

REFERENCE SIGNAL RESOURCE MANAGEMENT FOR FAST PANEL SWITCHING AND ANTENNA SWITCHING

TECHNICAL FIELD

This patent document is directed generally to wireless communications.

BACKGROUND

Mobile communication technologies are moving the world toward an increasingly connected and networked society. The rapid growth of mobile communications and advances in technology have led to greater demand for capacity and connectivity. Other aspects, such as energy consumption, device cost, spectral efficiency, and latency are also important to meeting the needs of various communication scenarios. Various techniques, including new ways to provide higher quality of service, longer battery life, and improved performance are being discussed.

SUMMARY

This patent document describes, among other things, techniques related to reference signal resource management to enable fast panel switching and antenna switching for wireless devices that have multiple panels (e.g., transmission/reception entities).

In a first aspect, a wireless communication method is disclosed. The method comprises receiving, by a mobile device, a configuration parameter from a base station. The method also comprises transmitting, by the mobile device, a sounding reference signal (SRS) to the base station according to an SRS procedure in which one or more resource sets are determined according to the configuration parameter, wherein at least one resource sets of the one or more resource sets are used for a first usage and a second usage, the first usage including an antenna switching usage or a beam management usage, and the second usage including a codebook transmission usage or a non-codebook transmission usage, and wherein a subset of the one or more resource sets (a) is positioned at a beginning or an end of the SRS transmission, or (b) has N lowest or highest indices, the subset being applicable to an uplink data transmission, used for the codebook transmission usage, or used for the non-codebook transmission usage.

In a second aspect, a wireless communication method is disclosed. The method comprises transmitting, by a base station, a configuration parameter to a mobile device. The method also comprises receiving, by the base station, a sounding reference signal (SRS) from the mobile device according to an SRS procedure in which one or more resource sets are determined according to the configuration parameter, wherein at least one resource sets of the one or more resource sets are used for a first usage and a second usage, the first usage including an antenna switching usage or a beam management usage, and the second usage including a codebook transmission usage or a non-codebook transmission usage, and wherein a subset of the one or more resource sets (a) is positioned at a beginning or an end of the SRS transmission, or (b) has N lowest or highest indices, the subset being applicable to an uplink data transmission, used for the codebook transmission usage, or used for the non-codebook transmission usage.

In another example, a wireless communication method is disclosed. The method includes transmitting, by a base station, a configuration parameter to a wireless device. The method also includes receiving, by the base station, a sounding reference signal (SRS) to the base station according to an SRS procedure in which one or more resource sets are determined according to the configuration parameter.

In another example, a communication device is disclosed. The apparatus comprises one or more transceivers and a processor in communication with the one or more transceivers configured to a method according to the first or second aspect.

CLAIMS

What is claimed is:

1. A method for wireless communication, comprising:
receiving, by a mobile device, a configuration parameter from a base station; and
transmitting, by the mobile device, a sounding reference signal (SRS) to the base station according to an SRS procedure in which one or more resource sets are determined according to the configuration parameter,
wherein at least one resource sets of the one or more resource sets are used for a first usage and a second usage, the first usage including an antenna switching usage or a beam management usage, and the second usage including a codebook transmission usage or a non-codebook transmission usage, and
wherein a subset of the one or more resource sets (a) is positioned at a beginning or an end of the SRS transmission, or (b) has N lowest or highest indices,
the subset being applicable to an uplink data transmission, used for the codebook transmission usage, or used for the non-codebook transmission usage.
2. The method of claim 1, further comprising:
(1) receiving, by the mobile device, a first message from the base station for triggering the SRS procedure, wherein a time-domain offset between receiving the first message and transmitting the sounding reference signal is less than or equal to a first threshold, wherein resources of at least one of the one or more resource sets correspond to a same panel or a same transmission state; or
(2) receiving, by the mobile device, a second message from the base station for triggering the SRS procedure, wherein a time-domain offset between receiving the second message and transmitting the sounding reference signal is greater than or equal to a second threshold, wherein the resources of the at least one resource set correspond to different panels or different transmission states.
3. A method for wireless communication, comprising:

transmitting, by a base station, a configuration parameter to a mobile device; and
receiving, by the base station, a sounding reference signal (SRS) from the mobile device according to an SRS procedure in which one or more resource sets are determined according to the configuration parameter,

wherein at least one resource sets of the one or more resource sets are used for a first usage and a second usage, the first usage including an antenna switching usage or a beam management usage, and the second usage including a codebook transmission usage or a non-codebook transmission usage, and

wherein a subset of the one or more resource sets (a) is positioned at a beginning or an end of the SRS transmission, or (b) has N lowest or highest indices,

the subset being applicable to an uplink data transmission, used for the codebook transmission usage, or used for the non-codebook transmission usage.

4. The method of claim 3, further comprising:

(1) transmitting, by the base station, a first message to the mobile device for triggering the SRS procedure, wherein a time-domain offset between a reception of the first message and a transmission of the sounding reference signal by the mobile device is less than or equal to a first threshold, wherein resources of at least one of the one or more resource sets correspond to a same panel or a same transmission state; or

(2) transmitting, by the base station, a second message to the mobile device for triggering the SRS procedure, wherein a time-domain offset between a reception of the second message and a transmission of the sounding reference signal by the mobile device is greater than or equal to a second threshold, wherein resources of at least one of the one or more resource sets correspond to different panels or different transmission states.

5. The method of any one of claims 1 to 4, wherein the configuration parameter comprises an indicator indicating an association of the one or more resource sets.

6. The method of any one of claims 1 to 4, wherein the configuration parameter comprises at least one of: a time-domain behavior, a number of antenna ports corresponding to resources in each of the one or more resource sets, a number of resources in each of the one or more resource

sets, a triggering state, a resource type, a bandwidth part, a component carrier, a transmission state, a spatial relation, a panel, a number of transmitting and receiving antennas, or a power control parameter.

7. The method of claim 2 or 4, wherein the first threshold or second threshold is configured by the base station or is determined according to a capability of the mobile device.

8. The method of any one of claims 1 to 7, wherein a guard period is applied between a first resource and a second resource, and wherein the first resource and the second resource correspond to different panels, same transmission states, or different resource sets, and wherein no signal is transmitted by the mobile device in the guard period.

9. The method of any one of claims 1 to 8, wherein resources in at least one of the one or more resource sets correspond to a same transmission state or a same panel, and wherein the resources correspond to different ports or port groups of the mobile device.

10. The method of any one of claims 1 to 9, wherein a capability of the mobile device indicates that resources in at least one of the one or more resource sets support different transmission states.

11. The method of any one of claims 1 to 10, wherein a number of different ports or port groups for the same transmission state, a number of resources that are associated with the same transmission state or the same panel, or a number of resources that are associated with different transmission states or different panels is a predefined value or is determined based on a capability of mobile device.

12. A wireless communication device, comprising:
one or more transceivers; and
a processor in communication with the one or more transceivers configured to perform the method of any one of claims 1 to 11.