in the bitmap with a value indicating whether the data sub-region includes scheduled data.

16. An apparatus for wireless communication, comprising a processor that is configured to:

receive multiple control information sets on a control channel from a base station based on a transmission setting for a group of data transmission configuration in M groups of data transmission configurations, M being a positive integer,

wherein the transmission setting comprises a transmission scheme of a data channel corresponding to the multiple control information sets on the control channel,

wherein each of the multiple control information sets comprises a transmission unit field indicating a transmission unit associated with the corresponding control information set, and

wherein a length of the transmission unit field is determined based on a number of the multiple control information sets.

17. The apparatus of claim 16, wherein the number of the multiple control information sets is represented as N, and wherein the length of the transmission unit field is indicated in a number of bits, the number of bits being equal to ceiling[log2 (N)].

18. The apparatus of claim 16, wherein time-frequency resources for the multiple control information sets are overlapping or non-overlapping in time and frequency domain.

19. The apparatus of claim 16, wherein the processor is configured to:

receive a dynamic signaling from the base station in part based on the transmission unit field, wherein the dynamic signaling comprises resource allocation information for data scheduled by the transmission setting, and wherein the dynamic signaling indicates one or more data sub-regions that are mapped to the transmission unit in both time and frequency domain.

20. The apparatus of claim 19, wherein the dynamic signaling comprises a bitmap that indicates mapping of the data sub-regions to the transmission unit, wherein a length of the bitmap corresponds to a total number of the data sub-regions, and wherein each data sub-region has a corresponding bit location in the bitmap with a value indicating whether the data sub-region includes scheduled data.